

# **BRITAIN WITHOUT CAPITALISTS**

**A STUDY OF WHAT INDUSTRY IN A  
SOVIET BRITAIN COULD ACHIEVE**

*By*

**A GROUP OF ECONOMISTS,  
SCIENTISTS & TECHNICIANS**

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## PREFATORY NOTE

**T**HIS volume in no sense represents a programme. It is not a sketch of a party policy; and what is contained in it must not be taken as committing any person or body of persons to particular undertakings. It is an attempt by a group of about a dozen economists, scientists and technicians (who for a variety of reasons have decided to remain anonymous) to apply a certain body of principles to a critical analysis of the condition of British industries to-day and the possibilities of achievement open to the working people of this country once the capitalist class were removed. This fundamental principle they share in common: that a constructive future for the people of Britain depends on the working class and its allies taking power through organs of their own creating in a way similar to that by which the workers' Soviets in Russia have won through to the constructive achievements of socialism. It is this principle which distinguishes this work from most of the works which have appeared on "economic planning" in recent years. At the same time they realize to the full that each country has national peculiarities which require the most careful concrete study; and on many points concerning particularly the economics of a Worker's Britain they realize that there is room for further examination and discussion. This is a first sketch for such a study, which makes no claim to precision of detail or to authoritative finality. At the same time, the authors believe that in its main lines and in its basic principles the case which it presents is unanswerable and true.

Less than one-half of the problem has been surveyed in this

work. But in an important sense it is the fundamental half. It is primarily a study of Britain's productive system—of the physiology, as it were, of Soviet Power; and as such it deals with economic possibilities rather than with details of administrative or legislative forms. It covers the leading industries of the country, transport and distribution, and concludes with a survey of the apparatus of scientific education and research in relation to production. The social and political aspect—such matters as general education, health services, recreation and entertainment, crime and punishment and problems of government—fall outside the scope of this work and must be the subject of a separate volume.

*4th August, 1936*

THE AUTHORS.

# I

## THE ECONOMIC SYSTEM AS A WHOLE

THE claims made for capitalism in the past look strange against the capitalist crisis of to-day. Similarly the traditional condemnations of communism as a creed of blood and destruction show grotesquely on the background of the Five Year Plan and the record of Soviet peace policy. Even the more sober, less highly coloured justifications of capitalism look threadbare enough. Capitalism used to be praised by its defenders because it afforded a maximum incentive to progress, initiative and innovation. Its inequalities were defended on the ground that the prospect of great fortunes gave a lure to enterprise and the possession of them provided a surplus from which alone capital accumulation could be drawn. Contrasted with it, socialism and a classless society, it was said, would stagnate: its initiative would disappear with the individual competitive struggle; pressed by the clamorous demands of the present, socialism would inevitably "save" insufficient for the future, so that progress would be starved. Mr. Keynes in his post-1918 *Economic Consequences of the Peace* used the analogy of the cake which one cannot both have and eat. The great justification, he declared, of nineteenth century capitalism was that it made larger and larger cakes without ever eating them—though he hastened to add that in the post-War world this justification was rapidly ceasing to be true. Some economists have hailed the competitive market with the values it establishes as the only means by which economic rationality and economic calculation can rule. One of them has recently even gone so far as to say that "under capitalism productivity and profitability are identical"<sup>1</sup>

<sup>1</sup> Prof. G. Halm in *Collectivist Econ. Planning*. Ed. Prof. F. A. Hayek.

Undoubtedly in its hey-day of competitive capitalism the system played a revolutionary role—a fact to which Marx and Engels in the *Communist Manifesto* gave witness. Capitalism revolutionized technique, pioneered in unexplored realms. Ever so, in the achievements of its hey-day there are serious qualifications to be made. The progress it achieved was at the cost of immense human suffering—the life-blood of the child-slaves of the Industrial Revolution and the stunting of generations in the factories and industrial slums. Anarchy of production entailed appalling waste and irrationality, much of which remains as an evil heritage down to the present day. Of this waste, the hideous chaos of industrial towns, the disorder of unplanned and competitive railway construction, the irrationality of mining methods (with which later chapters of this book deal) are outstanding, but by no means exceptional examples. In the realm of power-production and of scientific research similar results of anarchy are evident. Nor is the toll of vested interests (of landlords, royalty-owners, *rentiers* and monopolists of all kinds) to be neglected even in this earlier period; because, although much of these “rents” may have been “ploughed back,” as it were, into industry by re-investment, their effect in cramping and distorting development remained considerable, as again railway construction and town-planning bear eloquent witness.

But as Marx foretold (when other economists were painting the perspective of a dawning millennium), this youthful competitive capitalism of the nineteenth century developed into the monopoly-capitalism which we see enthroned to-day. A German economist, Werner Sombart, has called it “high capitalism”; Lenin termed it “the final stage of capitalism.”

**Monopoly-Capitalism, Fetter on Production** And this development has taken place not just as a chance excrescence on an otherwise harmonious system, but as a logical and inevitable goal of a capitalist system, with its keynote production for profit. Even in the early and middle nineteenth century capitalism was monopolistic where it got the chance—it restricted production, rather than expanding it, wherever either the individual capitalist was powerful enough or agreement among rivals made it practicable to control prices and increase profit by so doing. (We know, for instance, that the

iron-masters were restricting competition and fixing prices even at the time of the Industrial Revolution.)<sup>1</sup> For, if the individual capitalist can control price by his output-policy at all, his profit is increased by *restricting* output: by making things more scarce not by making them more plentiful, by guarding existing rights and privileges, not by pioneering and innovating and pressing forward. Moreover, in the recurring crises of the nineteenth century there was seen that continual contradiction between economic progress and the maintenance of the rate of profit, between profit and plenty. But in this earlier stage the growth of the means of production precluded monopoly from being more than an occasional and somewhat exceptional policy. The stage of technique which was reached imposed on industry a small-scale organization, which meant that in every industry there were hundreds or even thousands of separate *entrepreneurs*, the mass of them difficult to combine (save where they served a partly protected local market) and each of them alone impotent to control the market. With the march of technique concentration and centralization inevitably set in. Big capital swallowed the small. Big Business reigned where previously small business had thrived: moreover Big Business entwined in a complex union with Finance. Large-scale production and organization increasingly became the rule. And in these changed circumstances monopoly-policies—policies of restriction rather than of plenty—thrived, because in these circumstances such policies “paid”—paid not the social interest but the individual interest, paid not the workers and the masses of consumers but the owners of capital and the guardians of property-rights and monopoly-privileges generally. At this epoch of development that contradiction, of which Engels spoke, between the *social* character of the productive forces and the system of *individual* ownership and appropriation reaches its most acute stage: a stage in which capitalism has become a fetter on production for all to see—a fetter threatening to all progress, and a fetter condemning millions to misery and degradation and the human “scrap-heap.”

Nor is this all: monopoly-capitalism begets a very Frankenstein-monster, destined, when it comes of age, to destroy the very productive-powers which capitalism has built and to desolate the world. The ferocious grin of this misshapen monster has become familiar enough to us to-day: namely modern Imperialism, the

<sup>1</sup> Cf. in particular T. S. Ashton in *Hist. of Iron and Steel Trades*. The Newcastle Coal Vend was another example of an eighteenth century Cartel.



new economic nationalism and the colonial scrambles which go with it, and its logical outcome, War. Faced with a falling rate of profit at home, as capital accumulation proceeds faster than the proletarian strata available to exploit, capital looks abroad for new worlds to conquer, for new areas to exploit where the rate of profit is higher than at home. Export of capital takes pride of place over the mere export of goods which was the previous preoccupation of trade and industry. With it goes the export of capital-goods (machinery, constructional-equipment, etc.), and the consequent hypertrophy of the metal and constructional trades in the advanced industrial countries (an hypertrophy from which British capitalism is suffering so acutely to-day). But investment implies political *control* over the field of investment, where mere trade in consumers' goods did not—political control, not merely of an external character to “protect property,” but control over the internal economy of the area in question to bring about those changes in that internal economy (e.g. the land question and the labour-supply, competing native industries and tariff-policies, etc.) which will promote and extend the profitability of the capital invested. Added to this is the extra profit to be gained by fencing-off colonial “preserves” as privileged “territory” for the trusts, the financiers, the concession-hunters of a particular capitalist Power. Hence the “scramble for Africa” of the end of last century—a “scramble” which is not complete to-day—the partition of China and the Near East into “spheres of influence,” and the “economic penetration” of Central and South America.

✓ Such lust for colonies arises not because population is redundant, but because capital is redundant (relatively to the profit which it hopes to extract). And it is this lust which makes history to-day akin rather to tales of gang-rivalries in Chicago or New York, each rival “racket” driven by lust for extended “territory,” than to the world as pictured by classical Political Economy or by Cobden and Bright.

In this situation as we see it to-day the problem is not one of curbing and controlling this or that monopoly interest or of introducing certain elements of “public” control or influence into the policies of large corporations, as for instance the so-called “Liberty and Democratic Leadership” group see it in their recent publication entitled *The Next Five Years*, or as the Liberal Industrial Enquiry saw it in the *Liberal Yellow Book* seven years ago, or as the Labour Party programme apparently sees it in its

proposals for "public corporations." How absurdly Quixotic such proposals are should be sufficiently demonstrated by any comprehensive survey of the actual facts, if it has not been already demonstrated by the whole farce of American anti-monopoly legislation with its series of Acts, both State and Federal, stretching back to the Sherman Anti-Trust Act of 1890. It is not only that in capitalist society the State is inevitably a capitalist State, controlled in a thousand ways by the ruling class and in the interests of that class. This may control a sectional interest in the interests of the capitalist class in general, as it has partly done in the case of railways and electricity and as has to some extent been done (in the interests of war, as a later chapter will show) in the chemical industry. But the control nevertheless remains in the interests of monopoly in *general*, even where it may curb monopoly in the particular. As in a gang-ridden city it is the gangsters who control the sheriff rather than the sheriff who controls the gangsters; so control of monopoly by the capitalist State can hardly be more than control of Capital's right-hand by Capital's left. But, apart from this, such "solutions" are utopian because the problem of monopoly is much more fundamental than this: it is something woven into the very texture of contemporary capitalism. It is something which determines the very motives by which the whole system operates, the very limits and standard principles which determine what can be and cannot be done, what shall and shall not be done. Even if limits can be put to the powers and extortions of a particular monopolistic group<sup>1</sup>, this will not be able to make it adopt policies which yield it a lower profit (but are in the social interest) against policies which bring it a higher profit: it will not make a profit-making system yield plenty, where profit lies in restriction and conservation of privilege. Even if vested interests can be curbed, that is not to say that they will be cleared out of the way, where on every side they stand blocking the road to planned and rational development of the productive forces in the social interest and the raising of the standard of life of the masses.

Moreover, there is a strong body of evidence that "public" control of particular monopolies by the capitalist State operates in precisely the opposite direction—that it operates to bolster up monopoly privileges, not to undermine them, to encourage restric-

<sup>1</sup> As a matter of fact, all that the authors of *The Next Five Years* envisage by way of control of monopolies, outside the class of Public Utilities, is "publicity" of accounts and "operations"! This they enunciate as their "main" prescription for public control. Such is the caution of reformers where capitalist interest is involved.

tion rather than progress, and to do so, not at the expense of capitalist profit, but at the expense of the "small man," the worker or the consumer. This is the meaning of the whole gamut of "Economic Restrictionism" which is the predominant policy of capitalism to-day. There are a number of examples which one could quote, particularly from the recent history of Italy and Germany, of State-intervention in industry, born of the economic crisis, and directed *not* to controlling capital in its more profitable fields, but to succouring Capital in fields where it is weak or bankrupt or in distress—to succour it by awarding it special privileges, at the expense of the Budget (which generally means by "cuts" in social expenditure) or at the expense of the workers or the mass of consumers. We will cite three examples (which are typical of recent tendencies and by no means exceptional) two of which are cited by the authors of *The Next Five Years* themselves.

First, there are the various agricultural quotas and subsidies and Marketing Board schemes. Agricultural restriction is to-day a common policy the world over. There is a whole folio of American wise-cracks about **Agricultural Restriction-Schemes** farmers making money out of the Government by not raising hogs and keeping pigs from breeding and land out of cultivation. Germans are made to eat black bread to make a market for German rye and to abstain from white bread made from imported wheat. In England the most glaring example of this kind is the notorious sugar-beet ramp by which millions have been placed in the pockets of a few large producers at the expense of the consumer and the Budget. Next to this comes the scandal of the Milk Marketing Board, with its differentiation against the ordinary milk-consumer (at a time when doctors and health officers are preaching the need for increased milk consumption and the Government even conducts propaganda to "Drink More Milk"!) and its favouritism towards the large distributor and to the factory owner who buys milk for industrial purposes. As *The Next Five Years* cautiously puts it: "Assuming the desirability of encouragement, it is probable that sugar offered the least results at greatest cost. It was this sphere in which the State invested first and most heavily. Next to sugar, an expansion (as distinct from a maintenance) of wheat offered comparatively little either in food produced or in employment provided in relation to its cost; and yet it was to wheat we turned next. . . . Some existing Marketing Boards have dealt

tenderly and even with excessive generosity with the distributive mechanism, and have lent themselves too readily to the maintenance of excessive margins. . . . The margin between farm prices and shop prices appears to be increasing rather than diminishing and it is particularly noticeable that firms of middlemen and retail distributors have been increasing their profits and dividends during precisely the period in which almost all those whose produce they have been selling have been losing heavily."<sup>1</sup> Further afield, and earlier, the State-bolstered rubber-restriction scheme could be cited, a scheme which was misguided and wasteful as well as anti-social, "being pressed by a great organized interest, armed with full technical knowledge and concentrated upon a single objective."<sup>2</sup> It is a well-known theme in discussions about tariffs that, while in the abstract a perfect "scientific tariff" is possible to devise, in the actual world it is the "pull" of vested interests which determines where tariffs shall be placed and what tariff-policies shall be pursued. So it is in the realm of State intervention generally: in a capitalist society it is the "pull" of the large interests which determines what ends such intervention will serve. Those "ends," with very rare exceptions, are the increase, not the curtailment, of monopoly-profit.

The second example, is the history of the Government's policy towards the iron and steel trades. Here the weight of State influence has been in the direction of a higher **Iron and Steel** degree of cartelisation and trustification in the industry under the name of "reorganization" and "rationalization." In 1932, at the demand of the manufacturers in the trade, the Government imposed a heavy import duty of 33½ per cent, on condition that the industry would produce a satisfactory scheme of reorganization. The threat was made that, if the scheme of reorganization which the industry produced was not satisfactory in the eyes of the State, tariff protection would be withdrawn from the industry. Owing to the divergence of interests within the industry however, very little progress was made in the production of a reorganization scheme. Two schemes were proposed, accepted by the Import Duties Advisory Committee, but abandoned owing to opposition from the majority of manufacturers. The third and much less drastic scheme which was finally adopted in 1934 represented very little essential change

<sup>1</sup> Pp. 15 and 161.

<sup>2</sup> *Ibid.*, 15.

in the organization of the industry. Yet so tender was the State of disturbing the vested interests concerned by means other than mutual agreement that, on the contrary to the tariff being repealed, it was continued unconditionally, and no pressure was brought to bear on the industry to accept the State's point of view.

In the words of Prof. G. C. Allen: "All that has been done is to set up a body which has the function of assisting in the preparation of schemes, and it is probable that the chief outcome will be the strengthening of the sectional cartels in the interests of price maintenance. There is little probability that any plans for widespread rationalization will be pressed forward. Yet, although the Government declared that the continuance of protection was conditional on progress towards rationalization, it has nevertheless removed the time-limit on the duties. . . . The situation is of interest . . . because it shows how a government may be out-maneuvred by industrialists."<sup>1</sup>

What has emerged has been the entry of the British iron and steel industry into the international steel cartel, a protection of the home market by restriction of imports and a sectional movement towards monopolistic combination in certain branches of the trade in the shape of giant combines such as Vickers-Armstrong, Dorman Long, the Lancashire Steel Corporation, and John Brown (most of them assisted in their formation by subsidiary finance companies of the Bank of England). To the example of iron and steel one could add the Coal Mines Act of 1930 (passed under a Labour Government) establishing a quota and output restriction scheme on cartel lines for the coal industry.

Thirdly, there is the whole sordid history of housing and town planning. Here was a case where by universal admission (in the abstract) private profit and social interest were at variance. Here was a glaring example of the **Housing and Town-Planning** failure of private enterprise to provide one of the elementary human needs—housing accommodation for the masses on even an elementary scale. To provide "homes for heroes" was one of the most prominent pledges of the war-time Prime Minister and of the post-War election. More recently the theme of "The Slums—England's Disgrace" has been on the lips of official pronouncements by the present King. To do anything on any effective scale required not only substantial building by local authorities (instead of by private capitalists) but also required an attack on

<sup>1</sup> *British Industries* (second edition), 132E-132F.

the vested interests of landlords and estate speculators, to prevent their obstruction to extensive schemes of town-planning and to annex the large increase of site-values which building development would produce. Successive housing schemes have been produced, in face of opposition even adopted and operated, but on a scale which has done little more than touch the fringe of the problem. Not only has the influence of builders, large and small, over local authorities, combined with the extortions of building rings among the suppliers of building materials cramped the operation of such schemes and swollen their cost; but the complete failure of the State to override the interests of land and estate-owners and to produce effective schemes of town-planning has left us with a slum problem still hardly touched in most of the worst centres, and with the added scandal of "ribbon development" by the land and building speculators. Finally we see the National Government scrapping the building subsidy, decontrolling rents and leaving the field open again to private capital, under a much trumpeted "anti-slum campaign" which predominantly consists in building houses for sale or for lease at *over* 10s. per week, most of them between 15s. and 25s. to the better-paid artisans or lower middle class. To quote again the authors of *The Next Five Years*: "The State embarked on a great scheme of new arterial road development. It was obvious that these new roads would create greatly increased land values. . . . Parliament indeed foresaw these results and specifically posed the problem to the administration by providing powers to acquire not only land for the roads themselves but also adjacent land affected by them. The administration failed completely. . . . Only to-day under external pressure and after immense damage has been done, is an effort, now necessarily expensive, being made to retrieve the situation."<sup>1</sup> Even this belated effort, however, in face of a big public campaign, sponsored by prominent members of the ruling class who feared the defacement of town and country by unplanned "ribbon development," looks like being frustrated by the pressure of the interests affected. The first act of the Government spokesman after the introduction of new legislation on the matter, (The Restriction of Ribbon Development Bill in May 1935), was publicly to assure these opponents that their "legitimate interests would be fully safeguarded"; which raised from *The New Statesman* the following comment: "The Bill passed its third reading . . . after a storm raised by a number of Tories more concerned for private privilege than public interest. . . . The Bill is a pitiful thing. It

<sup>1</sup> *Ibid.*, 16-7.

widens the space between ribbons, but it does not prevent the continuance of ribbon development. . . . Moreover the zeal of local authorities for dealing with the ribbon development mischief will inevitably be curbed by the prospect of saddling the rate with the heavy price that will be exacted by owners of land. . . . The main problem is the unregulated exploitation of the countryside and its amenities for private profit. And, even without the right of appeal to the Courts, the exploiters are left, as *The Times* assured them a week or two ago, with ample safeguards against effective interference by the community."<sup>1</sup>

As a writer has recently pointed out: after an "ever-increasing spate" of town-planning enactments over twenty-five years, town planning schemes "approved and in operation at the end of March 1935 cover only 152,182 acres—a space as large as one of the smallest counties. . . . All the schemes which have been either approved or submitted comprise less than 175,000 acres, that is about 1/215th part of England and Wales."<sup>2</sup>

Once again we see State policy, even in such a sphere as this not only straitly fenced by certain capitalist principles and prior regard for propertied interests, but we see that policy actually diverted into channels which promote monopoly interests at the expense of the people. As an economic writer has wittily put it, such "planning" as men like Sir Arthur Salter, the late Sir Basil Blackett and Mr. Herbert Morrison advocate is likely to result in the mass of the people being "more planned against than planning"<sup>3</sup>: it will be planning *of* monopoly and not *against* monopoly.

It is sometimes thought however that while monopoly capitalism may bring specific evils in its train, it has at least the advantage of abolishing the anarchy of production, and that by supplanting the "wastes of competition" it can lead to greater economic efficiency. But, this assumption, too, seems to rest on a fundamental misapprehension of the matter. True, the large, up-to-date, highly integrated combine may attain, in its internal arrangement and management, a degree of efficiency which was beyond the powers of the old-fashioned and haphazard small-scale competitive economy—sometimes, but by no means always, since monopolies which thrive on restriction may become conservative, ossified and routine-bound by internal vested interests of their own. But the essence of the matter is that capitalist monopoly

<sup>1</sup> *New Statesman*, 3 August, 1935.

<sup>2</sup> W. A. Robson in *New Statesman*, 28 Dec., 1935.

<sup>3</sup> Barbara Wootton in *Plan or No Plan*, 320.

from its very nature implies not unity but enhanced rivalry—enhanced rivalry in all its *external* relations with other capitalists and with rival monopoly groups. Hence, in the economic system at large the anarchy of an acuter rivalry remains; and anarchy that has few of those positive results (spur to progress, reduction of prices, etc.) of that competition which was the basis of small-scale production. Profit-making monopoly implies *exclusion*: exclusion of rivals or potential rivals from the field. Exclusion necessarily spells rivalry; and rivalry between giant instead of pigmy contestants, with resisting power much greater and weapons of battle more destructive than those of old. One has only to read the history of any of the large American trusts to see examples of this; or to look at the cut-throat rivalry of the world's leading oil-combines with its sordid train of political machination and intrigue. Here (as we have said) the methods are more akin to those of gangster rivalry, warring for "territory", than to the principles of orthodox economic textbooks—a warfare it is true which also has its alliances and its temporary truces, but merely as breathing space for a still more bitter phase of struggle to emerge on the morrow. In less melodramatic strain: it is a familiar fact that inside a cartel price-cutting rivalry merely gives place to rivalry in the allotment of quotas; while the battle between cartels at successive stages of production is a familiar feature of cartel-history, as for instance the long-drawn-out rivalry in Germany between the coal and the iron cartels and between the "pure" and the "mixed" works inside each of them. That is the reason why the present trend to economic nationalism and "autarky"—to the fencing off and protection of the internal market of each country as a "preserve" for the large trusts and cartels—is by no means inconsistent with an intensified policy of imperialism and scramble for colonial preserves in the world at large. Both are logical products of monopoly capitalism—of individual production for profit in an epoch of capital concentration, finance-capital and Big Business.

One product of this new anarchy of a monopoly age is of special significance and will be given more detailed study later.

Advertising and Distribution It is the growing role which lavish expenditures on advertising and selling devices of all kinds play at the present day; and it is this which would seem to be by far the most important cause of the growing part played by distributive costs and the Distributive Trades in modern capitalism. It is a



striking fact that in post-war U.S.A., while the numbers employed in manufacture declined absolutely, the numbers employed in distribution and commerce of all kinds registered a more than equivalent increase. A similar, if less marked, trend is visible in this country, as shown by the fact that between 1923 and 1935 the distributive trades headed the list of expanding trades, with an increase of 55 per cent in the numbers employed; and this at a time when employment in many of the old basic industries was registering an absolute decrease. The explanation customarily given by economists for this phenomenon is the increasing importance, particularly in British industry, of lighter, higher quality products, with a more diffuse and variable market, which demand a greater attention to distribution as contrasted with production. But in view of the size of the change and its universality this seems far from adequate to explain the phenomenon. Moreover, the explanation suggested here is the more consistent with numerous other facts in the situation, including the tendency for the distributive mechanism to increase markedly even for the same type of product. Whereas in the days of classical competition rivalry took the form of price-cutting to steal the market from a competitor, it is a familiar fact that to-day this form of rivalry is becoming increasingly rare. Rivalry to-day increasingly takes the form of advertising campaigns and an elaborate selling apparatus to entrench a particular firm in a market and to coerce or cajole the consumer into accepting this particular product in preference to a rival's. And once such an expenditure has become general, it becomes, like pushing in a crowd or like armaments, necessary to "everyone": such expenditure appears as one of the essential costs of production and marketing which anyone must incur if he is to have any foothold in the field. The result is that the productive system becomes burdened with a growing mass of superfluous expenditure and a swelling parasitic apparatus. This represents a social waste in two ways; in the sense that such expenditure has to be paid for in some form by the worker or the consumer, and in the sense that productive resources are thereby still further diverted from serving social needs to producing those kinds of goods which can be made to pay most readily because they can be most easily advertised and pushed upon the consumer.

- Not adaptation of supply to demand is the slogan of large-scale monopoly-capitalism, but adaptation of demand to what is most profitable to supply. And the working consumer,

not the capitalist, is made to pay for the consumer's own coercion.

This is the reason why this volume is designed to show, not what "planning"—any sort of "planning" in the abstract—could achieve in Britain, but what *Soviet Power could achieve*. The problem is put in this form on the ground that the problem of class power must be solved as a pre-requisite of any social planning and any solidly constructed social advance. While the vested interests of Finance-Capital remain entrenched across the path, he who devises "plans" and "development schemes" is condemned to be either an academic trifler or else a maker of tools for others to distort to different and nefarious purposes. Only when the class-power of Capital has been broken, only when individual ownership of the means of production, and with it production for profit, has been abolished by the expropriation of the large capitalists, financiers and landowners, will it be possible to speak of unleashing the productive forces and planning their development in the social interest—the interest, not of property, but of the masses. Big Business and Finance have their cohorts and their reserves, and do not scruple to use them ruthlessly when their interests are threatened and if the disunity or incorrect leadership of the workers permits, as events in Italy, Germany and Austria tragically testify.<sup>1</sup> To dislodge the forces of capital from their entrenchment requires the whole organized power of the workers, in alliance with the wide masses of the so-called "middle class"—a power which can only be effectively focussed through the leadership of a steeled revolutionary Party, and through mass organizations of the workers' own creation, born of activity and struggle, and independent of and ranged against the capitalist State-machine with "its thousand threads binding it to the ruling class." That is why in this book the issue is stated as what a Soviet Britain could achieve.

<sup>1</sup> A recent book on the transition to Socialism (G. R. Mitchison, *First Workers' Govt.*) says in its Preface: "As for Sir Oswald Mosley and his followers, I have not even mentioned them." (P. 15). Yet it is this political factor of class resistance to workers' power, showing itself in capitalist dictatorship, military action and Fascism, which fundamentally conditions the nature of the transition to Socialism and the economic measures appropriate to this situation!

What then are the most essential respects in which the productive forces to-day are fettered by the institutions and principles of capitalism; and in what directions is socialist planning calculated to have its principal emancipating effects? If we can assess the precise nature of the problem as it exists to-day, we can be in a position to assess something of the forms and extent of the constructive achievements of which Soviet Britain would be capable.

First, and most familiar is the fact that to-day production serves not social needs, but "effective demand"—the demand of those consumers who have the money to buy.

**Neglect of Human Needs** This is not an accidental, but an essential feature of capitalist society, since class inequality is the foundation on which it is built. As apologists of the system do not tire of maintaining, such inequality provides both the motive-force (the *only* motive-force) to drive the system and the source of capital accumulation. In other words, one cannot, as many Reformists do, treat the "problem of income distribution" and the "problem of production" in water-tight compartments, as though the first can be reformed and the second left substantially unaltered. They are inseparable aspects of a single thing—of capitalism as a particular class system of productive relations; and one cannot "reform" income-distribution without revolutionizing capitalism as a system of *production*. A striking instance is the housing of the people, to which we have already referred. To provide housing accommodation for the workers is not a profitable investment and is consequently neglected. Slums, back-to-back cottages, and the squalor of industrial towns remain and capital is poured into speculative ribbon-development or villas for sale or luxury flats and luxury cinemas instead. Even the building "boomlet" of the last two years, supplying houses mainly for the lower middle class, shows signs of coming to an abrupt end owing to the limited market for new houses among such strata—too limited to make continued investment possible. "It pays" less to have regard for the health safety and welfare of the workers than to have regard for the upkeep of a machine; a respect in which (as Marx pointed out) capitalism is more callous than a slave economy, since in the latter the master has bought and owns the slave, while in the former he owns the machine but only *hires* the "hand." That is why it "pays" to neglect safety precautions in mines; and why

elaborate legislation, built up by mass pressure over a century, has been needed to ensure the most elementary precautions for health and safety in industry and on "dangerous processes." (One has only to recall the long years of stubborn opposition to mining legislation; the strong reluctance to abolish the use of white phosphorus in match-making; and the success of the interests concerned in causing the British Government to obstruct the international white lead convention). Better the ruin of a generation than 1 per cent off the rate of profit! For this reason too, industries which supply commodities of mass consumption, such as textiles, are depressed for lack of markets, machines rust and men walk the street, while at the same time millions lack these things and have not the money to buy. For this reason, wheat is ploughed back into the ground and coffee is burned as fuel in the midst of a world where men starve—because it is a world in which there is no profit to be made from feeding the hungry. For this reason, we witness the stupendous contradiction that, while advertisers spend lavish sums to capture markets and "create demand," economists and captains of industry reiterate that to restore production for profit to normality wages must come down—or be given "greater flexibility" as is the more tactful phrase!

Second is the fact that anarchy of production, accentuated, as we have seen, and assuming new forms in an age of monopoly, not only causes great waste to result because decisions are taken blindly and in ignorance and without co-ordination, but also causes certain essential and "key" things to remain undone.

**Anarchy of Production** Examples of such waste is evident in the disproportionate development which is characteristic of every "boom"—in faulty investment in certain directions, in plant which later will be left high and dry and derelict. A striking example of this was seen in the 1919–20 ship-building boom; when despite the fact that all the world was building ships and yards, investment in new British ships and shipyards proceeded apace in the competitive zeal and lust for quick returns. Meanwhile the trade journal *The Compendium* carried the slogan of *Ships, Ships and yet more Ships!* The result was that by 1920, in face of a shrinkage of world trade, the shipbuilding capacity of the world was swollen to more than double its pre-war capacity, and many of the ships, much of the constructional equipment and more of the men have been derelict

ever since. Even to-day in England after the operation of a scheme by which capacity of  $\frac{1}{2}$  million tons has been "broken up" the capacity of existing yards remains about  $2\frac{1}{2}$  millions, whereas the maximum annual output since 1921 has been no more than  $1\frac{1}{2}$  million tons. A similar tendency of investment to respond to the "peak" demand so as to become partly redundant when the abnormal peak is passed is well known to be a recurring malady of the constructional trades in general.<sup>1</sup> A further example is the familiar fact that, in the absence of any provision for planning ahead with respect to technical change and new construction, there is a chronic tendency to over-investment in types of plant which are destined very soon to become out of date or superfluous, with the result that the rate of obsolescence and scrapping of plant is considerably enhanced. Examples of the opposite fault—of important developments which fail to be undertaken—are less familiar, but perhaps more important. These are usually large expenditures on innovations or construction schemes which will not pay if they are duplicated by some rival interest introducing a parallel scheme; or else they are schemes of development which are dependent for their success on a number of related developments taking place in other spheres by the decision of some other *entrepreneur*. In the former case development is held back by fear and uncertainty lest someone else *will* do a similar thing; in the latter case by uncertainty on the part of each and all lest others *will not* do a similar thing, with the result that, in the absence of means of co-ordination and agreement, no one dares to take the initiative. Examples of the latter are found in all questions of standardization, in the development of which clearly there are very considerable economies to be achieved: also in the development of complementary processes or products (e.g. the relations between coking-plants and enterprises using their by-products). In relation to building, and the potentialities of simultaneous standardization and co-ordination of building plans and the production of building materials, this will be more concretely discussed in later chapters. In matters of the co-ordination and planning of scientific research and invention, and the results of the lack of it in present-day society, this point clearly has outstanding importance.

A good example of the latter is a recent case of the development of suburban transport facilities. One of the reasons given for the non-electrification of a suburban railway service in a direction

<sup>1</sup> Cf. G. C. Allen, *British Industries*, 166.

towards the north-east of London where the long-standing absence of any adequate traffic-facilities had become something of a scandal, and even a political question, was that the company had no guarantee that when it had sunk its money in such a scheme a competing tube-railway or a new tramway system might not be constructed by a rival authority and rob the railway of the fruit of its investment.<sup>1</sup> Sir Henry Mayhew in giving evidence before the Royal Commission on Transport declared that it would only be profitable to extend the tube beyond Finsbury Park if the company could be protected against "unlimited competition all through the slack hours of the day, paralleling our lines." Otherwise there would be no "guarantee of a reasonable return upon the expenditure."

Similar examples exist in the failure to develop certain types of power and fuel owing to uncertainty as to the action likely to be taken in rival fields in connection with rival sources; the importance of which will be illustrated in a later chapter. A minor, but eloquent, example is the obstacles to the introduction of the 20-ton coal-wagon, which are detailed later. Only the Patent Laws prevent—and then prevent very clumsily and inadequately—a similar obstacle standing in the way of every technical innovation. Connected with this is that whole class of cases where private ownership, because it is diffused among a large number of separate individuals, prevents productive operation from being carried out upon the scale which the best use of technique requires, so that obsolete and wasteful methods persist. Mining, agriculture and the textile industry bear witness to this.

Thirdly, there is the fact that a capitalist system is "short-sighted" with regard to its investments—short-sighted both in respect to space and to time. An investment which is likely to yield its principal fruit to others than the capitalist who made the investment will not be undertaken. Similarly with investments which will yield a large fruit, but only at a considerable date in the future, when future generations are likely to reap it. Examples of this are familiar enough and figure even in traditional textbooks. Its relation to wasteful and short-sighted methods of mineral exploitation and power-development and on the other hand to the failure to deal with fundamental problems of far-sighted planning of industrial location, of transport facilities

<sup>1</sup> G. J. Ponsonby, *The London Passenger Transport Problem*, pp. 47-8.

and the flagrant under-estimation of more fundamental types of research are sufficiently obvious to need little elaboration here.

Fourthly, there is a fundamental characteristic of capitalism which is of crucial importance for such a question as: Could Soviet Power abolish Unemployment? Whence could a Soviet Britain finance its Development Schemes? This point is one, which, in the realm of abstract theory, has been recognized by modern economists; but its full and comprehensive significance when applied to concrete problems has been little noticed, and at any rate has lain undeveloped and un-emphasized. The fact that capitalism is a system of production for profit means that the guiding principle, the very touchstone of what shall be and shall not be done, is whether it will yield a certain rate of profit, which in the circumstances of the time is considered "normal" and "necessary." So deep-rooted is this principle in present society that under various guises it is the ruling principle of public finance and State policy, as seen in traditional notions of "sound finance" and "budgetary stability." It is a fact, for instance, that dominated by such criteria the Treasury during the Labour Government of 1930 was unable to find any more than a comparatively modest and quite inadequate list of public works (designed to increase employment) which it deemed "financially sound" avenues of expenditure.

Now, the fundamental point, which has been debated under cloak of much technical jargon and many algebraic symbols among economic schoolmen, is a quite simple one: once a piece of capital has been given concrete shape in a machine, a building, a railway embankment, a power plant, waste of the stored-up labour embodied in it results *if it fails to be utilized to its fullest practicable extent for some purpose or other by reason of the fact that its use will not yield a profit.* Once labour has been stored up in concrete form there is no sense in which a "cost" is involved in its use; and consequently no reason why its utilization should be governed by any consideration of capital-cost, apart from replacement-cost or wear and tear. If one has a bicycle, there is no cost involved in allowing a friend to use it at a time when it would otherwise be idle, apart from the mere wear and tear: indeed it is actually being wasted when it is lying idle. And what is true of a bicycle is true similarly of a railway track or a power plant

or an invention. Moreover, a similar consideration applies to the use of idle reserves of labour-power or other concrete resources: from the point of view of "*social production*" the use of them (once they are in existence) involves no positive "cost" and their non-use represents, negatively, a waste.<sup>1</sup>

The point is so obvious that to stress it might seem superfluous. But to stress it seems necessary, since its practical relevance is so often overlooked. Its practical importance is that here lies one of the principal forms of waste attributable to capitalism, and a form of waste which is growing to become an outstanding factor in the economic situation. It is that, since capitalism is a system of production for profit, and since for this reason capital-cost enters as a fundamental element into all accounting and into principles of financial rectitude, a chronic waste of productive resources exists through *under*-utilization of existing resources. It is a familiar fact that a large range of industries seldom work to full capacity and sometimes do not even do so at the height of a "boom." At a time of crisis such as the present a chronic malady of surplus capacity is almost universal. This fact has been concealed at least from economists in the past by a specious argument to the effect that competition prevents this form of waste from occurring: that wherever surplus capacity exists, competition will force *entrepreneurs* to neglect "overhead costs" and consider only "prime costs" in their price and output policy. But such "pure competition" is, of course, a very rare occurrence. Probably it always has been the exception: in a monopoly-age, at any rate, it can almost be said to have no relevance to cases where large units or fixed plant are involved. The very prevalence of business customs about not "spoiling the market" and the very extent to which outcry about "cut-throat" competition—something regarded clearly as monstrous and exceptional—greet any price-cutting action of this sort seem to be sufficient indication of its rarity. Where, for any reason, surplus-capacity exists relative to the existing state of "effective demand," it is in the interests of capital that this capacity should only be partly used, because in this way prices can be maintained at a more profitable level than if plant is used to full capacity and the market kept plentifully supplied with the larger output. But the matter does not stop

<sup>1</sup> Anyone wishing to consult the standpoint of theoretical economics on this matter may be referred to J. Maurice Clark, *The Economics of Overhead Costs*, Chaps. II and XVIII. The same point has been expressed by the economist Wicksell, when he has said that production at anything above a zero rate of interest is "economic" (*Lectures*, Vol. I, 209).



here. What is true of existing plant and equipment is true also of new inventions and potential new technique. The same monopolistic interest which finds it profitable to leave existing plant unutilized frequently finds it profitable to hamper the introduction of new inventions which may destroy the value of existing capital, and to throttle, or at least offer no encouragement to, innovation and research that may be "dangerous" in this way. The present crisis, more markedly than previous crises, has expressed itself as a crisis of excess-capacity. Significantly enough, reorganization for recovery has consisted principally of restriction-schemes in the interest of maintaining the values of existing capital or schemes for scrapping and dismantling redundant plant, such as the shipbuilding scheme (the National Shipbuilders Security Ltd. formed in February 1930) by which a levy is laid on all active shipyards to pay the cost of breaking-up the rest.

The reason for the exceptional prominence of this factor in the present crisis seems clearly due to the power which the large trusts and cartels have been able to wield, so as to "cushion" the effect of the crisis on their own profits by output-restriction and price-maintenance: a measure of which is the wide difference between the price-drop in 1930 of cartel-controlled and uncontrolled commodities.<sup>1</sup> The further result has been that a magnified burden has been forced on the shoulders of labour in the shape of a volume of unemployment of quite unprecedented proportions. The crisis has likewise been marked by increasing talk, and by talk not infrequently embodied in action, about new invention and the need to restrict it. There has arisen what R. Palme Dutt has called the new "capitalist Luddism": capitalism has become, not merely a "fetter" on development, but a destroyer of the existing productive forces and existing scientific knowledge.

<sup>1</sup> League of Nations, *World Econ. Survey 1931-2*, p. 128, where figures are quoted to show a decline in Germany between January 1929 and January 1932 of 50 per cent in the price of non-cartellized goods and only 19 per cent in the price of cartellized goods. The *Survey* for 1933-4 states: "There was a convergence of varied forces from within capitalist industry towards an increasing degree of large-scale organization and monopolistic control. During the depression, such controls were diverted into predominantly national channels and were directly and consciously reinforced by Government policy almost everywhere" (pp. 73-4). It also points out that "producers' goods have fallen less in price than consumers' goods universally, largely due to the greater strength of monopolistic price-maintenance in the former" (p. 68).

To the question of what Soviet Power could immediately achieve in Britain this is of very great importance. It indicates

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that in this latent capacity there consists a large amount of "slack" which could immediately be taken up, once the shackles of monopoly and monopoly-profit were broken. It would become possible to use the reserves of spindleage which are deliberately made idle under the cotton restriction scheme, work existing looms to full capacity, making cotton materials at very low prices for the millions on Clydeside, Tyneside, South Wales valleys, indeed Lancashire itself, who have scarcely more than one shirt to their backs.<sup>1</sup> The Joint Committee of Cotton Trade Organizations in 1931 estimated that while about an eighth of the spindles in existence in 1913 were completely closed down, mills still active were working at no more than two-thirds capacity; while weaving-sheds were working at no more than 60 per cent of capacity and a further sixth of all sheds were completely closed. Characteristically enough, this Committee did not propose that capital-costs and interest-charges should be written off so that prices could be cut to a point where the idle spindles and looms could be worked to full capacity. This it clearly could not do: to cut prices so drastically would have been to sacrifice profit and loan-charges as well. Instead, it could only propose the typical capitalist solution of a compulsory levy on the trade to raise £2½ millions to be spent on the purely destructive task of scrapping 10 million spindles and 100,000 looms. "It was claimed that, as long as this redundant plant existed, profitable operation would be impossible, and its elimination was a necessary preliminary to reorganization and cost-reduction."<sup>2</sup> It has often been said in the past that Lancashire's problem could be ended if the Chinese could be persuaded to wear their shirts an inch longer. The population of China may be ten times that of Britain; but if an inch on Chinese shirts would suffice to bring prosperity back to Lancashire, surely an extra shirt apiece to Britain's workers would more than suffice? And what would be the obstacle once capital-costs had been "written off" and monopolistic restriction banished? Shortage of skilled labour? Skilled operatives are to-day working alternate shifts on short time, or walking the streets. Shortage of power and fuel? Is there not similar reserve capacity and lack of markets in these industries as well—idle

<sup>1</sup> Cf. also remarks about the export trade, below p. 42.

<sup>2</sup> G. C. Allen, *op. cit.*, p. 249.

coal-pits and idle miners, and in electrical power production (as a later chapter will show) considerable reserves and considerable economies to be gained by expansion and rational organization? Shortage of raw materials? Raw cotton production, like raw products in general, has been feeling the pressure of surplus stocks and has been subjected in past years to restrictive control schemes. The harvested area in America between 1932 and 1935 was compulsorily reduced by nearly 30 per cent. Even so, in 1934 the accumulated stocks of cotton amounted nearly to a year's output. There should be hardly any difficulty in importing considerably increased amounts of raw cotton, if need be by special forward-contract arrangements, at existing prices.<sup>1</sup> And what is true of cotton in Lancashire should similarly be true of Yorkshire woollen and worsted and the hosiery trade, and to a lesser extent of boots and shoes (which has much less surplus capacity than most trades).

The building industry presents a somewhat different problem. Here labour and materials represent the principal costs; and the obstacles to development at present consist of the poverty of the masses, which precludes them from being "profitable customers" for building capitalists to serve, the extreme irrationality of the anarchic system of enterprise throughout the trade, and the resistance (to which we have referred) presented by a small army of vested interests to any comprehensive planning of development. While there is unemployment in the trade to-day, this is mainly due to irrational organization and absence of planning (it co-exists often with actual shortage of certain types of skilled labour in certain places, e.g. in London and the southern counties). Here a Soviet Britain might find it less easy to tap reserves of idle skill than it could in the cotton industry. Nevertheless, there is plenty of ground for assuming that within a short space of time the supply of skill could be made fairly elastic; while, with respect to the less skilled grades, building construction could rapidly draw upon some of the present large reserves of unskilled and semi-skilled labour and draw them into steady and permanent, and not merely casual, employment, with chances open to them of progression and improvement within the trade. There seems little doubt that with adequate security of employment, a scheme of training

<sup>1</sup> For the general question of import and export trade cf. below, p. 39.

operated under the control of the building trade unions could increase the supply of skilled labour sufficiently to permit, say, at least a 50 per cent increase of building activity within a twelve month. Moreover, there is also plenty of evidence to suggest that, with the fear of insecurity removed (as it could be by abolition of casual employment and a national plan of building construction stretching over several years) the amount and quality of work achieved by the existing labour-force in the trade could be greatly increased by reason of more willing co-operation, relaxation of rigid demarcation-barriers, reduced loss of time during bouts of unemployment between jobs, and so forth. This may, perhaps, be open to some dispute. The Foster Report, however, sponsored by a leading building trades employer just after the last war, estimated that a scheme of industrial maintenance by which workers were paid a minimum income whether working or not working would more than pay for itself from the improved work which would result; while the brief history of the trade union-supported Building Guild (which operated such a scheme of regular maintenance) showed, according to private employers' own complaints, a much higher standard of work on construction-jobs undertaken by the Guild than on those undertaken by private contractors. When, in addition to this, account is taken of the big economies which could soon be achieved by rational planning, by standardization of methods and material, it seems not an optimistic, but rather a conservative estimate to suppose that in the early days of Soviet Britain the amount of building construction undertaken could be doubled: a figure which could be progressively increased in the course of a few years, perhaps, to three or even four times the present figure, as new supplies of skilled labour could be trained and the possibilities of socialist rationalization of the industry could be explored and tapped. In 1932-3 the number of houses built was approximately 200,000; and the original Wheatley Scheme had provided for 225,000 houses to be built annually by 1934. Since then there has been an increase on these figures. It seems safe to assume that in the first year of a socialist housing programme over 400,000 dwellings could be built—moreover, of dwellings of a suitable type, of rentals under and not over 10s. a week, and rentals graded according to income (as in U.S.S.R.). The amount of labour employed on building construction to-day is about 800,000. If our estimate is a valid one, it seems fairly safe to say that some 700,000 additional workers could be drawn into employment in the building trades

alone in the early days of Soviet Britain and about a million into building and public works contracting combined. It has been estimated that the construction of between 1 and 2 million dwellings would be required to abolish the existing slums. Allowing for some (but not a large) improvement in building methods and types of construction, it seems to be possible to assume (again on a conservative estimate) that within four to five years Soviet Britain could wipe away the slums. Within a further ten years it might have rehoused half the population and rebuilt a large number of the nineteenth century industrial towns, rearing in their place new planned socialist cities, to be a pride to the eye and to bring health to their citizens, instead of the squalor and ugliness and physical and moral deterioration which to-day surrounds our coal-fields, our ports and our factory centres. Assuming a rate of building construction of three times the 1932-4 rate, it would be possible to re-house the whole working-class population within fifteen years. And so far as the "labour-cost" involved in this was concerned, it could be done mainly by utilizing human resources which to-day run to waste.

Building materials, it might seem, would offer a greater obstacle to expansion. Certainly they offer an obstacle to-day; and the constant fear of successive framers of housing programmes has been that development might cause building costs to rise so as to undermine the financial basis of the scheme. But this again is mainly an expression of shackles which would cease to exist under a Soviet state. It is notorious, ever since the fact was made public by the 1919 Committee on Trusts, that rings and price-agreements cover the principal trades which supply building materials, and that these have been capable of maintaining or raising the prices of such materials by monopolistic action. Yet it is in many of the trades supplying such materials—for instance the metal trades—that the largest amount of idle capacity exists. In face of all that has been heard and said in recent years of blast furnaces drawn and steel-works closed down,<sup>1</sup> as well as of 25 per cent unemployment in these trades, can it really be supposed that the output of light castings and structural steel could not be speedily and considerably increased at what would be (again speaking from the standpoint of "social production") a very low, and perhaps in the early stages an almost negligible, prime cost?

<sup>1</sup> In Scotland for instance in 1932 there were never more than 7 blast furnaces in blast out of a total of 89 while in general engineering the unemployment per cent was 42.

True in the existing anarchic state of the industry a building programme which was committed to a particular style of construction might be unexpectedly pulled up by various unexpected "bottle-necks" of scarcity of particular materials. This would be for the reason that expansion was unplanned and consequently blind, each builder or each local authority being ignorant of the effect which the all-round expansion was destined to have on the prices of certain resources until those prices had actually started to rise on the market. But if building development were controlled by a fairly long-sighted development plan for the whole industry, this plan and its specifications would be controlled from the very outset, presumably, by data as to the state of the sources of supply; and to-day modern building technique and architectural resourcefulness seem to offer a sufficiently wide range of substitute materials and alternative types of construction to render any of these particular inelasticities no very serious obstacle.

This question of the relation between house-building and the industries supplying constructional materials opens up a much wider question. The largest amount both of unemployment and of excess plant-capacity to-day exists in those constructional trades which provide means of production or semi-finished materials for building or for the lighter finishing trades. The possibility of "taking in the slack" here is ultimately dependent on the expansion of those industries supplying the consumer, which the former group of trades serves. A given expansion of production in the clothing trades or building will have its further repercussion in a corresponding expansion in activity and employment in these more basic trades such as iron and steel; as will also every expansion in the consumption-demand of the masses which will follow their re-entry into employment and every cheapening of foodstuffs, clothing, house-room which can take place. (For instance, as more bicycles, more furniture, more radio-sets, etc., are demanded by workers who previously could not afford them, there will be a correlative growth of demand for all the materials used in making such things.) Conversely, the existence of such reserves in the basic industries provides the resources from which a speedy expansion of the trades catering for mass consumption could come, even in the very early stages of a Soviet Britain. From the standpoint of employment, it would mean, not only that a million more building workers would be required, perhaps a quarter to half a million more textile and clothing workers and so forth;

but that there would be a simultaneous absorption of the present pool of idle labour attached to iron and steel and engineering as well.

How far is it possible to estimate what the measure of this expansion of productive activity might be; i.e. of such expansion of activity as could follow simply from this taking-in of the reserve-capacity of the economic system, quite apart from the economies of planning and of further rational development? Clearly, any adequate and convincing answer would require a concrete survey of each industry and a somewhat complex statistical analysis of the result which we cannot attempt here. Any such estimate is complicated by numerous qualifications which have to be made to any simple method of summing-up or averaging the results in different industries. For instance, where there is variation, and inevitable variation, in the utilization of something such as electricity (as there is between daytime and night uses), there must be an inevitable reserve of capacity between the "peak load" and the "average load." This may be reduced by improved co-ordination and planning to facilitate a "dovetailing" of different "peaks"; but even so, *some* element of reserve will probably still have to remain; as for instance it does in the case of electrical power, where it could only approach complete elimination in a system of long-distance transmission several thousand miles east and west (as is being contemplated in U.S.S.R.). Again, much depends on where the reserve-capacity happens to exist: a reserve capacity in producing a certain "key" constructional material will clearly be of more vital importance to the possibility of building expansion than a reserve capacity in other less essential and more substitutable materials. Similarly a large reserve capacity for making window-curtains is not much use if what people primarily lack is houses. No simple answer is, therefore, possible. The most that can be done is to indicate the rough order of magnitude which might be expected. There seems some ground for assuming that reserves of idle plant-capacity are appreciably greater *proportionately* than the reserves of unemployed labour-power; for the reason that when a crisis begins many enterprises in process of construction are either left derelict or never operated to full capacity; so that even in the period of almost-full employment at the end of 1919 it is probable that there was much reserve

plant-capacity in many directions. In this country no study has been made of this question, and no figures or estimates exist which would enable us to make even an approximate calculation. In U.S.A. and Germany, however, estimates of this kind have been attempted. For America a book called *The Chart of Plenty* (ed. H. Loeb, etc.) estimated that at the peak of the boom in 1929 there was an excess productive-capacity of between 40 and 50 per cent.<sup>1</sup> A more cautious, and probably more reliable, estimate made by the Brookings Institution gave a figure of 19 per cent as the excess capacity in American industry in 1929.<sup>2</sup> This latter figure corresponds fairly closely with the results of an estimate made for Germany by the Institut für Konjunkturforschung, which estimated the excess capacity in 1934 (when production was some 20 per cent below the 1929 level) at about 40 per cent.

If these figures are any indication of the position in this country, it would seem not unreasonable to suppose that reserve plant-capacity to-day in British industry amounts to a proportion of something between 20 and 30 per cent, even when full allowance has been made for the fact that much plant idle to-day may be obsolete or unsuitably placed for adequate utilization. To this it is legitimate to add two further quantities. First, potentialities which exist for more efficient utilization of existing resources by co-ordination and rational planning, even without any fundamental reconstruction or new investment. This is a quantity at which one can do no more than guess at present; and in any such guessing there is bound to be a very wide margin of error. But plenty of examples of such possibilities exist in the building trades, in textiles and in distribution, as well as in many of the smaller trades. Secondly, there are the possibilities of adapting resources and labour-power, previously used to supply luxury-demands for the rich, to producing the more essential and previously neglected

<sup>1</sup> Pp. 132 seq., 136, 178.

<sup>2</sup> *America's Capacity to Produce*, Ed. E. G. Nourse, p. 421, seq. This study claimed to base itself on "practically attainable capacity," not on "theoretical engineering capacity" (p. 24). The U.S. Dept. of Commerce Census of Manufacture estimated American output in 1921 as being only 57 per cent of maximum. Since employment in 1921 had declined by 25 per cent compared to 1919, output in 1919 could hardly have been more than 76 per cent of capacity. Prof. Paul Douglas concludes: "Even after allowing for idleness caused by archaic and obsolescent equipment maintained only to meet peak loads, and by technological necessities, it seems probable that there is a considerable proportion of the capital which is not utilized even in the busiest years." (*Theory of Wages*, p. 88.)



requirements of the masses. Akin to this is the transference of resources previously devoted to unproductive and monopolistic and racketeering activities, of which the distributive trades provide a large field. Clearly, not all such resources are quickly adaptable; and the potentialities of this type will be smaller in a short period of time than they will be over a longer period of time. When these quantities have been added in, it seems hard to believe that the total reserves which could be speedily drawn upon could be *less* than between 30 and 40 per cent. It might even prove to be considerably more. Even if we take our very cautious minimum figure of 30 per cent; this would mean a potential increase of production equivalent to something in the neighbourhood of £1,000 million, or an addition of something in the nature of 10s. per week to every working class man and woman and child, or an additional income of some £70 a year to every wage-earner and small-salary earner. This does not allow for the possibility of increased utilization of multiple shift systems and the drawing into employment of women, offered opportunities of careers and relieved of much domestic drudgery by improved social amenities, such as those discussed in a later chapter. If such factors as this are allowed for, a perspective of much more rapid expansion appears—a perspective in which actual shortage of labour would soon (as in U.S.S.R.) take the place of the contemporary surplus.

Indeed, this is the most arresting contrast of all: that while in capitalist society men are thrown on the scrap-heap in the interests of profit; in a socialist economy, where *expansion* of production was the dominant aim, actual shortage of labour, particularly of skilled labour, would probably constitute the principal limit of expansion. In such circumstances, the machine would no longer figure as the enemy of the worker but as his ally and friend.

But, this is to deal with short-period and immediate potentialities. There is the larger question, even more difficult to assess quantitatively, of the potentialities of reconstruction and fundamental reorganization. This would be something which would not show its fruit immediately; but would take time and an intervening construction period when part of the resources—part of the suggested £1,000 millions—would have to be invested in new construction projects, in financing research and in training new *cadres*, rather than in immediate housing projects or in an immediate expansion of the lighter consumers' trades. To such projects would belong the development of electrification, including railway electrification, and the re-equipment and improved location of

iron and steel production, the reorganization and modernizing of textile processes where much of the plant is out of date and modern methods such as ring-spindles relatively little used. Such schemes would have a particular relevance to the iron and steel and constructional trades, placing a specially large claim on their products, their man-power and resources. If we take account of the possibility of such schemes as these, can there be much doubt that the silent despondency of the Clyde, Tyneside, Middlesborough and South Wales would quickly change to hope and activity and the optimism of building a new Britain—a Britain not for the few but for the many?

The chapters which follow attempt to survey the potentialities for reorganization which exist in the case of the principal industries of the country: potentialities unrealized under capitalism, but realizable for the first time under a system of planned social production. In some cases, as in coal and power and textiles and agriculture, these potentialities are smothered because of the anarchy which prevails in the industry: the chaos of diffused ownership and uneconomic units of control, of competitive rivalries and duplication or of divided responsibility and conflicting authorities. In other cases, as is the growing fashion in a number of industries, progress is thwarted by monopoly or semi-monopoly, thriving on restriction rather than on expansion and resisting any innovation which endangers existing "capital-values." In yet other cases, of which the most notable are agriculture and building (despite the recent and temporary building "boomlet"), the industry is fettered because it serves the needs of the masses who lack the means to buy. This survey necessarily treats the problem in a sectional way, concentrating for the most part on the problems internal to the particular industry or its particular market. In so doing it inevitably underestimates the potentialities which exist for a planned economy. For it is in the relationships *between* industries and whole groups of industries that the restrictive effects of the existing system are principally manifest. For instance, there is the periodic tendency, as witnessed in recurring crises, for disproportionate development between industries, particularly between the two broad groups of industries, those which manufacture finished consumption-goods and those which manufacture capital-goods or means of production. On the other hand, there is the cumulative tendency to decline

**A General  
Economic  
Plan**

(exhibited especially in the recent depression) arising from the fact that monopolistic restriction (by a cartel or combine) in one industry tends to worsen the position (by narrowing the market or raising costs) of some other industry; and in so far as the latter meets the situation by restriction of output and of employment, it spreads the evil further; and so on in a vicious circle of decline. Again, there is the extent to which development and progress in one industry may be held back by the lack of development of some other, or even by uncertainty as to the future development of another; or investment may be short-sighted or misdirected owing to uncertainty as to the future course of investment and of technical innovation. In other words, the irrationality and obstacles to progress which one finds internal to particular industries one can see writ large, with magnified results, in the economic system as a whole. There can be little doubt as to the possibility of more even and rational development under a system which could subordinate investment policy as a whole, and with it the relative growth of different industries and the location of different industries, to a comprehensive plan—moreover, to a plan which took count of the future and was sketched over a period of years. To consider such possibilities in detail is beyond the scope of this volume. Moreover, to assess its possibilities is to enter a scarcely charted realm where estimate and presumption must necessarily do service for forecast. If we could imagine, however, such elements of planning introduced into any of the periods of development of the last century—into the age of railway development, into the “boom” of the '60's or of the late '90's, or more recently the age of electricity and oil—there would seem to be plenty of ground to presume that the achievements of those years could have been very substantially magnified, and the subsequent heritage of depression, disorganization and suffering almost, if not entirely, avoided. This presumption is greatly strengthened by the epoch-making achievements of planned economy in the Soviet Union in the present decade. It is largely for this reason that piecemeal planning, or the gradual and partial socialization recently proposed, for instance, as an immediate programme for the Labour Party by Mr. G. D. H. Cole, is quite inadequate to deal with the present situation—quite apart from the political impossibility of introducing “islands” of socialism in an otherwise capitalist world. The major results which socialism can achieve depend upon a *general* social plan; and this requires the prior expropriation of the capitalist class

throughout the leading industries of the country, and the passing of these industries completely and simultaneously into the hands of the Workers' State.

It is frequently maintained by economists that any such subordination of economic decisions to a general social plan would be at the expense of abandoning all basis of calculation and accounting and destroying the Consumers' Choice and the Retail Market consumers' freedom of choice.<sup>1</sup> This may seem a strange charge in view of the fact that in capitalist society "freedom of choice" in consumption is the privilege of the few, and for the masses is straitly limited or non-existent, and a stranger charge still in this advertising age. But apart from this, the charge is built on a misapprehension. In what Marx termed "the first stage of socialism"<sup>2</sup> work-incomes would still be paid in money, and would vary with the amount and quality of the work done; and as a corollary of this a free retail market would exist, in which people would be free to distribute their income in the way they preferred in choosing between the purchase of different goods. Only at a later stage, when socialism had so mastered and developed the productive forces as to overcome the problem of scarcity would it become possible universally to extend the range of "social services" provided gratuitously by the community on the principle of "to each according to his need." In other words, Marx's "second or higher stage of socialism," or communism, would come, not "out of the blue," as some ideal miraculously evoked from heaven to reign on earth, but on the basis of concrete economic developments which made it possible. As Marx said, in his *Critique of the Gotha Programme*: "Justice can never rise superior to the economic conditions of society and the cultural development conditioned by them." Freedom of choice through money-incomes spent on a retail market would become a thing of the past only in the degree that the possibilities of choosing were *widened*; money as a basis of calculation would "wither away" only to the extent that the problem of scarcity disappeared. Even in the earlier stage, of course, there would be certain things, and an increasing range of things, which probably would not be subject completely to the pricing-system and the retail market: for instance, health services

<sup>1</sup> Cf. *Collectivist Economic Planning*, Ed. Prof. Hayek, and L. Mises, *Die Gemeinwirtschaft*.

<sup>2</sup> In his *Critique of the Gotha Programme*.

and the supply of milk for children, education, libraries and recreational facilities and housing accommodation, which would be supplied gratuitously or at flat-rate or nominal charges or (like rents in U.S.S.R.) at prices proportioned to income. To an increasing extent this might come to be applied to other things classed to-day as "public utilities," such as electricity and gas or to things like communal meals, books, holiday-tours and transport. But to begin with, there is no doubt that for the great range of ordinary industrial commodities and foodstuffs, distribution through a retail market would prevail; and hence there would exist a system of retail prices for these commodities established in relation to consumers' demand. This system of retail prices would afford that scale of valuation, or scale of priorities, which planning decisions would need to take into account, in order to calculate (in some common denominator) the relative advantages of alternative allocations of productive resources: in terms of these prices of the finished commodities which they created the "productivity" of productive resources in different uses (as well as different combinations of them) could be calculated.<sup>1</sup> Thus there would exist *an* index which could enter into economic calculations. But this is not to say that it would be the only criterion, or even in a number of cases the dominant criterion. For a variety of reasons, it might be necessary to develop certain types of production by subsidizing them at the expense of restricting others; and the planning authority might well require to take

<sup>1</sup> It is not the place here to go into this problem fully, which is a technical one, and the subject of considerable controversy. (Cf. especially in this country *Econ. Journal*, June and December 1933, articles by Dickinson and Dobb, and *Review of Econ. Studies*, October 1934 and February 1935, articles by Lerner and Dobb, and review of *Collectivist Econ. Planning* in *Econ. Journal*, September 1935.) Suffice here to summarize the matter in this form: Planning decisions must necessarily be based on some form of social accounting and calculation; and this requires that diverse things, such as wheat, metal, leather, stockings and radio-sets, or stone, brick, wood, cement, should be reduced to some common denominator for purpose of comparison and calculation. Problems such as this will arise for the planning authority: certain stocks of metal can be turned into machinery for making boots or into machinery for baking more bread. It will presumably be possible to calculate the boot-productivity of the metal when made into a boot-machine and to calculate the bread-productivity of the metal when made into a baking-machine. What is necessary to *compare* the productivity of the metal in the two uses (and hence to establish some scale of priority for metal-distribution) is to assign some price or valuation to boots and to bread. With the price of boots and bread given, the "productivity" of the two uses for metal also could be imputed in value-terms and compared, without there being any "free market" for metal.

the initiative in educating the taste for certain things (particularly new commodities or higher qualities) by producing and selling them for a time at a deliberately cheapened price, as well as passively ascertaining the past and present demand. Moreover, supplementary methods of ascertaining the wishes of consumers (and so "weighting" the scale of priorities for different products) would doubtless be used, such as sample questionnaires and inquiries from the local committees of co-operatives—methods which are non-existent or little developed in the capitalist world.

There is a particular respect in which a socialist plan for industry would doubtless need to override "consumers' demand" as expressed individualistically through a retail market; that is, in the direction of a greater simplification and standardization of products.

**The Economies of Standardization** There is no doubt that the anarchy of the market to-day multiplies varieties and "lines" to an absurd and uneconomic extent—a tendency enormously encouraged by capitalist advertising, which is continually exploiting the taste for variety in order that each seller can annex a special and privileged market for his "unique" product. If one takes any of a whole range of goods such as vacuum-cleaners, radio-sets, furniture and household appurtenances generally, it is clear that there exists a plethora of competing and competitively advertised types far in excess of anything required by the convenience of consumers; and that if their number could be reduced to one or two standardized types, the resulting economy would be enormous and many of these things could probably be produced and sold at less than half their present price. To a lesser extent the same is true of many articles of clothing, of drugs and medicines and of metal tools, not to mention producers' goods and machine-parts, and in particular building materials. This is not to say that variety would be banished, and all men have to wear the same pattern tie and all women the same hat. Variety would, of course, still flourish where the advantage of variety was considerable, and there would be every incentive for it to do so. It is merely to say that where the demand for variety is small relatively to the economies to be obtained by greater standardization, a collective decision would be taken in favour of plenty and cheapness, and that there is abundant room to-day for economies to be attained by this means. Indeed, this, combined with the potentialities of

more standardized production-processes through planned co-ordination between plants and between whole industries, might be among the principal economies which socialist economy could achieve.

Little is said in this volume on the subject of foreign trade. On the administrative aspect of the question there is probably little that need be said. The precise administrative forms adopted would so much depend on the particular circumstances of the time that to generalize about them in the abstract is difficult or impossible. For instance, they would differ according to the direction of the bulk of our trade, and whether this trade was with capitalist countries or socialist countries. Presumably, there would be a good deal of decentralization in this trade, the trading departments of different industries making their bulk contracts, whether for sale or for purchase, with foreign organizations, subject to general control from a Foreign Trade Department or a Commissariat of Foreign Trade through a system of export and import licences, or of import and export quotas embodied in the annual industrial plan. This would presumably be the case with the cotton industry, in purchasing raw cotton and marketing finished cloth; or of the iron and steel industry in purchasing iron-ore from Sweden or Spain. An industry such as textiles might require to maintain a network of sales-agencies or agents abroad; whereas the export of machinery and constructional equipment would be made by direct contract with foreign firms. Trade Delegations of the Commissariat of Trade in foreign centres could serve as agencies for such contracts, or to co-ordinate and assist the specialized agencies of particular industries. The import of foodstuffs and consumers' goods would probably be centralized in the Co-operative Wholesale Society and/or specialized State import boards; and the export of the products of smaller industries, or of industries for whom the export market played a minor role, could be conducted through similar channels.

What is of vital importance, however, is the question of what would happen to the general trade-balance in a Soviet Britain. Would the export trade still serve the same markets as to-day, and would it consist of similar products? Would our import-capacity be impaired, and would Britain have to revert to a self-

sufficient or nearly sufficient unit with all the problems which this entails?

One matter of principle requires to be made clear at the outset. There would be no question of a socialist Britain deliberately adopting a policy of economic nationalism and aiming at self-sufficiency as an end in itself.

**Economic Nationalism** During a transition period, if subjected to a blockade by capitalist Powers, it might need to do so. If world conditions were abnormally unfavourable, it might need to be as self-sufficient as possible (as U.S.S.R. has had to do in the middle of a hostile capitalist world) for a decade or two. But in a socialist world it would certainly not pursue this as an aim; nor would it probably do so (except in certain vital and key industries) if the major part of the world remained capitalist, provided that it was able to carry on normal trading relations by means of trade agreements with these other countries. And, ruling out the disturbances of an immediate transition period, there is no reason why this should not be possible. Indeed, one of the great emancipating forces in a socialist Europe would be the throwing down of the walls of economic nationalism, which to-day, particularly in the fascist countries (though not only in them), is throttling the economic life of whole continents and spreading waste, starvation and destitution. If there were labour and materials idle in Britain, then of course it would be preferable to use them to produce goods rather than to buy goods from abroad, however cheaply, since the cost of producing these goods with British labour and materials that would otherwise go to waste would be nominal. Even so, it might be more productive to set these idle resources (if they were sufficiently adaptable) to making things for export in exchange for the goods required. But apart from this case, there would be no reason for a Soviet Britain to grow all the wheat needed for English bread, if in fact wheat could be more economically grown and imported from, say, the North Caucasus or from Canada, or to subsidize oil production in England heavily in preference to importing oil from Baku. True, in conditions of modern technique industrial methods are much more adaptable than in the nineteenth century: nations can turn their resources and their labour-power more easily to any type of production; and with modern scientific farming this is becoming true of agriculture as well. This means that, if forced to do so, a country can become self-sufficient in



things she never previously manufactured much more easily than was formerly the case: a fact very relevant to the question as to how British industry and agriculture would fare if a socialist Britain were to be faced for a time by a boycott from capitalist Powers. But while industrial methods may be more readily adaptable to any type of product, this does not mean that the principle of specialization and division of labour ceases to hold. A country, or an area, will still gain substantial economies by *specializing* on certain types of production and undertaking them on a large scale by standardized methods. Conversely, she will lose these advantages if she dissipates her resources in too many directions and utilizes them in a too diversified way. In other words, in a socialist world it would be in the general interest to develop regional specialization on different types of product to a fairly high level, with extensive exchange of products between these regions. At the same time, of course, this rule of regional specialization must not be pushed to an extreme, irrespective of circumstances; and in a number of cases, particularly where the products were bulky and costly to transport, a fair degree of diversified production in each region would undoubtedly prevail. In all cases the additional costs of transporting the finished product to its market would need to be balanced against the economy to be gained by further regional specialization.

Leaving the transition period and its special problems on one side, there seems no reason why the bulk of our import and export trade should not be organized on similar terms to those on which it is conducted to-day by trade agreements with the principal countries with which this trade is at present carried on even if those countries still remained capitalist and hostile to socialism. Indeed, improved organization of this trade and the advantage to be gained by collective bargaining over contracts might enable this trade to be conducted on appreciably better terms. Is it conceivable that the countries which produce agricultural goods and raw produce, thirsting as they are (and are likely to continue to be) for export markets, would refuse for very long to make trade agreements with a socialist Britain on terms at least as favourable as to-day? Moreover, the last twenty years has witnessed a pronounced tendency for the world output of primary products to increase and their world-price to fall. Britain is an importer primarily of such products; and the fall in their world-price has been sufficient apparently to offset in recent years the decline in world demand for British exports (as measured in Britain's net

terms of trade, or the barter-terms of her imports and exports).<sup>1</sup> Whether this tendency will continue in the future with anything like the force of the past two decades is to be doubted; but at any rate the tendency is likely to be for the prices of her vital imports to fall (relatively to export-prices) rather than to rise; and hence for the terms on which a future socialist Britain could contract to purchase necessary foodstuffs and raw products from abroad to get more favourable, rather than less.

But there is an important item in the British trade balance in which a socialist Britain would undoubtedly sustain a loss. This is in the so-called "invisible exports"—the money payments which accrue to British capitalism to-day as income on foreign investments, as fees to banking and insurance houses, and as freight-charges to shipping companies. In 1934 the total value of British imports amounted to £730 million, and exports and re-exports to £447 million. Of the imports nearly a half represented food, drink and tobacco, and between a quarter and a third raw materials. Export of goods, be it noted, fell short of paying for imported foodstuffs and raw materials by £100 million. The difference between imports and exports, amounting to some £293 million, was accounted for by "invisible exports", consisting in the main of the three following items:

The  
Cancellation  
of Foreign  
Tribute

Interest on foreign investments	..	£175 millions
Shipping income	.. ..	£70 ..
Short interest and commissions	..	£30 ..

A Soviet Britain would have to face the loss of most, probably all, of the first and third items, which in the clearest form represent items of tribute paid by the rest of the world to British imperialism. One of the first acts of a Soviet Britain would be to cancel debt-obligations to it from subject peoples. In cases of industrial debts, where the interest-charge represented a payment by individual capitalist concerns in foreign countries to British capitalists, the Soviet State might attempt to take over these claims, and make

<sup>1</sup> Cf. *inter alia*, Memorandum No. 23 of the London and Cambridge Econ. Service. In other words, the plight of British capitalism in the post-war crisis would have been much worse if the loss of her monopoly position in the world market had not been partly offset by the cheapening of the primary products which Britain imports.

some compromise-arrangement for their "writing-down" or their redemption by the debtor country over a period of years (as, for instance, was originally arranged between U.S.S.R. and China in connection with the Chinese Eastern Railway). Even so, there is the very strong chance of foreign capitalists completely repudiating such debts and refusing even to negotiate for a transitional arrangement.

To take the possibility at its worst, therefore, a Soviet Britain might have to see its imports reduced by some 28 per cent as compared with the 1934 figure. This would necessitate a development towards greater self-sufficiency, not only in such manufactures and semi-manufactures as at present come from abroad, but in foodstuffs as well; and/or, an attempt to export more goods to other countries at much lower prices than to-day. Moreover, an expansion of industry and a raising of the standard of life in a socialist Britain would tend to increase the need to procure foodstuffs and raw materials from abroad. Part of the economies to be obtained by socialist rationalization might, therefore, be swallowed up in making this possible and in offsetting these negative factors.

This is to put the blackest perspective on the situation and to neglect any counterbalancing factors. Even so, it cannot be used as an argument against attaining Soviet Power in Britain and for retaining capitalism, for the reason that this tribute which British Imperialism has drawn in the past is *already dwindling* and will dwindle further, probably at an accelerating rate. *Before* Soviet Power is established in Britain this monopoly-tribute may well have almost disappeared, or shrunk to a fraction of its present size. Indeed, such a shrinkage is likely to be a principal factor precipitating a revolutionary crisis and shaking the pillars of capitalist power. The crisis of recent years has already reduced the yield on foreign investments, in part by repudiation or "standstill agreements." The waning of the financial monopoly of the City of London has already advanced a long distance and is likely to advance further with currency-disturbances and the decline of international trade. If an international gold standard is not restored in the near future (and there is no evidence of its possibility), not only may international investment come to a standstill, but a wave of further repudiation is highly probable. (If nations have no desire or possibility of further borrowing, what is to prevent debtor-nations, where it is politically possible, from refusing to make continued interest-payment on past debts?)

When we add to this the effects of fresh economic crises, colonial revolts and war, it should be clear that capitalism itself, and not the arrival of Soviet Power, will give the death-blow to the major items of Britain's "invisible exports."

But to look only at the loss of "invisible exports" and the figures of the 1934 trade balance is to give a very partial and one-sided picture of the situation. Actually, there are likely to be a number of important "compensating factors" in a Soviet Britain whose influence would be in the opposite direction; and if we take these into account, there seems little reason to anticipate any serious

worsening of our conditions of trade with the rest of the world. In a completely socialist world there is every reason to expect an improvement, and a progressive improvement. In the first place, the very act of freeing colonial and semi-colonial countries from the Imperialist yoke, both politically and financially, and inviting them instead to join in a free federation of peoples, will clearly increase the chances of economic intercourse between us and them by trade agreements and special exchange-contracts. Just as Persia and Turkey, which were doing their best to foster internal development by placing barriers against indiscriminate competition from capitalist countries, were willing to make specially favourable trade treaties with Soviet Russia, is it not highly probable that India, China, Egypt, even New Zealand and Australia, would be favourably disposed to make preferential trade treaties with a Soviet Britain which had cancelled its political and financial claims over them? More important is the fact that the trade relations with other socialist countries would be enormously improved; for example, trade with the Soviet Union or with a socialist Germany or a socialist France. The growth of a chain of socialist countries would break down over the whole of that area the barriers which economic nationalism has to-day imposed and which are a principal reason for the shrinkage of international trade and of Britain's exports. Over such an area the possibilities of interchange of goods would be enormously increased. It must not be forgotten that in a socialist world satiety of needs would be the only limit to the possible expansion of demand and hence of exchange. Until the point of satiety was being approached in any line of production, every economy in production-costs would lead to an appreciable expansion of

demand for the cheapened article, and so to an expansion of that barter-process which exchange between countries would amount to in a socialist world. Added to the effect of throwing down those trade barriers which monopoly-capitalism has erected to-day would be the stimulating effect of industrial expansion and a rising standard of life throughout this area of socialist countries. The major part of the fall in British exports to-day has clearly been due to the world crisis: to diminished demand and the shrinkage of world trade. British exports (excluding re-exports) fell between 1929 and 1934 from £729 to £395 million; or, allowing for the fall in wholesale prices, by more than 25 per cent. A restoration of exports merely to the 1929 level in a socialist Britain would compensate for three-quarters of the loss of foreign interest-payments and of banking and insurance charges of which we have spoken.

If we imagine a situation in which a considerable part of Europe consisted of socialist countries and a considerable part of Africa and Asia of independent peoples' governments, is it not clear that the possibilities for a socialist Britain to extend her trade-relations would be very substantial? Britain still retains considerable advantages in the production of numerous things. The traditional excellence of British workmanship makes her specially well fitted for producing higher quality products. The possibilities of coal exports, even in face of competing sources of power, are discussed in a later section. Perhaps textiles are goods which other countries will most quickly and suitably produce for themselves. Even here are there not appreciable possibilities of British mills sharing in the enormously increased demand for textile products which any raising of the standard of life of the masses would create? A Dutch authority, Dr. Wisselink, has pointed out that China, with its 420 million inhabitants, has to-day an extraordinarily low consumption of textiles—about 2½ lb. per head each year. If this consumption were to be increased to 6 lbs per head, it would absorb the production of 10 million spindles working 52 hours a week—or nearly one-fifth of all the spindles in Lancashire. Yet even this level of 6 lbs. per head is still very low—much less than in Balkan countries, and less than 19 per cent of the per head consumption in U.S.A. Dr. Wisselink concludes that in a country like “China, where lies hidden such enormous potential buying power, which at any moment might quickly come in action, there is always the possibility of an increase in the demand which the industries of Japan and China would be.

powerless to meet for a time."<sup>1</sup> But it will need an emancipated Asia to quicken this "enormous potential buying power" into life.

It is in machinery and the making of constructional equipment that probably the greatest prospect for export trades in a Soviet Britain would lie. With an industrial development of formerly backward and subject peoples, previously fettered to a colonial status, the demand for machinery and constructional equipment is likely to expand at a more rapid rate than their capacity to manufacture these things themselves. Imagine, for example, the possibilities of railway building, the construction of roads and new towns in China and in Africa if developments were to take place there at all similar to those in Soviet Asia in recent years. In a socialist world at any rate, with an expanding industry and the maximum harnessing of science and technical advance to lighten human toil, there would seem to be a large and expanding role for a Soviet Britain to play for a whole epoch as a workshop of a developing world.

But how far are we justified in assuming that a Soviet Britain would be part of a socialist Europe and not an isolated unit in a capitalist world? This question brings

**The Transition Period** us to the problem of the transition period, which it is not the purpose of this book to discuss in detail.<sup>2</sup> Naturally, it is impossible to prophesy the precise international circumstances in which Soviet Power would be achieved in Britain. In these days of accentuated inequality of development of world capitalism, an attempt at precise prophecy would be specially barren: development proceeds dialectically and not in a continuous line, each phase of the crisis bringing new features of its own. But this much it seems possible to say. It is highly abstract and unreal to imagine the death of capitalism in Britain with the situation in the rest of the world remaining entirely unchanged. The very crisis which cracked the citadel of capitalism in Britain could not be a purely parochial one: it would inevitably be part of a European, indeed a world crisis which was working similar effects elsewhere. And can it be doubted that the seizure of power by the workers of Britain would have repercussions on other countries at least as great and pro-

<sup>1</sup> In *Concentration in the English Cotton Industry*, p. 40.

<sup>2</sup> Some of these problems have already been discussed elsewhere, e.g. by Emile Burns in *Capitalism, Communism and the Transition* and *The Way Out*.

bably much greater than the Russian Revolution of 1917—repercussions, not only on colonial countries, but on countries like France, Germany, Italy, Austria, Spain, Scandinavia and the Baltic States? It seems not at all unreasonable—quite the contrary—to assume that a socialist Britain could look for aid, not only to Soviet Russia, with her wheat-lands, her cotton-fields, her oil and her ore-deposits, but to a chain of socialist countries (at least of sympathetic “People’s Governments”) on the continent of Europe as well.<sup>1</sup>

True, there might be a time-lag. The workers might come into power in Britain at an earlier stage of the crisis, while Fascism, shaken but not yet broken, still maintained its iron heel over large areas of Europe. Even so, it seems improbable in the extreme that this event would not itself be the instrument which was destined to strike swiftly at the Achilles’ heel of fascist domination on the Continent. However, to the extent that such a time-lag occurred, there would be a difficult transition-period, during which much of what is said in this volume could not apply. But it is hardly likely that in such a situation of international crisis the “front” of the capitalist Powers would be so solid as to maintain a 100 per cent blockade of English ports for more than a few months. It has been estimated that stocks of primary foodstuffs and essential raw materials in this country suffice, with reasonable economy, for a period of between six and nine months.<sup>2</sup> An intensive and planned effort in the period of a harvest could very substantially increase the output of home-grown foodstuffs, as the experience of the last war showed. In things such as meat it would be possible to augment the supply for a temporary period by “living on capital” in the sense of reducing the size of existing herds. Oil, ores, cotton and wool, rubber and timber constitute raw materials of industry which are imported in large quantities. Also certain metals such as nickel and copper, though imported in smaller amounts, occupy key positions in industrial processes. Oil-supplies could be eked out for a time by a rapid development of hydrogenation from coal. Although home-production of timber is only some 5 or 6 per cent of imported timber, this amount could probably be increased sufficiently to meet minimum

<sup>1</sup> At present between 35 and 39 per cent of British trade is with Europe. Twenty-two per cent of our imports come from North and Central America, and 10 per cent from South America. Thirty-seven per cent of British imports are from British Empire countries and 46 per cent of exports go to Empire countries.

<sup>2</sup> Cf. Burns, *Only Way Out*, 64–65.

needs by more drastic cutting of existing trees. If no ore could be shipped from Sweden or Spain, it should be possible for a time to make good the loss by an intensive and organized collection of scrap; just as during the last war deficiencies in the supply of paper-pulp were made good by improvised organization of the collection of waste-paper. Rubber stocks in the country seem to be unusually large (some fifteen months' supply in 1931); and these could probably be eked out by the reclaiming of used rubber as adopted in U.S.A.<sup>1</sup> The most serious problems would consist of such materials as cotton and wool, copper and nickel; and the lack of them would certainly cripple industry fairly severely during a prolonged transition period. But it seems a far-fetched assumption to presume that after a crucial period of perhaps the first six or eight months, no ships could get through to British ports from Leningrad or the Black Sea, or from Egypt, India or South America to bring supplies of such essential things.

A further problem of the transition period is the possible disorganization caused by Fascist resistance, by concentration on measures of military defence, both internally against counter-revolutionary attacks and externally against blockade or invasion, and also by possible sabotage on the part of the technical staff of industry, and their refusal to work under the new conditions of workers' control. The extent of the former it is impossible to estimate. Much would depend on what was happening in other countries and on the degree of help which Fascist and counter-revolutionary elements could secure from abroad. On the other hand, much would depend on the strength, the organization, discipline and preparedness of the working-class movement and of its revolutionary vanguard, as well as on the measure of sympathy enjoyed among the middle and lower-middle class. From deliberate sabotage of technical staffs alone there seems to be much less to be feared than is often imagined. Why should not most engineers, research workers and office-workers be more, rather than less, willing to work for a socialist industry, operated by Workers' Councils on which they were themselves represented, than for capitalist trusts which restrict production in order to make profits for shareholders and "guinea-pig directors" for whom most practical technicians feel nothing but contempt? Anti-capitalist discontent has been growing rapidly in recent years among these sections, and is already very strong. Moreover, wide sections of technical and professional workers

<sup>1</sup> Cf. Burns, *op. cit.*, p. 67.



to-day have their professional organizations of a semi-trade union type; and little but the tradition of privileges and security which they are already losing prevents them from feeling a conscious identity of interest with the organized wage-earners. However, in what follows in this volume we have, of necessity, neglected these special problems of the transition period, and have assumed that, apart from temporary and remediable disorganization, no serious heritage of disorganization would remain to mar the "normal" working of a socialist economy. If Soviet Power were weak, hesitant, insufficiently rooted in the masses of the people, if capitalist resistance to expropriation were strong, ruthless and well-organized, then the picture which is sketched in this volume would have to be modified. What is attempted here is to give a picture of what the working people of this country could achieve if they had the will, the unity and the power.

One final matter connected with the transition period requires a brief mention: namely, the mode by which the expropriation of the capitalist class is carried out. If banishing **Compensation?** capitalists from Britain means anything at all, it must mean that income from large aggregations of property is obliterated, and that recipients of such income, not only no longer have a say in the control of industry, but can secure an income only by working. This implies socialization of land and capital without compensation. In the debates which have taken place on more than one occasion at Labour Party conferences on this issue, the advocates of compensation by "buying out" the capitalists have argued that it would be unfair to penalize owners of particular types of property because their industry was nationalized while others were not, and that it would be better to buy out existing shareholders by means of interest-bearing State bonds, the income on which could later be whittled down by progressive taxation. Dr. Dalton has recently proposed the buying out of capitalists by means of "terminable annuities" which expire after a period of years.<sup>1</sup> We can leave on one side the ethical question as to the "unfairness" of returning stolen property to the community without compensation when other stolen property is still at large. The whole question only has meaning when piecemeal and gradual socialization by stages is being considered. As has been pointed out above, not only is such piecemeal social-

<sup>1</sup> Cf. H. Dalton, *Practical Socialism*, p. 170; G. R. Mitchison, *First Workers' Government*, pp. 106, *seq.*

ism politically impossible, it is economically impossible, since the most important achievements of socialism depend on a complete displacement of vested interests and on a general and comprehensive economic plan. Soviet Power would need to clear the board and break the power of propertied interests by a simultaneous and widespread socialization of property. To remunerate this class even with "terminable annuities" would leave this class with funds, influence and their old social position, would drain the new Workers' State of funds and be an obstacle to the rapid improvement of the standard of life of the masses, just at the most crucial testing time of the new order, when the dangers and difficulties of the transition period were most acute. The constructive achievements of socialism necessitate the breaking of propertied interests and the rapid breaking of the influence of the class which to-day has its roots in property and monopoly. Necessity—necessity imposed by the class situation under capitalism—and not whims of policy determine this; and no financial subterfuges can conceal this fundamental fact. It will be the fact itself, and not whether it is done in kid-gloves or with bare hands, that will determine the degree of resistance which it evokes. But this is not to say that compensation, whether by "terminable annuities" or State bonds, would not be awarded to the small property-owner or in "hard cases." The special problem of the small working-farmer and the small-holder in agriculture is treated separately in a later section. Many workers have small shares in textile mills; many petty middle-class families have savings invested in railway debentures or in State savings certificates. Clearly there would be no question of confiscating these small savings-holdings; and a clear line of principle could be drawn between property-incomes above a certain minimum level, to which no compensation applied, and incomes below this level.

In conclusion, it is essential to mention one aspect of the constructive achievement of a Soviet Britain which in the course of time would undoubtedly be of very great importance: namely the creation of a new type of man. While this achievement promises to be of outstanding importance to human history, if social emancipation has any meaning, it is the most difficult to frame in concrete terms and the hardest to assess in terms of contemporary evidence. Something of its possibilities,

**The Creation  
of a  
New Man**

however, can be estimated by the new type of man that is arising to-day in the Soviet Union now that the fruits of the first Five Year Plan are being garnered. One aspect of the matter is the extent to which in a class society ability and initiative are wasted, because leadership and initiative are virtually the attribute of capital and a certain social position. Both in government and in industry this is strikingly so; and while the man of abnormal "push" and instinct for leadership may not be restrained by early poverty from climbing to be a captain of industry, a very great deal of good middling ability and some first-class ability is undoubtedly thwarted and wasted because it needs to be yoked with capital to succeed. One aspect of this in the scientific sphere is treated in a later section. Probably more important than this is the crushing effect which capitalism has on the very birth of initiative and constructive ability, even on interest and pride in work, among the masses of workers. Not merely poverty and bad living-conditions, but soul-killing cap-touching subjection to a master class and the consciousness of toiling to produce profits for that class deadens initiative and rouses hostility and antagonism to the whole industrial machine. The weak it fashions into obedient robots; the strong it rouses to hatred and revolt. Moreover, the very qualities which "survive" and are encouraged in capitalist society are not primarily social and productive qualities. They are qualities of commercial pushfulness or personal dominance—the qualities of the sleek-tongued salesman, the bullying foreman, or the smart estate speculator; and the genius of a Stavisky, a Kreuger, an Al Capone is of closely similar texture to the genius of the successful captain of industry or field-marshal of finance. Youth is educated in unselfishness and the "team spirit" only when it is destined to rule subject-peoples of an Empire or for purposes of war.

A Britain without capitalists could not only release and harness initiative and ability which to-day is wasted; it would provide new incentives, and incentives to *social* behaviour, of which a class system could never dream. The energy to-day pent up in the working class and directed largely into antagonism against the system, against machinery, against innovation, would have a constructive outlet in developing and improving a system which the workers owned and controlled. Little has been said in this volume of the detailed ways in which workers' control over industry would be exercised. This would need, in its detailed form, to be decided largely by experience and be adapted to particular

circumstances. But the principle would rule that, in addition to the ownership of land and industry being vested in the Soviet State instead of in individual capitalists and landowners, the workers would participate, through their organizations, at every possible point in the control and administration of industry. Not only would bodies such as works committees exercise important functions over working conditions inside the factory; but the administrative boards of the various industries, both in the districts and nationally, would include (probably would predominantly consist of) trade union nominees; while factory committees, trade unions, planning conferences of rank and file workers would doubtless participate in criticizing and amending the economic plan so far as it applied to their own sphere of work. In this way every worker would have a concrete sense that the industry belonged to him and was working for him: he would feel this in the particular and not merely in the general; while conversely, by participating in matters of policy and administration he would tend to gain an added sense of responsibility to the collectivity of which he was part. In this way the maximum of initiative "from below" would be stimulated. The principal advantage which "free" labour was always supposed to have over "slave" labour was the greater willingness to work and the improved quality of the work. How much more epoch-making is likely to be the result of complete emancipation from a propertied master class, and of the sentiment that for the first time industry belongs to the workers who operate it and is operating primarily in the interests of the working class! This new spirit is what has struck most forcibly thousands of people who have visited the Soviet Union and have come into any close contact with the new life. Something of its potential achievement is already becoming plain; for instance, in the societies of worker-inventors and the Stakhanov-movement in the U.S.S.R. It constitutes a unique quality in social history: a quality which promises achievements no less epoch-making in industry than it does in human psychology and in social life.

# II

## TRANSPORT

### I. TRANSPORT UNDER CAPITALISM

**T**RANSPORT seems at first sight an exception to the general state of industry under capitalism. Transport, together with the provision of postal services, power (electricity or gas), and water, forms one of the so-called public utilities—that is to say, services of such vital importance to other branches of capitalist production that the capitalists in their own interests have to curb some of the worst excesses of extortionate profit-making and anarchical competition. (For this purpose they make use of the organized power of the ruling class as a whole—that is to say, of the State. Marxists will see that the State regulation of public utilities, to which bourgeois theorists point as an example of the State acting in the interests of the “whole community,” is really in complete agreement with the function of the State as the “executive committee of the capitalist class.”)

Thus we find that the railways, which until recently were the most important means of transport in developed capitalist countries, are owned and run by the State in many countries (Belgium, Germany, Austria, Switzerland); and in practically all other countries they are closely regulated by the State in the matter of rates and charges, construction of competitive lines, safety of operation, etc. In Great Britain this function is exercised

by the Railway and Canal Commission and by the Railway Rates Tribunal, in the U.S.A. by the Inter-state Commerce Commission.

Nevertheless, the nationalization of transport, even in the most advanced capitalist countries (in fact, especially in them), is very incomplete; and the pay and conditions of transport workers are usually worse than those of the better-off workers under capitalism. Thus we find in Britain a chaotic tangle of competing railway lines in the industrial regions coupled with a serious lack of rail facilities in purely agricultural areas; in the United States predatory financiers have diverted into their own pockets millions of dollars subscribed by the public for railroad construction and held whole states to ransom with excessive and discriminating charges.

During the last twenty years both in Britain and in the U.S.A. the railways have been subjected to regulation (*i.e.*, the profits of railway capitalists limited for the sake of those of capitalists in general) by such legislation as the (American) Transportation Act of 1920 and the (British) Railways Act of 1921. But during the same period a new form of transport—motor transport—has risen into prominence; and, as is usual under capitalism, technical improvements, instead of increasing the wealth and lightening the toil of the masses, have simply intensified the anarchy of competition and have thrown workers remorselessly on the scrap-heap. Road transport has been so mishandled by its capitalist exploiters that the bulk of its enormous potentialities have gone to waste. The building of an extensive network of roads at the public expense has given a subsidy from the general taxpayer to road transport, diverting to the road much traffic technically more suitable for carriage by rail. Even when, as under recent taxation of road vehicles in Britain, this subsidy is withdrawn, uneconomic competition remains. In particular, the ill-assorted combination of State-regulated rates in railway transport with purely competitive rates in road haulage has led to a chaotic and technically indefensible division of traffic between the two agencies. Here as in so many cases, private ownership and its vested interests makes quite impossible a planned allocation of resources to the necessary tasks. Moreover the advent of a new form of transport, lacking the traditions of organized working-class action that have grown up in the railway service, has been used by the capitalist class as a means of undercutting wages and worsening conditions of toil for the workers.

Transport does not stand alone as an isolated section of a country's economic organization. It is closely linked with other industries and services. In particular, the industries dealing with power, including coal-mining, gas-making, the production of motor spirit and fuel oil from coal, and the generation of electricity, whether from coal or from water power, are so closely related to transport that they cannot be considered apart.

Here the question of railway electrification must be considered. Nowhere is the failure of capitalism seen more clearly than in its failure to deal comprehensively with this problem. The Southern Railway, serving the well-to-do residential suburbs of Outer South London and dealing with the remunerative luxury and holiday traffic to the South Coast, has pushed forward with schemes of electrification, while the densely populated working-class and lower-middle-class dormitories of North-East London have had for years to put up with transport conditions that are a disgrace to a "prosperous" country.<sup>1</sup>

The Weir Report of 1931 indicated that main-line electrification would be advantageous, even by capitalist standards. On a conservative estimate the yield of a comprehensive scheme of electrification would be 7 per cent (on a capital cost of £261 million).<sup>2</sup> This estimate was made on the basis of existing traffic and made no allowance for the effect of an increase of traffic due to the possibility of greater speeds and higher loads, nor did it take into account the effect of the greatly increased consumption of current in lowering the cost of production of electric power. Since the report was published the price of copper has fallen from about £75 to about £35 a ton, thus considerably reducing the cost and raising the probable yield of the scheme.

Why then has railway electrification not been undertaken under capitalism, if it offers a yield of 7 per cent or more?

(1) As the report makes clear, the scheme must be undertaken as a whole if it is to produce its full effect.

<sup>1</sup> A scheme has recently (June 1935) been launched by the L.P.T.B. to electrify *some* of the L.N.E.R. lines in north and north-east London. It was recently undertaken after the Government had guaranteed the raising of the capital.

<sup>2</sup> An additional £80 million would have to be expended in electrical equipment by the Central Electricity Board and other authorized undertakers. The economic return on this sum is included in the estimate of the price to be paid by the railways for electrical energy.

“Unless special conditions obtain, the electrification of small sections of a main-line railway system is unlikely to be economically justified on account of the costs of dual working, and the consequent inability to take the fullest advantage of the new capital expended on fixed equipment or haulage units.”<sup>1</sup>

But £261 million is a large amount for private enterprise to risk in the period of capitalist crisis.

(2) The fact that much capital already sunk in the railways is now unproductive and that the holders of ordinary and deferred shares are getting less than their anticipated return makes it difficult to raise fresh capital. Existing shareholders would demand that any increased profits should go to restore the pre-war value of their securities before dividends are paid on new capital. Thus division of interest between sections of the capitalist class delays technical progress.

(3) Finally there is the inability of capitalism to plan economic activity *as a whole*. Transport by itself or power by itself they can deal with, but the co-ordination of the two is obstructed by sectional interests. The railways would benefit from cheap power, the electricity grid (and hence the distributing undertakers) would benefit from the increased demand from the railways; but each group of capitalists is thinking of its own interests and they cannot co-operate.

British railways have been and are still characterized by six defects:

British Railways	(1) Avoidably high cost of construction; (2) Duplication and overlapping of facilities in some districts, together with lack of facilities in others; (3) High rates and fares (a consequence of the two foregoing); (4) Unprogressive administration; (5) Bad labour conditions; (6) An anarchic rate system.
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(1) Cost of Construction.—The following table shows the capital actually expended in railways in Great Britain up to the end of 1932.<sup>2</sup>

<sup>1</sup> *Report of the Committee on Main Line Electrification, 1931*, p. 26 (xix).

<sup>2</sup> Ministry of Transport; *Railway Returns . . . for the Year 1932*. (Later returns exclude data relating to lines operated by the L.P.T.B.)



	£ million	£ thousand per route mile
Total Capital expended (including ancillary enterprises) ..	1256	62
Total Capital expended on railway proper (including railway workshops) .. .. .	1086	53
Total Capital expended on permanent way and buildings ..	899	44
Total route mileage—20,383		

*Comparison with Capital Cost of Railways in some other Countries<sup>1</sup>*

	Paid-up Capital	
	£ per route mile	£ per mile single track
Great Britain (1908) ..	63,778	36,917
Belgium (1906) ..	35,381	—
France (1905) ..	25,285	—
Germany (1907) ..	22,296	—
United States (1908) ..	11,106	10,372
Sweden (1905) ..	6,647	—

(The statistics are pre-War, but the bulk of the railway system in the countries concerned had been constructed by the date of the return and the use of pre-War figures avoids the complications due to post-War currency fluctuations. The comparison is thus fairly representative of present-day conditions.)

It is true that, in return for this expenditure, British railways have been built in a substantial and enduring manner—one has only to look at some of the bridges and embankments built ninety years ago and still good for another 190—with well-laid road-beds, easy grades and gentle curves, made possible by tunnels, cuttings and embankments that must have taken untold millions of labour-hours to construct. But it is not on technical excellence alone that the money has been spent. The capital costs of British railways have been enormously inflated by the cost of acquisition of land and by the legal costs of promotion. This is what the Royal Commission on Transport of 1930 says in its *Final Report*:<sup>2</sup>

“46. In some respects British railways have suffered from the fact that they were pioneers in this great revolution in transport;

<sup>1</sup> *Encyclopedia Britannica* (eleventh ed.) art. “Railways,” Tables VIII, IX and XIX.

<sup>2</sup> Cmd. 3751/1931.

we made or allowed to be made mistakes which other countries—and especially new countries—were able to avoid, profiting as they did by our experience. These early mistakes have placed on our railways certain disadvantages and handicaps which do not exist elsewhere. Not the least of these is the very heavy capital expenditure with which the companies were burdened in construction.

“48. . . . Extremely high prices were paid for land in order to buy off the opposition of influential land owners and to meet claims for compensation in respect of depreciation, real or fancied, to estates and the destruction of amenities. . . .

“49. With the great number of promotions—good, bad and indifferent—which took place during the second quarter of the nineteenth century there was, no doubt, much sound criticism and justifiable opposition but, speaking generally, it was opposition based on the interests of individuals or on the lack of foresight on the part of authorities which placed such heavy additional capital burdens on our railways and, incidentally, involved them in abnormally heavy Parliamentary fees. . . .

“50. Much wasteful expenditure was also incurred in unnecessary competition between rival companies. This was due to the policy of Parliament which, in the early days of railways and with the object of preventing the abuse of what tended to become monopoly, deliberately fostered competition by authorising a large number of small separate undertakings. . . . Within limits competition is good, and it may be argued with some force that this policy led in many cases to the provision of better services and facilities, but a policy which permits and, indeed, compels a number of agents to compete with one another for the same ton of traffic cannot be regarded as other than uneconomic.”

(2) Duplicating and overlapping of facilities.—The construction of competitive lines referred to in §50 of the *Report of the Royal Commission on Transport* has produced in many districts a veritable spider's web of lines, multiplied far beyond the transport needs of the district and ill-arranged for traffic purposes. Especially in coal-fields has this process gone on (except in the North-East Coast where the North-Eastern Railway early obtained a monopoly). Lanarkshire and the West Riding of Yorkshire afford good examples. The confusion of railway terminals in Leeds and Manchester, the duplication of lines in the Spenn Valley and in South Wales, show what monstrosities free competition could give rise to in the hey-day of capitalism. To replan the railway network and terminal facilities will cost millions, even

if the tangle of property relations and vested interests under capitalism can be overridden. Kent affords another example of duplicated facilities, this time without the excuse of heavy mineral traffic. The competition of the former London, Chatham and Dover and South-Eastern Railways has resulted in there being nearly twice the mileage of railway necessary to give the county adequate facilities and two (or even three) railway stations in nearly every town of any size in Kent, none of them large enough to warrant more than one. As a consequence, too many light trains have to be run, where with a well-planned network fewer trains with fuller loads would handle the traffic quicker and at less cost.

On the other hand, those parts of Britain that did not offer the prospect of immediate returns in the way of remunerative traffic have been left without proper railway facilities. In these days of road transport this is not so serious, but during the period 1870–1910 this fact was doubtless responsible for the relative decline of many rural regions and the concentration of the population into the industrial areas and into the region within fifty miles of London. About the end of the century there was a brief flash of enthusiasm for light railways, after the model of the very useful and successful *chemins-de-fer vicinaux* and *kleinbahnen* of France, Belgium, Germany, Holland and other countries. But vested interests and the greed of landlords smothered them in the womb or put a millstone of promotion costs round their necks as soon as they were born. Few of them were built and most of them have closed down since the coming of the motor-vehicle. It would probably not be worth while constructing railways of this type nowadays, but if during the last fifty years they had been built more extensively in the agricultural parts of Britain and in the regions of sparse population like Wales and the Scottish Highlands, British agriculture would not to-day be in quite as bad a plight as it is.

(3) High Rates and Fares.—The high charges of British railways have frequently been commented on and compared unfavourably with charges on the continent of Europe, both before and since the coming of the railway's powerful rival the road motor-vehicle.

In making comparisons with Europe it should be remembered that the standard of service given by the railways in Britain is higher than in continental Europe. Our normal goods service corresponds rather to the *grande vitesse* or express service than

to the ordinary *petite vitesse* goods service of Continental railways.

Similarly our third-class carriages correspond in comfort to those of the second class on the Continent and are run as a matter of course on all trains, whereas in France, for instance, the faster trains are first and second-class (or even first-class) only. Our long-distance passenger trains are on the average faster and certainly more frequent, and there is no extra charge for travelling by express trains.<sup>1</sup> Moreover, British railways have been constructed to a higher standard of technical soundness and safety than Continental railways.

Nevertheless, the absence of high promotion and land-acquisition charges, the planning of a rational network from the beginning, the absence of functionless but highly-paid directors, and the adoption of simple and rational tariffs have given a considerable advantage to the State railways of some countries, such as Belgium and Germany. It should also be remembered that, except in Belgium, the average traffic density is less in most Continental countries—in some much less—than in England, a factor which might be expected to raise operation costs considerably.

(4) Unprogressive administration.—The aspect most obvious to the travelling public is that of speed. While at one time British railways led the world for speed, they are now lagging seriously behind their own records of the past and are being overtaken by more progressive railway administration in the U.S.A. and on the Continent. During the War they lowered their previously high standards of speed for economy's sake, and since then neither the rising standards of other countries nor the insistent pressure of competition from road and air transport has succeeded in rousing the railway companies from their apathy. Year after year the *Railway Magazine* comments on the fact that the scheduled times by express train between most of the chief towns of the United Kingdom are greater than they were before the War. (Last summer—1935—an improvement was made, but chiefly in trains to holiday resorts.) Particularly in cross-country services and in medium-distance inter-urban transit is this backwardness of British railways noticeable. In the U.S.A. and Canada or in Germany a dense industrial region like South Lancashire, the West Riding of Yorkshire, or the lower Clyde valley would be covered with a network of electrified inter-urban railways, with swift, clean trains shuttling rapidly between

<sup>1</sup> Except in the case of the "Silver Jubilee" train on the L.N.E.R.

the chief centres at frequent and regular intervals. Compare with this the dirty, slow steam trains, running on irregular and infrequent schedules, between, say, Leeds and Halifax, Manchester and Wigan, or Glasgow and Motherwell. Here is another excerpt from the *Report of the Royal Commission on Transport*:

"133. No doubt the trains run in the middle of last century were very light compared with the immensely heavy loads hauled by express locomotives to-day, but it is certainly remarkable that there has been practically no improvement in locomotive speed in this country during the last eighty years. The fastest long-distance train to-day (1930) is the 'Cornish Riviera' Express which accomplishes the run (non-stop) from Paddington to Penzance, a distance of  $225\frac{1}{2}$  miles, in four hours, i.e., at an average speed of  $56\frac{1}{2}$  miles an hour. This is a fine performance, far better than that of the 'Flying Scotsman' which runs non-stop to Edinburgh at an average speed of  $47\frac{1}{2}$  miles an hour and which, it is curious to observe, takes as long to accomplish the journey without a stop as it did when it stopped on the way. The length of such journeys as these, however, precludes the possibility of serious road competition; it is in the short and moderate distance journeys that the railways have lost passenger traffic by failing to make full use of their capacity for speed. . . .

"Cross-country journeys by rail, with a few notable exceptions, are slow and usually involve changes—often with long waits—at junctions. . . ."

But a moderate and unprogressive standard in speed could be tolerated, if it were accompanied by great attention to safety, both of passengers and of railway staff, and by considerate treatment of workers: "Slow but sure" would not be too bad a motto. This is not however the case. British railway directorates are exceedingly loth to instal safety devices. Proper signalling devices, the block system, automatic brakes, and other safety measures now the standard practice on our railways have been forced upon the railway directorates by Parliament, after years of agitation inside and outside that august body. Always the railway directors said: (a) it is ineffective; (b) it is unnecessary, existing methods are perfectly safe; (c) it is too expensive, we must consider our shareholders. Always the railway director M.P.'s fought stubbornly against these measures. At the present time the struggle is over track circuiting and automatic train control (a device which operates a warning signal in the cab if the train overruns a "danger" signal and automatically brings the train to a standstill if the warning is still ignored). Some railways

(such as the G.W.R.) have installed this device. Others refuse, on the score of expense. Yet one-third of the average annual distributed profits of the British railways would suffice to equip the remaining uncontrolled main lines, and accidents such as the recent one at Welwyn on the L.N.E.R. (15 June, 1935) would be made practically impossible. Another matter is gas lighting, with all the dread possibilities that it implies in the event of accident. To-day about 35 per cent of railway passenger vehicles are lighted with gas. Again, there is the present antiquated and dangerous method of coupling carriages and wagons. Automatic couplings are standard practice in the U.S.A.<sup>1</sup> and Canada, in Australia and in New Zealand. Yet our British railway magnates declare that they are impracticable. So the daily toll of deaths and injuries among railwaymen continues.<sup>2</sup>

One more point of technical inefficiency due to private ownership may be mentioned. That is the continued existence of privately owned wagons. There are about 700,000 of these in use in Great Britain and as the Standing Committee on Mineral Transport say in their *First Report* (Cmd. 3420/1929): "There can be no question that the great diversity of ownership increases the actual cost of transport in consequence of extra shunting, and extra managerial, clerical and other overhead expenses." The N.U.R. and the R.C.A. urged before the Royal Commission on Transport the abolition of the privately owned wagon, on the ground that it involves a great deal of empty haulage, causing thereby unnecessary waste. (Royal Commission on Transport, §§ 117, 120, 154.) Sir Ralph Wedgwood, Chief General Manager of the L.N.E.R. has calculated that the elimination of the private wagon would effect a saving to the railways of nearly £1 million per annum, while many authorities put it higher still. (*Times*, 26 May, 1932.)

(5) Labour conditions.—In the past, conditions were very bad on British railways. Railwaymen were paid worse than men of equivalent skill and responsibility in other occupations and were forced to work long hours under conditions of incessant strain and fatigue. A generation of trade-union effort has brought standards in the railway industry nearer to those prevailing in other industries. During the nineteenth century the railway directors were among the most haughty of the magnates of capital,

<sup>1</sup> Automatic couplings were made compulsory by law in the U.S.A., June, 1900.

<sup>2</sup> In 1934, 216 railwaymen were killed and 2,398 injured in accidents.

not only refusing to recognize the unions, but maintaining the policy of the open shop in full vigour. Stubbornly, too, did the railway magnates resist Parliamentary interference with their right to exploit "their" employees. While legislative concern with the safety of the travelling public dates from the Regulation of Railways Act of 1842, it was not until 1900 that by the Railway Employment (Prevention of Accidents) Act the Board of Trade was given power to make regulations affecting the safety of railway employees.

Nowadays capitalism, pursuing its policy of divide and rule, is pitting low pay and long hours of road transport workers against the railway workers, seeking thereby to lower railway standards. After a short period of calm during the days of capitalist stabilization, when the railways were almost a "sheltered industry" a fresh wave of attacks on railway standards is being launched: speeding up and wage reductions are once more the order of the day. Road competition is the great bogey (yet the Railway Companies are now large shareholders in nearly all the road passenger transport undertakings.)

(6) The anarchic rate system.—Railways began their existence with such an immense superiority over their rivals that they could charge almost what they liked for their services and still take the traffic away from stage coach and carrier's wagon. Thus arose the practice of "charging what the traffic would bear," which has developed into the present complicated system of rates, according to which goods are conveyed at rates that vary, roughly speaking, proportionately to their selling price. In other words a railway rate is more akin to a tax than to a charge for a service. This principle of basing rates on the value of commodities carried is modified by "exceptional rates," which are reduced rates granted to traders to enable them to compete successfully in distant markets. This has had many consequences, but here we can only mention two. One is that, since there is little relation between the cost of and the charge for transport services, the anarchy of competition is intensified. Many manufactures are established, not where total costs (of production and distribution) are low, but where a low rate can be extorted from the railway company (often because of competition between railways); thus the existing location of industry in Britain is a completely irrational one. The other consequence of our rate system is that, when road transport came, with a tendency to fix its charges on the average cost of carriage, the whole basis of railway rates collapsed.

Road transport naturally took the richest (highest-rated) traffic and left the railways to carry the poor traffic. The Railways Act of 1921 established the principle of fixing railway rates by a special tribunal which should so adjust the average *level* of rates (while leaving the *structure* of rates as a whole substantially unaffected) as to bring in a certain "standard revenue," based on the capital expended by the railway companies. Any surplus over this was to be divided between the railways and the traders in the ratio of one to four by means of a lowering of rates and charges. This scheme, which would have been an admirable safeguard against the monopoly power of the railway companies if it had been enacted in, say, 1881, was out of date before it was passed by Parliament. The railways have obtained road powers and now run road services of their own for goods (they also hold extensive shares in omnibus companies), but they are simply competing with themselves. Sooner or later the railway rate system will have to be completely overhauled, on the principle of the uniform ton-mile charge for all classes of goods; but this, under the private ownership of industry, will cause immense dislocation.

The present position of British railways is one of decline. Burdened by high construction costs and by an ill-planned network of lines, excessive in some places and defective in others, their charges have been so high that they have been particularly vulnerable to road competition. The road carrier takes his pick of the traffic, competing for the more remunerative and leaving the railway to carry the low-rated goods. Apart from the competition of the roads, the prolonged crisis of capitalism and the growth of monopoly (called "rationalization"), by diminishing the volume of goods produced, has been responsible for a further diminution of railway traffic. Receipts have fallen off and the "standard revenue" of the Act of 1921 has never been earned since the Act came into force. In spite of cutting down and de-grading of staff, wage-reductions, and "speed-ups," by which labour costs have been reduced by 15 per cent during the six years 1927-32, the holy-of-holies of capitalist enterprise has suffered damage—profits although not disappearing (they amounted to £32 million even in 1932) have fallen below the amount necessary to pay dividends on the ordinary stock at the rates that railway in-



vestors had come to expect during the golden days of expanding capitalism.

As has been already indicated, the power-driven road vehicle, although technically a valuable addition to our means of transport, has not been properly utilized by profit-making capitalism. Owing to the strange mixture of competition and monopoly that is characteristic of capitalism in its decline, and to ill-contrived methods of fixing railway rates and of paying for the cost of the road systems, the road vehicle has at the same time been forced into uses for which it is not suited (because by a fortuitous combination of causes it is "cheap" from the individual capitalist's point of view), and kept out of uses where it would have been serviceable.

**Road Transport**

When mechanical road transport first began, the roads were built and maintained by the local authorities at the cost of the general ratepayer. In the days when road transport was by horse-vehicle, it was purely local, either short-distance cartage or delivery of goods that had gone most of their journey by rail, canal or coasting vessel. It was complementary not competitive in relation to other means of transport. But with the rise of motor traffic the road began to compete with other forms of transport, especially with the railway. Then the road haulier, having the use of roads built at the general expense, was in fact subsidized; the traffic that was diverted to the road was carried at costs that were apparently, but not really, low. In 1920 the principle was established that the proceeds of taxation in motor vehicles should be paid into a special fund—the Road Fund—and be ear-marked for road construction. Even in spite of occasional "raids" on the Road Fund by needy Chancellors of the Exchequer, the large expenditure of local authorities (out of rates) continued to tilt the balance in the direction of a subsidy to road transport. In 1930 the total expenditure, by central and local authorities, on roads was about £60 million and licence duties plus petrol tax brought in about £40 million. Thus for every pound contributed by the road users the general tax and ratepayer contributed ten shillings. It was not until 1931 that an increase in the rates of taxation of vehicles and an increase in the petrol tax established a rough balance. Before then the State had subsidized the vested interests of the road and enabled them to deprive the railways of traffic for which they were technically

and economically suited. The conflict between the railway rate system and the road haulier's charges has been discussed in an earlier section. It has resulted in an uneconomical distribution of traffic between rail and road.

A further source of concealed subsidy to the road interests was the prevalence of low wage standards and long hours of work on the roads. The railwaymen had built up strong trade unions, and fought for decent standards. Then the capitalists subsidized a form of transport where unionism was weak and standards low, and said to the railwaymen: "You must accept a wage cut and work longer hours: your existing standards cannot be maintained in the face of the competition of road transport." Divide and rule. However, the Road Traffic Act of 1930 and the Road and Rail Traffic Act of 1933 established legislative protection for road transport workers on similar lines to that applying to railway workers, but less effective. Such as they are they have been widely evaded by road transport operators, and the workers being to a large extent unorganized are easy victims of capitalist extortion and oppression. The passenger road-transport workers (drivers and conductors of omnibuses and motor-coaches) in particular suffer many impositions which no Act of Parliament guards them against and which they are not as yet strongly enough organized to resist. The hours of work are long—a fifty-four-hour week being found in many services—with a "spread-over" which may extend a nominal eight or nine-hour day to twelve or sixteen. Pay is low, especially in the country districts. Many omnibus companies make a practice of taking on conductors at eighteen years of age, paying them as little as 7d. an hour, and then dismissing them when they require an adult man's wage; other companies employ chiefly women conductors. Speeding-up is a chronic complaint. Bus routes are lengthened while the same time is allowed for the longer distance as previously for the shorter.

A subtle form of speed-up, little realized by the general public, results automatically from the tremendous increase of traffic in our great cities: a bus route may be running on the same schedule as in 1920 and the work of the driver and conductor will be nominally the same as it was in 1920, but the skill and attention required, the expenditure of nervous energy and the consciousness of responsibility are immeasurably greater than they were fifteen years ago. No wonder busmen suffer from diseases of nervous origin.

A recent danger to road-transport workers has been raised by the suggestion of an industrial psychologist that certain men are "accident-prone," i.e. are abnormally liable, due to physiological and psychological peculiarities, to be involved in road accidents. This highly speculative hypothesis, which needs further experimental testing before it can be accepted as a basis for the sifting of personnel, has been seized on with avidity by road-transport employers who see in it an admirable device for getting rid, in a truly "scientific" way, of workers whose political and trade-union activities are unwelcome.

Another reason for the favour shown to road transport by capitalist State is the fear of a General Strike. The threat of such an action by organized labour in 1921 (Black Friday) and the actuality in 1926 drove the supporters of the existing order to foster a form of transport which is decentralized, easily improvised, whose labour is largely unorganized and which can easily be manned by "amateur" labour. The uselessness of blackleg labour in the highly specialized operations of railway transport during the railway strikes of 1919 and the General Strike of 1926 emphasized the desirability of encouraging an industry less blackleg-proof than the railway and easily fitted in with the Organization for the Maintenance of Supplies.

Now, however, the epoch of competition in transport is over. The capitalists have closed their routes and monopoly is the order of the day. The Road Traffic Act of 1930 and the Road and Rail Traffic Act of 1933 establish a system of licensing which will in time enable the railways once more to control the field. Moreover the revision of motor taxation has restored to the railways some of their technical advantage. Above all in passenger transport is the fusing of interests to be seen. Two holding companies—Thomas Tilling, Ltd. and the British Electric Traction Co.,—together with the Big Four railway companies, now control the share capital of nearly all the omnibus companies operating in Great Britain. In goods transport, too, the railways have acquired large road interests, such as the famous firms of Carter Paterson, Ltd. and the Hay's Wharf Cartage Co. (including Pickfords, Ltd. and other subsidiaries). However, the railways' direct control is less evident in goods than in passenger transport. The co-ordination and rationalization of transport is being effected under capitalism but in such a way as to leave the capitalist interests in even securer possession of their rights to profit and in a position to play off one section of workers against another and to make

fullest use of the Emergency Powers Act and the Organization for the Maintenance of Supplies in case the workers do again challenge their masters by united strike action.

## II. TRANSPORT IN SOVIET BRITAIN

### A. Land Transport

A Soviet government would immediately nationalize, without compensation, all the more important transport undertakings—  
 all railways, tramways (not already municipalized), canals, canal carriers, and all road transport undertakings owning more than (say) five vehicles.<sup>1</sup> At the same time it would cancel all interest and dividend obligations of municipal and State-owned transport undertakings. Thus the toll of interest and profit that is at present levied by capital would be made available either for the improvement of wages and working conditions, the reduction of charges, the improvement and extension of the plant, or for general social purposes. In this way all the transport resources of the country would be put at the disposal of the workers, and it would be possible to operate them according to a social plan without any of the hindrances due to private property rights and other vested interests. Since the same thing would have been done with all coal-mines, oil businesses, electricity and gas works, the way would be clear to a comprehensive planning of the related services of power and transport *as a whole*. (The already State-owned Post Office would come into the same scheme.) The Land Transport Authority so created would construct and maintain all railways, roads, canals, navigable waterways, bridges, ferries, etc.; and operate all transport services by rail, road and canal. (Air and sea transport will be considered separately.) It would undertake all transport outside the works gates for nationalized undertakings in all branches of industry and by its power of control over the private sector would take over the road haulage done by the remaining private firms for themselves in their own vehicles, whenever an economy in operation would thereby be effected.

<sup>1</sup> Small haulage firms, occasional carriers, and firms not yet nationalized who do their own road transport would be allowed, provisionally, to carry goods by road under licence (revocable) of the Road Transport Commission.

Having complete control over all forms of transport, the L.T.A. would be able in each particular case to make use of the most efficient means for the purpose. In order to judge the relative efficiency of different means of transport for various types of traffic, the most accurate costing system must be established throughout all socialist transport enterprises, to the end that the cost of carriage by different means of transport, and by the same means of transport in different places, may be accurately known and compared.

The administration of this gigantic transport undertaking would be a difficult job. Although transport **Organization** must be planned as a unified whole, it must be decentralized for purposes of efficient management.

At the head of the entire transport system, by land, sea and air, would be the Commissariat of Transport and Communications. Under it would be the separate Authorities for the different branches of transport. The Post Office would either function as a separate organization directly under the Commissariat of Transport, or it would be organized as part of the Land Transport Authority.

The existing railways would be united into a single unified State Railway (forming part of the L.T.A.) and then divided into a number of "areas" on the lines of the present L.N.E.R. area organization. The L.N.E.R., as at present, would make three of these, the L.M.S.R. probably three, the G.W.R. possibly two, the S.R. would form a single area. Thus there would be about nine railway areas, subdivided, as at present, into operating divisions. Each area would enjoy considerable autonomy and for many purposes would be worked as a separate railway. But the administration of the State Railway would have extensive powers of standardizing rolling-stock, signal equipment, etc.; of allocating rolling-stock to areas; of co-ordinating programmes of capital construction; and of co-ordinating time-tables (incidentally it would absorb the functions of the present Railway Clearing House). The areas would correspond roughly to the present companies' systems, but lines could be transferred from one to the other to suit convenience in operation, without regard to rights of ownership or vested interests of shareholders. (For example, the two Scottish areas—L.M.S. and L.N.E.R.—might conveniently be reshuffled into two, or three, new areas.)

Road transport would be administered, under the L.T.A., by a Road Transport Commission. This would have under it a Highway Board, which would be the present Road Board, with its functions enlarged so as to make it an effective body for planning and constructing new roads and routes. As at present, the local government authorities would co-operate with it and act as its agents for the actual execution of the work. Actual transport would be in the hands of a number of regional operating boards. It would probably be found best to have separate boards for passenger and for goods transport, grouped under separate sections of the Commission. Each section would have wide powers of control over the actual vehicles, allotting them to different regions according to the traffic forthcoming.

In a similar manner there would be an Inland Water Transport Commission, operating such canals and navigations as were deemed by the L.T.A. worth retaining in use, and a Coastal Shipping Commission, operating coastal services (see the section on Sea Transport). In order to ensure the most efficient co-operation of all forms of transport, there would be regional co-ordinating committees, and a central co-ordinating committee immediately under the L.T.A., having access to all statistics of traffic, receipts, and operating expenditure.

The present chaotic tangle of railway rates and road hauliers' charges would be simplified and made uniform. The L.T.A. would provide *transport*—not just rail transport or road transport or canal transport, but transport by the most convenient and expeditious method—for socialized industry and for the general public at fixed and known charges. As for goods transport, the present system of "charging what the traffic will bear" with its jumble of class rates and exceptional rates would be superseded by a simple system of a uniform tapering ton-mile rate for the great bulk of commodities, based on the average costs of handling traffic. There would be a few special rates for particular commodities, whose costs of conveyance were definitely above or below the average, by reason of excessive bulk or the need of exceptional care in the one case (such as cardboard cartons, electrical apparatus, or explosives), or by reason of facilities for bulk handling in the other (such as coal or iron ore). As for passenger transport, the present confusion of rail and road fares, of ordinary and excursion fares would be replaced by a single

**Fares, Rates,  
and Charges**

set of charges based on mileage. The snobbish distinction between first and third class, with its attendant waste of space and extra cost in train-marshalling, would likewise be abolished. Workmen's fares and season tickets would be continued for a time, until the economic planning authorities had properly co-ordinated housing and transport.

The reason for this simplification is not merely administrative convenience or a desire for simplicity for its own sake, but the necessity, in a planned economy, for making transport charges correspond to the real costs of transport. Only then will it be possible to plan rationally the location of industries, so that both the production and the distribution of goods will take place with the least total expenditure of human effort. It must be remembered that transport is a means to an end, not an end in itself. Thus there is no point in increasing the number of ton-miles carried by rail or road, unless the total costs of production are thereby reduced. Under some circumstances a more rational location of industry may enable a given volume of goods to be delivered into the consumer's hands with *less* use of transport agencies, so economizing human labour. For example, the generation of electricity in large central power stations situated near the mines would not only economize coal in the actual generation of power but also eliminate much unnecessary hauling of coal in trucks about the country. For the same reason, an accurate system of costing must be installed within the unified transport system itself. Only so can the transport system reach the highest degree of efficiency both in itself and as an organ of the whole economy.

The word efficiency requires further explanation. Efficiency in transport may be interpreted solely in terms of cost or in terms of other factors, such as speed, reliability, freedom from damage, safety to persons, etc. With regard to safety and reliability no problem arises. The Soviet transport authority must make it its duty to maintain in the conduct of its undertaking the highest possible standards in these respects. But speed may conflict with cost, in that a form of transport that is most efficient in the sense of giving the shortest time of transit is probably not the cheapest. Hence in many cases it would be desirable to provide alternative services at different rates—a slow cheap one and a fast costly one—and give the traveller or the consignor a free choice between them. Thus bulky non-perishable goods might be carried at a lower rate by canal than by railway. In other cases, however, the

cost of duplicating services might outweigh the convenience of having alternatives. In such cases the L.T.A. ought to provide the speediest practicable service. Thus it would probably be worth while not to continue long-distance omnibus services, such as London—Edinburgh, but to concentrate all the passengers upon the railway and reduce railway fares to the motor-coach level. It is questionable whether any increase of real efficiency would be attained by preserving the greater part of the British canal network. The low cost of actual carriage is offset by slowness, uncertainty, and the fact that, unlike the road and rail networks, the canal system does not cover the whole country and can at the best take only a small proportion of the traffic originating in a given place. It must be remembered moreover, that with a rising standard of living, people can afford to expend a larger proportion of their labour for the convenience of having things when they want them and as they want them. Thus it is true economy to develop speed at the expense of cheapness. (There is a limit to this, of course. No one would suggest transporting coal by aeroplane.)

Under the proposed organization, the transport facilities of the country could be used more efficiently than ever they had been before. No sectional interests of this or that body of shareholders, anxious for their pound of flesh and careless of the general good, no ignorance of essential data, sedulously maintained by separate undertakings, no fears on the part of the workers that increased efficiency might lead to unemployment, would hinder the men who actually ran the transport undertakings of the country—the technical, administrative and operating staffs of all grades—from using the great instrument under their control for the fullest benefit of their fellow-workers.<sup>1</sup>

The railways, largely reconstructed and rationalized, would form the steel framework of the new transport system. If the whole railway system of Britain were treated as one railway undertaking, many improvements could be introduced in the handling and routing of traffic. Some lines would be abandoned, others specialized for slow or fast traffic respectively. Many new connections would have to be made, terminals reorganized, and

<sup>1</sup> For a survey of possibilities of planned transport see *Transport and the Public*, by J. A. Dunning. (The author's bias in favour of Social Credit must be discounted.)



fly-over and burrowing junctions constructed in order to make smooth the flow of traffic. With the rational organization of the distributing trade, the flow of goods could be made more regular and consignments increased in bulk, giving full truck loads and full train loads, with resultant economy in operation. (Passenger traffic would be less amenable to regulation, but even here much could be effected by "staggering" office hours and similar devices.) With traffic so concentrated and regularized, the bulk of it would probably be cheaper to handle by rail. The number of goods depots could be very greatly reduced by abolishing those at small stations and combining those in larger towns (heritages of the competitive past). Those that were retained would act as railhead distributing-centres, each served by a fleet of motor-vans. Road transport would thus be definitely ancillary to rail transport, taking the short local hauls and continuing rail transport beyond the rail-head. The use of containers could be greatly extended with the co-operation of industry through standardizing methods of packing goods and regularizing their dispatch. Such containers would be interchangeable between rail and road (and possibly canal boat). Similarly many small passenger stations could be dispensed with without loss of convenience to the public if there was effective co-ordination between road and rail. The cutting out of numerous stops would expedite greatly the long-distance (and especially the cross-country) services of both passengers and goods. The proper co-ordination of rail and road traffic would mean that time-tables were co-ordinated; that through bookings and through services were given to the public; that omnibuses ran into railway stations (not a hundred yards outside) and that transference of passengers was effected under cover; that, when a railway was abandoned and omnibuses substituted, passengers would have the same facilities as before of waiting under shelter and of booking through to a distant destination. These things are done in some parts of England; why not in all?

The canal system would have its part (though a restricted one) in the new system. The canals of the "cross" (connecting the Thames, Mersey, Severn and Humber with the Midlands, and those of the trans-Pennine system) widened, deepened and adapted to electric traction, would be a valuable addition to the means available for carrying heavy goods, where speed was not important. The others would be better scrapped.

Roads, although used less than at present for heavy traffic, would have their uses for certain categories of fast goods traffic

and for passenger transport. The use of private cars might be expected to diminish considerably immediately after the Revolution, but with the development of socialist production the workers would in time be enabled to enjoy themselves the pleasures they formerly toiled to provide for others. There would probably be little absolute decrease in road traffic after the first few years, although there would be a change in kind—fewer very heavy vehicles on the road. Thus the maintenance and extension of the existing road network would be necessary. Of prime importance would be safety. The development of roundabouts at road crossings and of under and overbridges at the more important ones, the use of flying or burrowing junctions, the extension of automatic light control, the building of by-pass and circular roads—all these would go on. Needless to say, local authorities, freed from the domination of estate agents and speculative builders, would plan housing and streets so as to avoid the evils of ribbon development. Dwelling-houses, shops, schools, offices and factories must all be situated off the main traffic arteries so that the latter are not congested with local traffic and their effective width is not diminished by standing vehicles.

In all branches of transport one of the main directions in which improvement would be sought would be safety. Safety for the travelling passenger and for the general public and safety for the transport worker would be the two watchwords of the new socialist administration. No cheeseparing “economies” and no ruthless “speeding up” in the interest of functionless dividend-drawers would be allowed to interfere with this policy. For this reason alone a considerable diversion of traffic from the road, with its huge weekly toll of accidents, to the protected tracks of the railway would be justified. On the railway, automatic train control could be extended to all the main lines. (See p. 58.)

The linking up of the Post Office with the unified transport system would give opportunities for many small conveniences and economies. For instance, every post office could act as an agent for socialist transport: it would be a booking office and receiving-station for the L.T.A., a centre of information and service. The parcel post and the railway parcel service could be fused (as in Switzerland and some other capitalist countries with an efficient State railway). As in some of the Australian states the sale of farm produce, especially small produce, such as fruit, butter and eggs, could be facilitated by the setting up of a general agricultural agency. (In Soviet Britain this would be worked by the Co-opera-

tive Societies.) The farmer or small-holder could take his stuff to the post office or the railway station and dispatch it thence to the nearest big consuming centre, receiving later at the post office or railway station the proceeds of the transaction, less transport charges and a small commission.

In particular only under socialist planning can the full co-operation of industry with industry be achieved. Power is the industry most allied with transport. Railway electrification has already been referred to as an example of the failure of capitalism to live up even to its own standards. (See pp. 18-19.) But more than railway electrification could be achieved under a socialist plan. If power and transport were planned as a whole, great economies could be achieved by centralized power production in super-power stations situated in the coal-fields. Three results would be obtained. The cost of generation would be reduced by enlarging the capacity of the power station; the load factor would be improved by enlarging the area of supply; the cost of distributing power by modern high-tension transmission lines would be less than that of hauling coal in trucks. One aspect of the inefficiency of capitalist production is that the much-vaunted low rates charged by the railways for carrying coal (on the monopolistic principle of "charging what the traffic will bear") are really uneconomically low and offer a premium on inefficient methods of burning coal. Other possible consequences of a bold policy of electrification, both of transport and of industry, that are ignored in the capitalistic calculus of profit and loss are (a) rural electrification, increasing the productivity of agriculture and lightening the farm worker's toil; and (b) the abolition of the smoke nuisance, with the result of brighter and cleaner towns, the diminution of the working housewife's burden, and a great improvement in the standard of the people's health.

Low-temperature carbonization also claims consideration from the transport point of view. The great expansion of road transport in recent years is almost all due to the increased use of the internal combustion engine and has entailed very large imports of petroleum. The development of effective means of deriving motor spirit or diesel-oil from coal would diminish the extent of our dependance on foreign countries for supplies of this very necessary commodity, and would at the same time do much to revive the demand for British coal. In planning transport as a whole and the division of traffic between road and rail, this point would have to be kept in view.

The financial prospects of socialist transport must now be considered. (1) First we must consider the possibilities of increased traffic. This depends on the general

**Financial  
Prospects**

development of socialist industry. With the bringing into use of productive resources, now idle under capitalism, in order to raise the standard of living of the people, there would be an all-round increase in traffic by rail, road, waterway and airway. The falling-off in the railways' mineral traffic in 1932 to less than three-quarters of its amount in 1913 is almost entirely accounted for by depression in trade (to a small extent by technical economies in the use of fuel). The bringing into full use of means of production now idle would increase traffic of all kinds by about 25 per cent. Against this must be offset the possibility of eliminating needless haulage at present created by the competitive anarchy of production under capitalism:—"cross-hauling", that is to say, the simultaneous transport of similar goods from London to Manchester and Manchester to London; the transport of useless and even harmful commodities whose production would be discontinued under Soviet rule; the carriage of coal in small lots to hundreds of small stations which would be cut out by centralized power-generation in the coal-fields. Nevertheless when all is taken into account there would probably be a considerable increase in goods traffic. A higher standard of life, made possible by the use of the means of production to satisfy the needs of the people, would mean more travelling for pleasure. Against this would be offset the elimination of useless journeys by commercial travellers, salesmen and agents, much of whose work would be redundant in a rational economy. On balance there would probably be an increase of passenger traffic both by rail and road.

(2) Secondly we must consider the possibility of reducing cost. The elimination of the present wasteful competition between forms of transport and the allocation of traffic to its most economic channel under unified control would enable great economies to be made. The thorough-going co-ordination of transport would enable many small and uneconomic branch railways to be closed down. Mainline services on competitive lines could be "staggered" so as to give a more frequent service with the same or less rolling-stock. (Thus instead of trains leaving London for Leeds at about the same time from King's Cross and St. Pancras, they would be spaced more evenly through the day. Alternatively, all the fast

trains could be run on one line and the other line used for intermediate connections.) The socialist reorganization of industry and the distributive trades, by enlarging the units of both production and distribution and enabling orders to be concentrated into consignments of larger bulk than at present, would diminish considerably the cost of handling traffic. At present the tendency is towards smaller and smaller consignments. These "penny numbers" cannot be handled economically. It is no use to condemn British railways for not using high-capacity wagons, if the wagons at present in use cannot be filled. If a 12-ton wagon in a crack express goods train is loaded up with a dozen bent-wood chairs, a bundle of hockey sticks and a perambulator, the introduction of 20-ton or 40-ton wagons would simply increase the amount of unremunerative load. When the productive organs of the community can guarantee the transport authority full truck loads and full train loads, then the traffic of the country can be handled at far less cost than at present.<sup>1</sup>

Here a point of general importance in the socialist conduct of industry must be mentioned. If reorganization of the transport system causes redundant lines and stations to be scrapped, if co-ordination of rail and road enables fewer workers to handle the same volume of traffic, if by mechanical invention human labour is economized, the effects under communism will be very different from the effects under capitalism. Under capitalism it is no one's business what becomes of the worker whose job is "rationalized" out of existence. The mill-owner gets compensation for "surplus" spindlage destroyed, but the spinner gets—the U.A.B.! During periods of expanding capitalism, such as the period of (temporarily) successful imperialist expansion culminating in 1914, workers displaced from one occupation can find jobs in another—though often at lower rates of pay. But during the period of its decline, the capitalist system cannot continue to keep in employment a given number of workers, even without rationalization and labour-saving invention. Any worker displaced during this stage by technological or organizational improvement is simply thrown on the industrial scrap-heap. Under communism things would be different. First of all, the

<sup>1</sup> The following figures (from K. G. Fenelon's *Railway Economics*, p. 11) illustrate this point:

			<i>Average wagon load</i>	<i>Average train load</i>
Great Britain	..	..	5.64 tons	130 tons
Germany	..	..	7.7 "	290 "
U.S.A.	..	..	26.9 "	804 "

destruction of the dead hand of monopoly capital, with its output restriction and its sabotage of capital-saving inventions, would entail a rise in productivity which would quickly absorb into kindred occupations workers displaced from any one process. Secondly, a great part of the toil now taken from industry by capitalist parasites would be put back into industry, so initiating a period of expansion and socialist reconstruction in which it would be men that would be scarce, not jobs. Thirdly even if these two tendencies did not abolish the unemployment problem, there is the fact that, under a socialist planned economy, no industry or service would be considered by itself in isolation. Its needs in the matter of labour-power, like its output of goods and services, would be considered as part of a unified social plan, the object of which would be, not to "provide employment," but to make the best use of the resources of the country in order to satisfy the needs of the working people. The available supply of labour and the requirements of each industry being known, the productive programme of the different industries could be revised or the entire scheme of production raised or lowered proportionately as a whole, in order to adjust the demand for labour to the supply. No large-scale improvements in methods of production or organization involving displacement of labour would be sanctioned until plans had been worked out for making use of the productive power of the workers displaced. Furthermore the trade unions and the workshop committees would have such a share in the administration of these improvements as would enable them actively to safeguard the workers' interests. In this way, freed from the bugbear of unemployment, the workers need no longer fear technical improvements and administrative re-organization, but could co-operate in carrying them out, in the full knowledge that their increased productivity would benefit their fellow-workers without sacrificing their own interests.

(3) Finally, we must try to draw up a provisional balance sheet for the unified land transport system. Full official statistics are available of the receipts, expenditure, profits, etc., of British railways and canals, but no official returns are made by road transport undertakings. Taking the railways by themselves, their annual gross receipts are of the order of £200 million and are steadily declining, partly due to deflection of traffic to the road and partly due to the chronic depression of capitalism. Expenditure is maintained at about 80-85 per cent of gross receipts, being reduced as receipts fall, largely by savage wage-cuts and worsening

of the railwaymen's conditions of work. Over the six years 1927-32 the railways distributed an average of £42 million per annum in interest and dividends (compare this with about £75 million in salaries and wages). The position of road haulage undertakings, judging from companies' balance sheets, is more satisfactory than that of the railways. Statistics are available of expenditure on road construction and maintenance both by the Ministry of Transport and by the local authorities. From these it appears that, since the recent increase in the taxation of heavy vehicles, the specific taxation on road transport (vehicle duty plus petrol tax) just covers the total expenditure on the roads; but, owing to the fact that capital expenditure is made out of current receipts, the real financial strength of the roads seems to be underestimated.

We can summarize the probable position of the unified land transport undertaking as follows: (1) Present revenue covers all present working expenses and leaves a net profit of about £40 million a year in a normal year in respect of railways alone, plus an unknown, but fairly large sum in respect of road transport undertakings. (2) The unification of land transport will have two results: (a) It will make irrelevant the drift of traffic from road to rail. The traffic will be dealt with in the most efficient manner and what is lost on the one will be gained on the other; (b) More complete co-ordination should make for economy, and enable aggregate working costs to be reduced for the same total volume of traffic. (3) The revision of the rate system would produce great alterations in the relative volume of traffic carried by rail, road, canal and coasting vessel and also in the relative volume of different kinds of goods carried, e.g. less transport of raw materials and more of finished products. But there is little reason to suppose that the *total* volume of traffic would shrink very much by reason merely of the reform of the rate system, and what small shrinkage there was would represent a real improvement in the efficiency of the social economy. (4) The breaking of the bonds with which capitalism now fetters the productive system and the full development of the resources of the country which socialism would make possible ought to increase very considerably the quantity of traffic. Raising the utilization of resources merely to the pre-war level would entail a 10 per cent increase in the real volume of production and hence a nearly proportionate increase in the volume of transport of all sorts.

Thus with the same *average* level of rates and fares as at present

(but with considerable changes in particular rates) and with the same *average* level of wages and salaries (again with some of the lowest wages graded up and some of the highest salaries graded down), a surplus amounting to somewhat exceeding the present volume of profit should be obtained from the unified socialized transport undertaking. There are four ways of disposing of this surplus: (a) lowering rates and fares, (b) improving conditions of work and raising wages and salaries, (c) re-investing it in the enterprise, (d) using it for general social purposes, such as investment in other socialized enterprises, paying for social services, or defraying the costs of State administration. There is good reason for rejecting the last alternative: such a surplus would be in effect a tax, and of all taxes one on such a prime necessity as transport is the most harmful. Ultimately the first two alternatives should absorb the surplus. Cheap fares diminish overcrowding and enable the worker to get into healthy surroundings for hiking, bathing, games and holiday camps. Low rates on goods reduce the cost of production of consumable goods and so lower the cost of living. The wages and conditions of many categories of transport workers are badly in need of improvement. Nevertheless, there is good reason for postponing an immediate reduction of charges and raising of wages. True, some improvements in these respects must be made at once, especially in the matter of wages and conditions. The wages of some of the most underpaid categories of railway and road transport workers must be raised; the hours of road transport workers should be reduced, at least to the extent of enforcing the provisions (at present generally ignored) of the Road and Rail Transport Act of 1933; some of the more destructive to health and safety of the recent "speed-ups" on the railways and in the L.P.T.B. should be cancelled; but any general advance in standards must wait on the completion of the general scheme of socialist replanning and re-construction of industry which it would be the first job of a Soviet government to put in hand. The great bulk of the surplus of the socialized transport concern must be "ploughed back" into the undertaking. The rationalization of the railway network, the replanning of railway terminals, the general electrification of the British railways, the reconditioning of those canals which it is decided to retain, the building of new arterial and by-pass roads—all these will absorb the whole surplus (and probably need additional resources from the general social fund) for some time to come. As an example of this it may be pointed out that to carry out the Weir estimate



of main-line railway electrification, plus the cost of additional plant in connection with the electrical grid, would absorb the whole of the distributed profits of the railways for nine years. (See pp. 52-3.)

### *B. Air Transport*

Since air transport is still largely in the experimental stage, both commercially and technically, it would be advisable not to brigade it too closely with land transport, but to leave it a certain administrative independence in order to promote flexible adaptation to changing conditions. For this reason, air transport would probably be organized under an Air Transport Authority, separate from the L.T.A. and immediately under the control of the Commissariat of Transport and Communications. It would consist of two main divisions, one operating air services within the British Isles, the other (incorporating the present Imperial Airways) operating Continental services. At present air transport offers a costly but speedy service, suitable for luxury or emergency traffic, that scarcely competes with more humdrum means of transport. But, as American and Russian experience shows, improved machines and methods of working may change this, and air transport may become an ordinary means of communication. When this stage is reached, it would have to be more closely co-ordinated with its rivals. Ultimately all internal air services would come to be managed by the same Transport Authority that ran railway and road traffic while the Continental services might continue to be operated by a separate and autonomous body.

In dealing with air transport we must face one thorny problem. In no single country of the world to-day is air transport run on its technical and commercial merits.<sup>1</sup> Everywhere civil aviation is more or less highly subsidized by governments in order to maintain a reserve of air-craft that can be rapidly converted for war purposes. A Soviet Britain confronted by possibly hostile capitalist powers, would have to do the same. A Soviet Britain in a world of Soviet republics would labour under no such necessity. In this case air transport would have to be considered purely on its own merits, the additional speed and convenience

<sup>1</sup> A few air services operating in wild and undeveloped regions of the world, such as North Canada and New Guinea, where no other means of transport exist, manage to pay their way without any subvention. |

being balanced against the additional cost and risk. Unless there is a prospect that further research will reduce considerably the cost of operation,<sup>1</sup> it may well be that the decision taken about the worthwhileness of air transport would be very different from what it is at present.

### *C. Water Transport*

Inland water transport has been dealt with under the heading of land transport. Transport by sea-going vessels falls into two distinct categories, with different economic functions and problems:

1. Transport between ports in the British Isles (comprising coastal shipping and such services as those between Great Britain, the Isle of Man and Ireland);
2. All other sea-going and ocean transport.<sup>2</sup>

Transport in the first category must be co-ordinated with the road and rail services to which they are either complementary or competitive (some of it is railway-owned at the present time). Transport in the second category requires separate and independent management.

All British-owned ships over a certain tonnage (except fishing-vessels, which would be dealt with separately) would be nationalized. Their management would be consolidated under two distinct authorities. Coastal and inter-island shipping would be worked by a Coastal Shipping Board, organized as a constituent part of the Land Transport Authority. All other sea-going vessels would come under a Maritime Transport Authority, directly under the Commissariat of Transport. To allow of decentralized management, this authority would be divided into partly autonomous sections for different kinds of shipping or for different regions. These might correspond (with certain adjustments) to existing "lines" of vessels, or perhaps to the different shipping conferences.

The object of the new management would be to obtain the maximum economy of operation consistent with a radically changed attitude towards the workers, both by hand and brain, of the nation's mercantile marine.

<sup>1</sup> It is possible that scientific research in aviation, freed from the necessity of serving military ends, would forge ahead more rapidly than at present (see Crowther in *The Frustration of Science*).

<sup>2</sup> It would be for the Commissariat of Transport and Communications to consider whether cross-Channel (and perhaps North Sea) shipping might not be included under 1.

The scandal of "coffin ships," with worn-out steering-gear, overloaded deck-cargo, insufficient and overworked officers and crew, and rotten living-conditions, would be abolished. [At the present time British seamen prefer to serve in foreign ships because their standard of fore-castle accommodation is on the average much higher than that of British ships] By British law a ship can be sent to sea for a long ocean voyage with only one watch-keeping officer.<sup>1</sup> Representation of both officers and seamen on the Maritime Transport Authority, together with ship committees to deal with questions of food and quarters on board, would put it in the hands of the workers themselves to remedy these evils.

The commercial problems of the Maritime Transport Authority would be very serious. Unlike the corresponding authority for land transport, it would have to compete directly with non-socialized enterprises. In the past, British ships have carried a large (though declining) proportion of world trade. The proceeds of this carrying trade have been an important part of the receipts from British exports, enabling this country to import necessary foodstuffs and raw materials for industry. A communist Britain would have to maintain its carrying trade at all costs in the face of foreign competition. At all costs—except that of the lives and health of seamen. All possible technical economies would have to be used. Old and inefficient ships would be scrapped and the work concentrated on the newest and best. But if foreign ships can compete successfully with British ones without sacrificing the crews' standard of safety and comfort, why should not a renovated Soviet British mercantile marine do the same?

Here we must also mention docks and harbours. Those at present under national or municipal management would remain so. Railway and canal-owned docks, such as Southampton and Goole, would be nationalized along with their controlling body. Specially constituted bodies, such as the Port of London Authority would have their constitutions revised so as to remove the capitalistic element. Over all the separate authorities would be set a central Dock and Harbour Commission to plan and co-ordinate development. Some British ports badly need modernization and

<sup>1</sup> See the annual report of Mercantile Marine Service Association (*Manchester Guardian*, 15 May, 1935). See also the reports of the Wreck Commissioner's Inquiry into the loss of the *Blairgowrie* (*Manchester Guardian*, 10 July, 1935) and of the Board of Trade Inquiry into the loss of the *Milpool* (*Manchester Guardian*, 12 July, 1935) and the *La Crescenta* (*The Times*, 27-29 November, 1935).

equipment with efficient mechanical handling gear. It would be a special task of the new central commission to deal with the old-standing scandal of casual labour at the docks. Royal Commissions and Departmental Committees have reported on the problem; but capitalism cannot get on without its reserve army of labour, and still the docker has to sell his labour-power under inhuman and degrading conditions, a victim of petty tyranny and corruption.

# III

## DISTRIBUTION

**D**ISTRIBUTION is not an "industry," but a function—or set of functions—complementary to production. Its precise character, therefore, is largely determined by the nature of the organization of production.

As with any production process, so with distribution it is advantageous from a social point of view to get the job done with the minimum expenditure of effort. Whereas, even under capitalism, there is a tendency for any given production process, at least inside a particular industry, to absorb less and less social effort, the opposite tendency obtains in distribution.

Under capitalism at its present stage in Western countries, "distribution"—covering a multitude of diverse and useless activities, as well as a few necessary ones—clings parasitically to production and serves effectively to offset much of the saving due to technical advances in the production processes.

The only rational motive for production is so that man may enjoy the fruits of his labour. But this is often lost sight of in a crazy economic system which permits millions to go in want while goods are deliberately destroyed in the interests of one small class which lives on profits. In a Soviet Britain there will be no profit-seeking. Socialized industry will consciously aim to produce just those goods which man needs for his physical and cultural well-being. The function of distribution will then be to see that, at the existing level of society's capacity to produce, he gets the goods he needs at the time, in the place and in the quality and quantities required.

Distribution under capitalism does not succeed in giving the

workers what they want. On the contrary, distribution for profit merely intensifies the chaos resulting from production for profit. Even among those who uphold the capitalist system of production, there are few intelligent people who will not admit that the evils of profit-seeking and "free competition" in the distribution field more than offset their supposed advantages.

Not only is capitalistic distribution itself thoroughly wasteful and inefficient, but it also encourages and leads directly to the production of masses of useless products and gross inefficiencies in the production of necessary products.

In the following pages some attempt is made to indicate the scope of this form of parasitism.

Although in Great Britain distribution operates only with gross inefficiency and at enormous social cost, it nevertheless does carry out certain necessary tasks, however badly. In any advanced economy there are a number of functions, usually included in the term "distribution," which are *necessary* to complete the production process, because, until they are performed, the goods are not available for consumption. To carry out these necessary functions, moreover, must always involve the expenditure of some social effort. Distribution under capitalism, however, swells the amount of this social effort to a ridiculous extent and, at the same time, adds the cost of additional functions which are socially unnecessary. The functions of capitalist distribution can conveniently be divided into three groups. Two of these are necessary under any economy. The third is the offspring of production and distribution for profit.

The first group of distributive functions has been called "merchandising," and consists in the process of determining what is wanted, in terms of both quality and quantity. The organization for performing this function becomes increasingly important as, with the development of more highly specialized production and the greater sub-division of labour, producers and consumers become more widely separated.

The task of the second group of distributive functions is to make the products of industry available at the time and in the places when and where consumers can obtain them. In addition to the provision of wholesale and retail outlets situated in the right places, and transport and other arrangements for their regular supply it, covers every sort of incidental service such

as expert knowledge of and advice about merchandise and its use, stock holding, book-keeping, bulk-breaking and wrapping.

The third group can most conveniently be referred to as "selling," which consists in attempting to induce others to buy the particular merchandise which the seller is offering.

It is obvious that, in an advanced economy such as ours, to carry out the first two groups of functions is absolutely necessary. In order to produce intelligently it must be known what is wanted; and, when the goods are produced there must be some machinery for getting them into the consumers' hands. But the third, the aggressive selling of merchandise, has no place in any rational economy, and the energy devoted to it in the overwhelming majority of cases constitutes sheer social waste. Nevertheless, as we shall point out below, with the confusions and contradictions characterizing an economy based on production and distribution for profit, selling activity is assuming more and more importance and is eating up a larger and larger proportion of the wealth produced. At the same time merchandising and the operation of the distributive machine already absorb far more social effort than is necessary. And, as capitalism proceeds further into its decline, inefficiencies are becoming more and more pronounced.

One of the principal characteristics of decaying capitalism is the transfer of economic activity from productive to non-productive occupations, and distribution in Britain

**Consequences of Capitalist Distribution** affords a glaring example of this form of parasitism. The recent increase in the number of workers engaged in the distributive trades illustrates how rapidly this decline is proceeding.

Between 1923—the earliest year with which current figures are comparable—and 1934, the number of insured workers between the ages of 16 and 64, in Great Britain and Northern Ireland, engaged in the distributive trades increased from 1,261,580 to 2,005,340, i.e. by 58.9 per cent. From 11 per cent of the total insured workers in 1923 the proportion of workers engaged in distribution increased to 15.5 per cent of the total in 1934. In 1934, the figures show that, omitting transport workers, clerks and restaurant employees, more than one insured worker in every seven was a distributive worker.

We are fortunate in having this one really reliable indication of

the growth of this form of parasitism, for, despite the fact that "distribution" employs more workers than any other single occupation group, there is an almost complete absence of accurate statistical information about it. Although there have been numerous requests for a thorough inquiry into the structure and costs of distribution in this country—as, for example, the Census of Distribution taken in the United States in 1930—nothing has been done. Suspecting that the facts may throw too much light on the inefficiencies and contradictions of capitalism, the Government appears to prefer to keep them obscure. But even if there is an absence of accurate data, there is nevertheless ample evidence to prove that distribution absorbs a ridiculously large proportion of social energy and that this proportion is growing.

The figures below are taken from the population Census of England and Wales, 1921 and 1931, Occupation Tables:

		1921		1931	
Commercial Travellers ..	males ..	81,347	120,212		
	females ..	2,117	2,130		
	Total ..	83,464	122,342		
Canvassers (not including dock, insurance or rail- way) .. .. .	males ..	4,300	27,340		
	females ..	1,577	6,784		
	Total ..	5,877	34,124		
Salesmen and Shop Assis- tants .. .. .	males ..	313,691	456,573		
	females ..	346,774	408,732		
	Total ..	660,465	865,305		
Employers and Managers (wholesale and retail businesses) .. .. .	males ..	421,740	498,787		
	females ..	120,437	152,313		
	Total ..	542,177	651,100		

Unlike the figures showing the number of insured workers, these census figures are neither strictly comparable as between the two years nor very reliable as an indication of the numbers engaged in the different occupations. They nevertheless cannot fail to indicate the trend.

If we are to obtain some idea of the total number of people engaged in distribution, we must add to the official figure of two million insured workers those not insured. The uninsured are mainly employed workers under 16, employed workers in receipt of over £250 per annum and working proprietors. The



numbers of young and better-paid workers outside the insurance schemes have been estimated at some 100,000 and 50,000 respectively. Added to the number of insured workers this gives a total of some 2,150,000 employed workers in 1934. As regards proprietors, the American Census of Distribution showed that the number of "proprietors and firm members" was one-third of the total number of employees. Taking the same ratio for the United Kingdom we have over 700,000 proprietors, most of them actively engaged in the businesses owned. Altogether, then, there are something like 2½ to 3 millions of persons directly engaged in wholesale and retail distribution. The population of the United Kingdom in 1934, was given as 46,681,000. At least 1 in every 17 of these is engaged in handing out goods to the other 16. A comparable ratio for the United States is about 1 in every 24.

What is the structure of this "distribution" which employs so many people? Who owns or controls it? What is the amount of capital tied up in it? What is the total of retail sales and the total distributive wage bill? We do not know. No comprehensive survey has ever been made, so we have to piece together such meagre information as does exist and try to formulate a picture from it.

As a first step in obtaining some idea of the distributive structure it would be useful to know the approximate number of retail shops. Estimates of the number of shops in Great Britain vary between 500,000 and 1 million! The number is certainly larger than 500,000 and is probably nearer a million. At any rate sample surveys made in a number of representative towns and regions from time to time indicate that there is one shop to every 45 or 50 inhabitants. Apply this ratio to the population of Great Britain, just under 47 millions, and you have about a million. In the United States there was one shop to every 79 persons in 1929.

If there are so many shops the average shop is bound to be small. It is, but there is a comparatively small number of large shops and chains of shops which have large average sales. P. C. Hoffman, in a pamphlet **The Big Shops** *Shops and the State*, published by the Shop Assistant Publishing Co., Ltd., 1934, refers to the large combines engaged in distribution and gives a table summarizing the extent of their penetration into the different trades. His table, reproduced below, deals with public corpora-

tions only and does not claim to cover the whole of the field. The figures for capital and employees may include, in certain cases, some engaged in production, although where possible, those productively engaged have been eliminated.

<i>Trades</i>	<i>Capital £</i>	<i>Shops and Stores</i>	<i>Employed Persons</i>
Drapery and General Stores .. ..	46,000,000	360	90,000
Grocery and Provision Trade .. ..	24,000,000	9,000	62,000
Meat Trade .. ..	14,000,000	5,000	50,000
Drugs .. ..	11,000,000	1,800	30,000
Milk Trade .. ..	6,000,000	800	10,000
Boots and Shoes .. ..	12,500,000	2,500	10,000
Gent's Clothing .. ..	12,000,000	1,400	25,000
Furniture .. ..	3,000,000	100	1,000
Tobacco .. ..	1,500,000	1,100	3,000
Confectionery .. ..	2,000,000	750	3,000
Bazaars .. ..	12,000,000	750	30,000
Various .. ..	7,500,000	5,000	21,000

Hoffman estimates that 4 per cent of the shops do 30 per cent of the trade, and that the remaining 70 per cent of the trade is done by a great number of small shops with average annual sales of under £2,000.

L. E. Neal, in his book *Retailing and the Public*, estimates that 10 per cent of the shops (out of his estimated total of 500,000) "belong to the multiple companies and other forms of large-scale retailing" and "account for possibly 45 per cent or more of the trade."

The Co-operative Movement is, of course, the most important of the "other forms of large-scale retailing." The table below shows the growth of Co-operative retailing over the past fifty years:

<i>Retail Co-operative Societies in the United Kingdom</i>				
	<i>No. of Societies</i>	<i>No. of Members</i>	<i>% of Mem- bership to Population</i>	<i>Sales £'000</i>
1881 .. ..	971	547,212	—	15,411
1901 .. ..	1438	1,793,167	4·3	52,761
1911 .. ..	1403	2,640,429	5·8	74,812
1921 .. ..	1352	4,548,557	9·5	218,780
1931 .. ..	1188	6,590,020	13·4	207,888
1933 .. ..	1150	6,917,138	—	197,257

The scale of the operations of the retail societies to-day is indicated by the data set out below: the figures relate to the whole of Great Britain and Ireland and are taken from the 66th Annual Report of the Co-operative Congress, 1934:

Share capital	.. .. .	£124,055,699
Loan capital	.. .. .	£17,610,060
No. of Distributive Employees	..	126,387
Amount of Distributive Wages	..	£16,249,587
Amount of Sales	.. .. .	£197,257,009
Distributive Wage cost per £ of Sales	..	19·77d.
Average Wage paid, 1933	.. .. .	£128·57
Net Surplus, including Share Interest	..	£23,754,096

A 48-hour week is said to be worked by nearly all the employees of retail Co-operative Societies.

Despite the large share of the retail trade of the country falling to the big distributive organizations, the great majority of persons engaged in distribution continue to operate through the small unit shop. Typical of a number of surveys carried out from time to time is that described in the *Manchester Guardian* in February 1934, by Dorothy Hodge. This investigation into the retail shops of six representative Manchester wards outside the central shopping centre of the city, disclosed that 83 per cent were shops attached to a house. Nearly all of these were private shops with a very low average rateable value. The investigator concludes that: "the bulk of the retail trade in the six wards is in the hands of the small shopkeeper, and is carried on by shops with not more than three branches." The proportion of private, multiple and Co-operative shops in the six wards was: Private, 92; Multiple, 6; Co-operative, 2. The figures in terms of rateable value of the premises occupied were: Private, 84; Multiple, 11; Co-operative, 5.

The most "popular" estimate of total annual sales in this country is a half of Prof. Bowley's estimate of the National Income, viz. £1,750 million. Hoffman thinks this is low, and estimates retail sales at £2,361 million. A round figure of £2,000 million is probably reasonably near the mark.

What proportion of this goes in distribution costs? As we have

no comprehensive figures for this country we are thrown back mainly on the American parallel. Otto D. Schaefer,<sup>1</sup> writing in the *Manchester Guardian Commercial*, 5 April, 1935, summarizes existing information on the subject of distribution costs as follows:

"The most trustworthy data in this field were derived from the Distribution Census of the United States, which showed that for the year 1929 the costs, remuneration of the executives and net profits of the retail trade averaged, for all branches, 28 per cent of the gross receipts. For those branches of the wholesale trade which sell chiefly to retailers the average cost burden was shown to be 13.7 per cent of the gross sales if a proper allowance was made for interest on capital, rental value of own premises, remuneration of executive services, and net profit. Calculated on the basis of price to the consumer this gives a figure of 9.9 per cent for the price-increment added by the wholesale trade. Thus a total of 38 cents out of every dollar spent by the consumer in 1929 in American retail shops went to cover the price-increment added by the wholesale and retail trades; and this figure does not even include the whole of distribution costs.

"If we add to this the distributive costs incurred by the producer we reach the conclusion that more than two-fifths of the retail price serve to pay not the cost of production of the goods but merely their distribution from the producer, through the different steps in the commercial process, to the consumer. Three-fifths of the national income of the United States were spent in 1929 in retail purchases, and the large percentage of this huge sum which went to cover distributive costs means that more than one-fifth of the entire national income was used to pay the cost of distributing consumers' goods ("Konsumgüter") alone; and no mention has yet been made of the cost of distributing capital goods.

"Calculations in Germany—though for the present they can only lay claim to the same degree of accuracy in so far as they concern the retail trade—gave almost exactly the same results as in the United States for the proportion of distributive costs to the national income, as well as to retail prices to the consumer. It is almost certain that practically the same figures hold good for the other advanced national economies. Moreover, the starting point in these calculations was the situation in the economically favourable year 1929; and all more recent calculations show that the world crisis, say, from 1930 on, has still further increased the

<sup>1</sup> President of the Technical Committee of the International Distribution Commission of the International Chamber of Commerce; Director of the Reichskuratorium für Wirtschaftlichkeit in Berlin.

percentage of distributive costs through the lowering of prices and the decline in commercial activity.

“Doubtless more important than this upward movement in distributive costs resulting from the general situation which in many countries began to show signs of change in 1934, is the fact that for a generation, independently of all fluctuations in the general situation, the costs of distribution have been claiming a steadily increasing part of the retail price. Of all available data on this subject those of the British co-operatives go back the farthest. They show, for example, that the cost of the personnel engaged in distribution, which is the largest factor in retail costs, rose from 4.13 per cent of the gross receipts in 1897 to 7.35 per cent in 1930. . . . The progress in efficient mass production, with the accompanying steady decline in the unit cost of manufacture, has had no parallel thus far in distribution, so that the reduction in manufacturing costs has so far unfortunately had only a limited effect on retail prices.”

If the American figure of 38 per cent of the retail selling price is taken as the cost of wholesale and retail distribution in this country, then, on a total retail sales of £2,000 million, the distribution of consumers' goods costs something like £760 million a year. And, as Schaefer points out, this does not include distributive costs incurred by the producer, such as manufacturers' selling and advertising expense.

If distributive costs are large, distributive profits are also considerable—at any rate for the big distributors. On the basis of figures for the twelve months ended 13 June, 1934, published in the *Economist*, Hoffman states:

“For the sake of clarity it is best to compare only the type of firm with which we have already been dealing, that is the Departmental Store and its Associates, and the Multiple or Chain Stores which are public companies. There are seventy-six of these published in the *Economist* with a paid-up capital of £116,764,508. After taking off the small losses, there are left profits to the amount of £14,331,157, or more than 12 per cent. If there be added the sums brought forward, there was available for distribution £21,456,825, or 18½ per cent. It should be noted that this is after debenture interest has been paid, which amounts probably to £1 million more.

“During the last fifteen years capital has been swollen tremendously by the issue of bonus shares and by the buying and selling of businesses. . . . It is probable that one-third of the paid-up capital can thus be accounted for. Were the profits available for

distribution on the subscribed capital only, they would represent about 27½ per cent. . . .

"It remains to be told that these firms added to their reserves after allowing for withdrawals no less than £2,334,940." (*Shops and the State*, p. 14.)

It is doubtful, however if the small retailer does quite so well. Referring to that type of small retailer who starts shopkeeping because he is unemployed and cannot find anything better to do, Hugh Weeks writing in the *Week-End Review*, 4 March, 1933, states: "The mortality of the small newcomer is pathetically high. The average life seems to be about five years."

The bankruptcy statistics, published in the Annual Reports by the Board of Trade on Bankruptcy, appear to support this statement. The failure of individual shopkeepers, however, does not reduce the number of shops. For every unemployed factory worker who, through turning to shopkeeping, has lost what small savings he had, there are plenty more willing to follow in his footsteps. Lawrence Neal, writing in the *Manchester Guardian Commercial*, 24 December, 1932, referred to the small shopkeeper in these terms:

"Normally he is possessed of a negligible amount of capital, and very possibly may only be kept going by financial help from wholesaler or manufacturer. Equally, he has in all probability received no training nor had any suitable experience; he drifts into shopkeeping in the mistaken belief that it is safe and because no better alternative offers itself. He can look for a contingent trade of £2,000 a year; but from the start incurs definite liabilities for rent, rates and other overheads, and for his modicum of stock. Moreover, even if he is proficient in this fundamental question of stock-keeping he is fighting against odds by reason of a turnover that is not large enough to support a well-assorted choice of merchandise. The practical upshot is that he will not be able to keep his stocks sufficiently clean and fast moving: and in this, as in other directions, capital and energy will be locked up and under-employed.

"Moreover, while individual shopkeepers may go under, the shops themselves remain open, though under other direction, so that . . . a competitive excess of shops tends to depress the general level of performance."

No reference is made to the human tragedy behind the struggle

“against odds” of countless small shopkeepers to wrest a livelihood out of an unproductive occupation because they are denied the right to do something productive—the long hours worked by the shopkeeper and his family, the perpetual worry, leading finally to despair as his debts begin to crush him.

The lot of many distributive employees is even harder than that of the small shopkeeper. Hoffman states:

**The Shop Assistant** contains such under-payment and over-work as does that of retail distribution. . . . The Shop Assistants’ Union report cases of Branch Shop Managers in receipt of 35s. a week and less, adult women receiving 15s. to 20s. a week, girls 17–20 years receiving 7s. 6d. to 10s. a week and less, adult male shop assistants in thousands in receipt of less than 25s. a week.” (*Shops and the State*, p. 15.)

The Report from the Select Committee on Shop Assistants, 1931, Vol. I, referring to shop assistants’ hours of work, gives the following table showing hours worked exclusive of meal times:

<i>Name of Trade</i>	<i>Average Normal Weekly Hours</i>	<i>Range of Normal Weekly Hours of great majority of Assistants</i>
Bakers and Pastrycooks ..	54	Between 50 and 58
Butchers .. ..	55–56	.. 52 .. 60
Chemists and Drug Stores ..	51–52	.. 48 .. 55
Confectioners (Sweets and Chocolates) .. ..	56?	.. 50 .. 60
Cooked Food and Tripe Shops	55–56	.. 52 .. 60
Dairies .. ..	52–53	.. 46 .. 58
Fishmongers and Poulterers ..	54	.. 48 .. 56
Greengrocers, Fruiterers and Florists .. ..	55	.. 48 .. 60
Grocers and Provision Dealers	54	.. 48 .. 56
Hairdressers and Barbers ..	53	.. 48 .. 56
Ice-Cream Merchants ..	Over 60	Over 60
Market Traders .. ..	54?	Between 52 and 55
Newsvendors, Stationers and Booksellers .. ..	52?	.. 46 .. 54
Tobacconists .. ..	56?	.. 50 .. 60

These the Committee calls “long hours”—i.e., between 48 and 60 hours per week. Referring to “excessive hours”—i.e., over 60

per week—the Committee states: “It is possible to find examples of persons normally working more than 60 hours a week in nearly all distributive trades” (p. 33). And the Committee proceed to give examples of “excessive hours of work.”

Numerous examples are given of hours worked over 60 per week, up to, and even over, 70 per week, exclusive of meal times, from most of the trades listed in above table. In conclusion the Committee states:

“With regard to ‘long hours,’ it has been seen that in a great number of trades, the majority of assistants work between 48 and 60 hours a week. The isolated instances of ‘excessive hours’ mentioned in the foregoing paragraphs may be taken as typical of conditions occurring here and there in places all over the country. It is clear that in most of the trades mentioned only a small percentage of the assistants work more than 60 hours a week. But such excessive hours are possible, and if they affect the lives of only a few thousand people, they are not negligible. It was found that out of a large number of shop assistants chosen at random on Merseyside, 15 per cent worked over 60 hours a week. If, as seems possible, only 5 per cent of the shop assistants in Great Britain, between one and two millions, work for such hours, this means that from 50,000 to 100,000 persons, many of them women and children, are working more than 60 hours a week in shops. . . .” (p. 35.)

Commenting on the effect of the Committee’s Report, Hoffman writes:

“Even a reactionary House of Commons has at last been constrained to deal with part of the evil by introducing legislation which fixed the hours of employment for those under 18 years of age to 52 (!) per week until 27 December, 1936, and to 48 per week thereafter, and the abolition of all overtime for those from 14 to 16 years of age and a limitation of the overtime of those from 16 to 18.” (*ibid.*)

The reader will have obtained some idea of the social cost of distributive chaos in capitalist Britain from the foregoing summary of available information. It remains to be shown how this state of affairs has come about, and why distributive inefficiency is *inevitable* under capitalism.



In order to make any sort of comprehensive study of distribution with a view either to analysing the causes of capitalist anarchy in this field or to suggesting the lines on which distribution would be organized under socialism, **Classes of Goods** it is necessary to make a rough classification of the goods which have to be distributed. We have first of all to distinguish between goods which are intended for the producer, or "producer goods", and those which are ready for use by the consumer, or "consumer goods." Producer goods are such things as plant, machinery and tools, raw and semi-finished materials, small supplies of all sorts for operating mines, farms and factories. Although a short study of the distribution of producer goods is made below, we are not primarily concerned with them here because the technique of distributing or allocating such goods in a socialist economy will bear little resemblance to their distribution to-day. On the other hand the same fundamental problems will present themselves in relation to consumer goods.

The best classification of consumer goods for our purpose is that based on consumers' buying habits which is developed and used by Prof. Copeland of Harvard University in his book *Principles of Merchandising*. Copeland distinguishes three main classes: *Convenience* goods; *Shopping* goods; and *Speciality* goods.

*Convenience* goods may be described as goods of comparatively small unit value purchased frequently, usually at the most accessible shop. They have been called convenience goods because the consumer tends to purchase at the most convenient shop, that is, the shop nearest to him when the want is felt. An important characteristic of convenience goods is that no matter how attached he may be to any particular brand or variety, rather than defer satisfaction of the want the consumer will usually take a substitute if he cannot immediately obtain his favourite kind. Groceries and other frequently-purchased household requirements, cigarettes, sweets are typical convenience goods.

Copeland describes *shopping* goods as "seasonable commodities, novelties and small wares for which each consumer desires to have a variety from which to make a selection at the time of purchase. The primary patronage motive . . . therefore, is . . . access to an assortment which affords an opportunity to 'shop around.' . . . The shopping habit is developed more strongly among women than it is among men: women's purchases consequently, predominate in shopping goods." (P. 67.) Typical of shopping

goods are women's and children's clothes, toys, dress and furnishing fabrics and many varieties of furniture. Such things as men's ties, socks and shirts are often purchased as shopping goods.

The term *speciality* goods is more familiar in this country where it is widely applied to such products as vacuum cleaners and refrigerators. Copeland gives a rather wider meaning to the term and includes any product of comparatively high unit price which, as a rule, is infrequently purchased. While, therefore, it is true that such things as men's suits, arm-chairs and cutlery are often purchased on speciality lines, the most characteristic speciality goods are the mechanical types, such as motor-cars, bicycles and wireless sets. The consumer tends to take trouble in making up his mind beforehand what he wants, and if necessary he will go to some trouble to obtain exactly what he has decided upon.

This attempt at classifying consumer goods into groups of products having certain fairly similar characteristics in terms of consumers' buying habits is intended only as a basis for clearer discussion. No one claims more for it than that.

What the consumer requires of distribution in relation to convenience goods is that he should be able, with the minimum of trouble, at any time, to obtain the actual or conventional necessities of life in reasonable variety and that the amount added to the price to cover distribution costs should be as low as possible.

Convenience Goods

What the present distributive system gives him is an unnecessarily great variety of essentially similar goods, as regards many of which he cannot easily determine the quality because standards are few and often arbitrarily chosen by the seller who is interested only in making the maximum profit. He is never quite sure whether his requirements can be met at any particular shop and most of the shops, moreover, are closed during the hours when the worker is free to buy. Finally, the anarchy existing in the distributive trades results in a charge for distribution which is far higher than necessary in nearly all cases and fantastically high in a great many.

Like any social phenomenon, the present distributive "system" has its roots in the past. At one time small-scale production both in agriculture and in industry predominated; transportation was difficult and expensive and there were few large towns. Conse-

quently, consumers and producers were not, as a rule, widely separated and most of the functions of distribution which were not performed by the producers themselves (e.g. by selling their produce at the weekly market) could be carried on by retailers. The retailer also, in addition to purely distributive functions, engaged in "manufacture" (bread baking, bacon curing, coffee roasting, etc.) just as many still do to-day. Produce which came from overseas, such as spices, was distributed by wholesale merchants to retailers, who in turn sold it to the consumer. The growth in number and size of towns as well as the growth in the number of factory products led to an increase in the importance of the wholesaler's function as the sources of commodities became more widely separated from the points where they were consumed. During the second half of the nineteenth century, therefore, the typical set-up of the distributive machine for convenience products was: producer—wholesaler—retailer—consumer. The wholesaler, usually handling a fairly wide variety, and having specialized knowledge of sources of supply and selective skill, marshalled, stored, sorted, processed and split up goods derived from a number of more or less specialized producers. The retailer, usually handling a wider variety in smaller quantities, in turn performed much the same functions in relation to the goods so that they could be obtained by the consumer in the very small retail quantities needed for the household. The retailer continued to carry out much of the processing as previously, but many of the more elaborate processes were now carried out by the wholesaler who could usually do the job more cheaply on a bigger scale.

Knowledge of what the consumer wanted, both as regards quality and quantity, reached the producer mainly through the orders placed by the wholesaler with the producer. The wholesaler, in turn, derived his information from what the retailer ordered from him, and the retailer, of course, was in direct contact with the consumer. The great majority of producers were no longer able to establish direct contact with consumers. Under conditions which concentrated large numbers of consumers in big towns this was no longer possible. Consequently, distributors were placed in a relatively strong position and they tended to make the most of it. They quite naturally attempted to make as much profit as possible at the expense of both consumer and producer. The consumer was fairly easy game, as he still is to-day, but the producer began to look around for some means to strengthen his position. As regards the producer who was a

manufacturer and not a farmer, the weapon he soon discovered was the "proprietary article" or the branded product. It was clear that the piece-meal efforts of wholesalers and retailers to maintain that continuity in quality and characteristics which consumers wanted of convenience goods was often ineffective. The manufacturer perceived, even if only hazily, that the consumer wanted to be able to buy certain types of goods with the very minimum of trouble; and this involved standardization, packaging and labelling in such a manner that the consumer could always obtain—or think that he was obtaining—exactly what he had purchased before without the trouble of careful inspection or the necessity of being on the alert. This factor coupled with the monopoly conferred on a manufacturer by patent rights or a secret formula, encouraged the marketing of proprietary articles. The possibility of producing more and more products on cheap mass-production lines was a further stimulant. When a commodity began to be sold under the manufacturer's brand-name many of the functions hitherto performed by the wholesaler and retailer were transferred to the manufacturer, and, broadly speaking, the wholesaler and retailer became merely vehicles for passing it on. Neither the wholesaler nor the retailer liked this very much because it usually resulted in a whittling down of their profit. The manufacturer, doing the sorting, grading, bulk-breaking and packaging on cheap mass lines, was able to take the lion's share of the profit. But, however much they disliked it, distributors had to tolerate the branded product. In the first place, the consumer obviously welcomed the guarantee of standard quality which the brand implied and therefore asked for the branded product; and secondly, the manufacturer had now a means of appealing direct to the consumer and thereby "creating" a demand for it.

Profits from the manufacture of branded goods were so large that the principle was rapidly extended. But while success was easy for the first one in the field with any particular commodity, when the number of brands of the same commodity began to multiply, it became more and more difficult to get distributors to stock each additional brand as it came along. It soon became clear that there was not much use in trying to sell new brands to wholesalers because, even if the wholesaler could be induced to stock a new brand, it would probably lie on his shelves indefinitely unless retailers ordered it. The wholesaler certainly had no

inducement to attempt to sell it to the already overburdened retailer, and there was no particular reason why the retailer should add another brand to the number he was already selling. Consequently, the manufacturer started out to sell his new brand direct to the retailer on whose shelves it was at least visible to potential consumers. This compelled manufacturers of established brands, fearing that they would lose sales, to start selling direct to retailers also. Retailers began to be visited not only by the salesmen of rival wholesalers, but also by salesmen carrying only the branded products of a particular manufacturer. The number of manufacturers' salesmen calling on a retailer to-day closely approaches the number of brand-names the reader has ever seen or heard mentioned.

Although persuading the retailer to stock was a necessary process in selling branded goods, it was not by any means the most important—or the most expensive. As the number of brands increased the possibilities of influencing the consumer—who, after all, finally put down the money for the goods—expanded enormously with the growth of newspaper circulations. Branded goods and newspapers each fostered the growth of the other. The more manufacturers were willing to pay for “space” in which to advertise their wares, the bigger, cheaper and “better” the newspaper; and the bigger the newspaper (or its circulation) the more the manufacturer was willing to pay for space.

In addition to newspaper advertising, many other means came to be used to influence consumers to buy one brand of a commodity rather than another, such as posters, direct-mail letters and circulars, free samples, shop-window and counter cards and so on. More recently, the cinema, skywriting and broadcasting have put new possibilities into the hands of advertisers. In addition, money is spent in endeavours to persuade the medical profession and prominent public or “society” figures to advocate this or that brand of an every-day commodity.

While the profits accruing from the manufacture of proprietary articles was encouraging a spate of heavily-advertised, branded goods, the large-scale organization was finding its way into the distributive field. The growth of multiple shop and co-operative trading, especially in the class of goods we refer to as convenience goods, was not without its reactions on the manufacturers of branded products. The principles upon which most multiple shop companies tend to operate is that popularly known as “small profits, quick returns,” which means that they take a

comparatively low gross profit and hope to make up for this by turning their stocks over more quickly and thereby taking a profit *more often*. Those multiples that were well managed and conformed to this principle made, and still make, handsome profits. To stock a large number of brands of the same commodity, however, is not consistent with a quick stock-turn, and, as a result, the multiple shops gave no encouragement to the new or slow-selling brand. Neither did the Co-operative societies. In spite of their practice of paying "dividends" on sales instead of on capital, and the consequent emphasis on gross margin rather than on rapidity of stock-turn, the co-operatives were nevertheless sufficiently business-like to realize the futility of multiplying varieties of the same commodity unnecessarily. Moreover, the co-operatives had brands of their own.

As the multiples and the co-operatives were not very receptive outlets for new and obscure brands, the manufacturers were forced to concentrate on the unit retailer as their main outlet for new lines. The results of this concentration on the smaller retailer may be seen to-day in the shop of almost any grocer, chemist or confectioner, where countless obscure brands and varieties of breakfast cereal, canned salmon, chocolate bars and toothpaste congest shelves, counters and windows.<sup>1</sup>

The reader might well ask how it is that the "free play of competition," which is claimed to be so healthy for economic efficiency, does not drive the small, harassed retailer, who struggles under such handicaps, out of business. On the contrary, paradoxical as it may seem, it is precisely this free competition which fosters distributive inefficiency. In the first place, no matter where it is situated within reason, or how many other outlets exist, a shop selling convenience goods can always obtain *some* business,

<sup>1</sup> A glance at any list of branded goods shows the extent to which unnecessary variety has been carried. The recent intensification of redundancy was emphasized by Lord Luke in June 1935. Speaking at the International Chamber of Commerce Congress, he said:

"I have had a calculation made by comparing the price lists of a representative wholesale grocer for 1925 and for 1935. I find that in 20 of the most important types of commodities sold through grocers, there has been an increase of over 43 per cent in the number of different proprietary lines which the grocer might reasonably be expected to carry. In some cases the increase has been even greater. Thirty branded furniture and floor polishes are listed in 1935, as against 15 in 1925; 32 proprietary cereal foods, as against 17. But all classes except one show a substantial increase."

(*Advertiser's Weekly*, 4 July, 1935.)

The number "which the grocer might reasonably be expected to carry" is by no means the total number on the market.

because someone—even if it be only those consumers who live over it or next door to it—will not bother to go any further. Consequently, provided each retailer can only secure a high enough margin on the goods he does sell, he can make enough to cover his expenses on a very low total sales figure. One of the favourite baits offered by sponsors of new brands is a higher margin than that given on established brands. The higher margin may not necessarily take the form of a bigger percentage discount—although it often does—but may be given in the form of an “initial offer” of free goods, a deferred bonus, increased credit and other “services.” And the manufacturer trying to put new brands on the market is not the only one who cultivates the small retailer. Owners of established brands, in order to keep others out, also spend a great deal of money in soliciting his favour. Writing on this theme and referring specifically to the small retailer, Hugh Weeks (the authority previously quoted) observes: “As shopkeepers—*entrepreneurs* in a highly competitive industry—their custom is eagerly sought by the representatives of the manufacturer. . . . A score of makers and a dozen wholesalers will offer them quick delivery, credit, display material, help in dressing the window, advice, and a profit of 3d. to 4d. on every shillingworth sold.” (*Week-End Review*, 4 March, 1933.)

As an executive in the firm of Cadbury Bros., Ltd., he ought to know.

In the second place, the promoter of a new brand, by spending large sums on advertising to divert consumers from other brands, inevitably succeeds to some extent, and what demand he does succeed in attracting is naturally met by the only outlets that have the brand on sale, namely the small retailers whom he has induced to take supplies. The cost of the effort made to induce these retailers to stock, the cost of the extra inducement given to them and the cost of the advertising naturally has to be covered by the price the consumer pays.

But the rot does not stop there. This diversion of business alarms the manufacturer of established brands who, in turn, finds it necessary to advertise heavily in order to maintain his sales volume thus threatened by rivals. Typical of the waste involved in the perpetual “wars” between producers of rival brands is the case commented on by the *Statistical Review*, which is published by a firm of “space analysers,” April 1933:

“The ‘war’ in the Health Beverage field between Ovaltine and Bourn-Vita, which started in September, does not seem to have weakened either of the original combatants. Indeed it has brought

a fresh rival into the field—Horlicks, whose appropriation, which had averaged round about the £4,000 a month mark previously, started to rise in the March quarter to an average of some £8,000 a month. Ovaltine, determined not to yield to Bourn-Vita, raised its total last quarter from £74,455 to £79,726. This firm's aggregation for the last three quarters works out at no less than £194,401."

Unfortunately no accurate information is available on the total amount expended on press advertising and other forms of sales promotion, but we have some idea of the order of magnitude of the sums involved. Annual expenditure on Press advertising alone has been estimated at various sums ranging between £100 million and £200 million. The net output (that is, the value added) of the Printing, etc., industry, according to the Census of Production, 1930, amounted to over £37 millions. A very large proportion of this certainly represented the cost of printing material for competitive sales effort, and did not include the cost of the paper, etc. to which the print was applied. The number of individuals (males) returning themselves as "commercial travellers" for the Population Census, 1931, was over 120,000. The total annual remuneration and expenses of these travellers has been estimated—at an average of £500 per head—to be some £60 millions. There are also other huge items, such as poster, mail and cinema advertising.

The fierce rivalry between manufacturers involved also the wholesaler. Deprived of the cream of his trade by the manufacturer's practice of selling direct to the retailer and by the growth of large-scale retailing, he was left—so far as branded goods were concerned—with the skim milk of small and out-of-the-way retailers. He naturally demanded a higher rate of gross profit on everything he handled in order to cover his increased expense ratio. His expenses, however, tended to rise even more rapidly than his margin, as his retailer-customers, overburdened with variety, tended to order in smaller and smaller quantities. Eventually the wholesaler began to adopt more effective measures to safeguard his livelihood. Sometimes he took advantage of his regular contact with retailers to introduce his own brands, carrying as a rule a higher margin, both for himself and for the retailer, than the manufacturer's advertised brands. In other cases he bought up a number of retail businesses the owners of which had become indebted to him; and, leaving the original proprietors to manage the shops, started a "hidden" or "secret" chain. Thus has the wholesaler been obliged, in self-defence, to assist in increasing the number of superfluous brands and in bolstering up redundant retail outlets.



In the race for profits, the pace is set by the boldest new-comer: the one who is willing to spend most on an attempt to muscle in on an overcrowded market. And the limit is set only by the danger of running up prices to the point where consumers will begin to see through the racket—and turn to non-branded varieties of the commodity.

Because of this reckless competition the cost of distributing branded convenience goods has been steadily increasing, offsetting most of the advantage derived from increased efficiency in production. The multiplicity of brands and outlets to which the drive for profits has given rise demands an ever-increasing margin between cost of production and selling price to cover "distribution costs." An increasing number and proportion of workers are engaged upon the various activities included in the term "distribution." In addition to the earnings and wages of countless small shopkeepers, shop assistants, clerks, wholesale warehousemen, commercial travellers and canvassers, the consumable product has to provide for wholesalers' profits, the dividends of shareholders in multiple shop companies, the salaries and fees of the managers and directors of these companies, the inflated rentals taken by landlords of shop property, practically the whole of the money taken by the advertising profession and a considerable proportion of printing profits and wages. Further, the consumer heavily subsidizes the big newspapers which draw a substantial proportion of their revenue from sales of space. This space is paid for by the consumer who buys the goods advertised; and he pays, incidentally, for the privilege of having his opinions formed for him by those who would have him continue to pay.

That is how distribution works out in one direction under capitalism. Unnecessary variety, created by the "play of free competition," develops and encourages the growth of unproductive effort, until capitalists themselves begin to complain that the costs of distribution hang like a millstone round the neck of industry.

The evils of the competitive struggle for the consumer's shilling are not restricted to the economic sphere. The application of intensive selling effort to branded products not only forces up distributive costs, but also has far-reaching social effects. In the first place, irrespective of real merit, those products and those brands which are most heavily advertised tend to become

most widely used. Owners of brands are alive to the fact that it pays to put effort into selling rather than into the product, and relative to the price of the product, standards of quality tend constantly to fall. An attractive packet assumes more importance than its contents, and what its sponsors claim for a product tends to determine the consumer's choice rather than what the product actually is. However poor the quality of the product, provided enough money is spent on telling consumers it is a good product, they will buy it, and its promoter will make good profits.

This situation would be bad enough if all consumers had an income sufficiently large to enable them to waste some of their substance on comparatively useless goods. But the employing class see to it that most workers have just about sufficient, or rather less than sufficient, to keep themselves adequately fed and clothed when their income is spent wisely. The working-class family, therefore, by paying the inflated prices charged for many branded goods, such as patent and processed foods, patent medicines (and believing moreover that it is getting value for its money) is thereby deprived of more useful, and often necessary products, such as really nutritive food and proper medical treatment. While bad housing conditions and the low average income of working-class families may be its main causes, the declining standard of physical fitness, so much complained of by recruiting authorities, is certainly due in part to the diversion of spending power from sound foods to branded rubbish.

Secondly, the vulgarity of the selling technique employed by advertisers cannot but have a degrading effect on its helpless victims. In their efforts to increase sales of a particular brand of canned fish, scouring compound or face powder, promoters of the brand do not hesitate to appeal to the lowest animal instincts. From the comparatively high level of feeble humour, the appeals widely used pass through snobbery and vanity, avarice and fear down to gross sentimentality, gluttony, perverted sexuality—and just plain dirt. Most of us have become so used to this that the appalling effect on the young and adolescent—to say nothing of many impressionable adults—of being confronted at every turn with the suggestion that they are probably suffering from “Night Starvation,” “Body Odour,” or defective sex appeal due to their omitting to use this, that or the other patent food, patent medicine or cosmetic, is scarcely realized.

Stung by the successes of trade rivals who have outpaced them in advertising unscrupulousness, advertisers themselves in occa-

sional outbursts reveal the real nature and extent of this social evil. Thus, Mr. Alec Nathan, Chairman of Joseph Nathan & Co., Ltd. (Glaxo), speaking at a London Publicity Club debate, on 27 March, 1933, really let himself go. Said he:

“Much of the Press advertising to-day is sheer ‘bunk’ and the community would be better off in health, happiness and wealth if it was suppressed. . . .

“Much advertising . . . is directly hurtful and harmful to the health of the people, some of it creates and develops imaginary complaints, diseases and illnesses, breeding a body of hypochondriacs, so that the advertiser can reap a rich harvest from their unfortunate imaginary ills.” (*World’s Press News*, 30 March, 1933.)

Warming up to the subject of the evening—“Advertising Ethics”—other advertising men were equally frank. Mr. S. P. O’Connor, an advertising agent, read a letter from “the head of a firm whose products are known and used all over the world.” This advertiser wrote:

“I believe that 90 per cent of current advertising is written deliberately to mislead or beguile the public.” (*Advertisers’ Weekly*, 30 March, 1933.)

Mr. A. R. Zoccolla, of the Parker Pen Co. refused to speak “about a subject which is non-existent. I don’t believe there are any ethics of advertising. The bulk of advertising is unethical; a great deal is untrue.

“It is all very well to talk about the ethics of advertising, but advertising itself is the most sordid business there is. It is not a profession. It is a cold-blooded business proposition.” (*ibid.*)

The selling methods applied to branded goods are in no small measure responsible for the existing distributive chaos, but the

**Un-Branded Convenience Goods** distribution of that large proportion of convenience goods still sold unbranded is no less costly. Many types of convenience goods are not yet widely retailed under brand names, either

because the product by its nature is unsuitable for branding, or because the organization of production is unfavourable. Those convenience goods which are still widely sold, unbranded are mostly either the direct products of nature such as fish, fruit and vegetables, fresh meat, coal; or they still tend to be produced on a smallish scale like milk, bacon, bread. Although brands of some of these products do exist, for the most part, these staple necessities are not sold as branded goods.

To begin with, the distribution of most unbranded convenience goods reflects the antiquated organization of production which under capitalism continues to be mainly on a small scale and unplanned. In this country, moreover, no attempt has been made until recently—and then only piecemeal—to organize even the first steps in distribution on a large scale. For many years the distribution of agricultural produce has been carried on by methods, in principle, dating from the pre-industrial era which are, quite naturally, ill adapted for a community largely concentrated in towns.

Small-scale, "individualistic" production coupled with an antiquated distributive structure results first, in great irregularity of supplies and greatly varying quality of different consignments, and second, in the employment of tortuous devices for "spreading" the risks which are largely the outcome of this irregularity. Commodities are repeatedly bought and sold by every sort of broker, commission salesman, commission buyer, wholesaler, secondary wholesaler, sub-sub-wholesaler and retailer, both in and out of markets, "organized" and unorganized. To markets such as Covent Garden and Billingsgate commodities are brought from many miles away into the centre of a congested metropolis, and then sent off again—often to places very near their origin. *The Report of the Linlithgow Committee on the Distribution and Prices of Fruit and Vegetables*, 1923, referred to Covent Garden as "a confused and unorganized anachronism." No less unflattering things have been said of other aspects of the marketing of produce. Although some sort of wholesale organization is obviously necessary when the sources of commodities are so scattered and so far distant from the consuming centres, the upholders of capitalistic distribution are certainly not proud of the organization they now have. Distribution for profit and distributive efficiency do not go together. There is abundance of proof of this in the *Report of the Imperial Economic Committee on Marketing, etc. of Fruit*, 1926 (Cmd. 2658). The Committee deals with the marketing in Britain of overseas fruit, a considerable proportion of which—in contrast with British-grown fruit—is properly graded and prepared for sale. Referring to the divergent interests of the overseas suppliers (or "shippers" as they are called), on the one hand, and the auction brokers, commission salesmen and railways on the other, the *Report* states (p. 32):

"It is obvious that brokers who are established in one port cannot be expected to recommend shipment to ports other than

their own, even though conditions may be such as to render such a course advisable in the interest of the shipper. The port authorities and the railway companies have an obvious interest in favouring a particular port. Some port authorities have gone so far as to send a mission or to maintain a representative overseas for the purpose of influencing trade in their direction."

Here is another instance of the use of salesmanship contrary to the interests of efficiency—but in the interests of Profit.

The Committee also gave some significant figures on the cost of distributing fruit imported into Great Britain. After dealing with brokers' commissions and the obviously inflated "consolidated handling charges" levied by brokers, the Committee goes on to refer to "the spread between wholesale and retail prices" in London:

"The Linlithgow Committee indicated that as the result of an investigation made on their behalf by the Ministry of Agriculture and Fisheries during the first week of January, 1923, the gross profit on retail prices in London as compared with wholesale prices was in the neighbourhood of 105 per cent in the case of cooking-apples and varied from 196 per cent to 344 per cent in the case of dessert apples." (p. 44.)

A further investigation carried out between the 19th and 22nd January, 1926, by the Ministry of Agriculture on the same lines

"showed that the spread between the wholesale and retail prices in the case of certain Canadian boxed and barrel apples and Jaffa oranges was roughly as follows:

	<i>Per cent</i>
British Columbia boxed apples ... ..	124
Nova Scotia barrel apples ... ..	100 to 200
Averaging (about 120 per cent) ... ..	
Jaffa oranges ... ..	50 to 290
(Averaging slightly under 100 per cent)"	

But the individual retailer does not benefit excessively.

"The Linlithgow Committee stated that taking the trade as a whole the evidence before it did not show that retailers in fruit were making excessive profits." (p. 43.)

Nor does the overseas producer benefit:

"Where British Columbia boxed apples are sold to the consumer at 8d. a lb., the grower receives net of that 8d. slightly under  $\frac{1}{4}$ d., and where Nova Scotia barrel apples are sold at 4d. the grower receives net about the same amount." (p. 42.)

Where then, does all this "spread" go? It goes to support a whole group of middlemen, entirely unproductive, which distribution for profit permits and encourages. But no single group in capitalist society has things all its own way all the time; and for a long while producers have been casting envious eyes on the magnitude of the profits accruing to the distributors. The intensified agitation on the part of the agricultural producers for a larger share of the proceeds of their industry, following the collapse of world prices after 1929, culminated in the Agricultural Marketing Acts, 1931 and 1933. Since then there has been no lack of official statements concerning the inefficiency of both agricultural production and distribution in this country. The Reorganization Commission for Pigs and Pig Products gives "a summary of the weaknesses of the industry" under fifteen heads, including such fundamental points as superfluity of breeds and types, no grades or standards for either carcasses or bacon, low standards of technical practice in the feeding of pigs, in the management of pig production and in factory bacon curing, and great irregularity of production.

*The Report of the Reorganization Commission for Fat Stock* states (p. 37):

"We believe that one weakness of the existing system lies in the fact that competition for supplies is dispersed over too many places of sale, e.g. over too many farms, too many markets, too many auctioneers. . . ."

Dealing with the possible reasons for the low liquid milk consumption in this country, the Reorganization Commissioners for Milk state on page 37 of their Report:

"Criticisms of the milk supply that are frequently made by certain members of the medical profession cannot fail to exercise a deterrent influence on any expansion of milk consumption. . . . Assertions that milk is an unsafe food are based mainly on the occurrence of living tubercle bacilli in a percentage of samples of milk . . . and on the known high incidence of tuberculosis among dairy herds in this country."

Again capitalism fails to produce the goods. And on the distributive side the story of high margins is repeated. The Commissioners give a table showing "nominal distributive margins," 1922-3 to 1931-2, and comment on the figures as follows:

"These figures show that the nominal distributive margin in London has remained exceedingly rigid since October, 1922. Except for the two years 1924-5 and 1925-6, the average margin

has remained at between 11½d. and 12d. per gallon. The charge for handling and distributing milk has thus shown no appreciable reduction on the figure of 12d. per gallon which the Linlithgow Committee considered was capable of some modification to the benefit of either producer or consumer. The average margin has not merely remained stable during a period, the latter part of which has been characterized by falling prices generally and much reduced purchasing power amongst consumers, but it has actually increased relatively to the retail price of milk. The proportion of the retail price represented by the nominal margin has increased from 41·4 per cent in 1924-5, when it touched a low level, to 46·4 per cent in 1931-2." (p. 58.)

And on the subject of cream, the Commissioners display just a little mild annoyance when they observe:

"The gross margin of profit taken when cream is retailed in cartons of less than half-pint capacity is in the region of three times the wholesale price of cream. A high rate of profit on a small turnover seems definitely to be the price policy in the retail cream trade." (p. 42.)

The production and distribution of potatoes is no less inefficient. *The Ministry of Agriculture's Report on the Organization of Potato Marketing*, Economic Series No. 34, 1931, states:

"An outstanding feature of potato marketing in England and Wales is the lack of standardisation of both produce and trade practices. Lack of standardisation begins on the farm, for as many as 50 varieties of potato are extensively grown in Britain. Then as regards market grades, the position is that, hitherto, standardised grades have not been generally adopted in this country. . . ." (p. 33.)

"The absence of standardisation adds to the cost of marketing and probably even to the cost of production." (p. 35.)

"The general lack of definition in market transactions and contracts leads to disputes, with the usual waste of money and energy." (p. 36.)

Again, there is "maladjustment of supply within the season." Despite all its weird and wonderful devices for "adjusting supply and demand," capitalism fails so far as potatoes are concerned. The Ministry's Report states:

"But, although it is technically quite possible to adjust the flow of supplies to demand, and although demand is, in any case,

very stable, the potato trade is characterised by wide and erratic price fluctuations both within the same market and between one market and another at a given time, and also from time to time within a given season." (p. 36.)

"Such lack of adjustment of supply to demand . . . is due . . . to the insufficiency of market intelligence." (p. 37.)

But any amount of "market intelligence" will not enable capitalism to do the job:

"Even given complete and widely disseminated knowledge of market conditions, there would be no guarantee, in the absence of any co-ordination of the marketing policy of individual producers and distributors, that supplies would flow to market in an orderly manner." (p. 38.)

It seems as if the "experts" at the Ministry are also beginning to perceive that distribution for profit and efficiency do not go together.

The various reorganization commissions, etc. were of course set up under the Agricultural Marketing Act, 1931 (supplemented later by the Acts of 1933)—which was fathered by the last Labour Government—and their job was to recommend measures to put British agriculture on its feet again. There were two methods of doing this. The first and more difficult was to increase efficiency, which meant primarily reducing distribution costs. It entailed, for instance, inducing farmers to produce what the consumer wanted, obtaining proper preparation of the goods for sale and the elimination of many superfluous middlemen and their "costs" and profits. The other way was to restrict supplies and competition so that profits could be made at the expense of the consumer by raising prices. Although a good deal of lip-service was paid to efficiency measures, and one or two half-hearted prods made in the direction of the problems involved, the Government chose the latter method and decided to limit supplies.

As often as possible the "foreigner" with his "unregulated competition" was blamed for the plight of the British farmer and he was used as an excuse to move in the direction of monopoly—at the consumer's expense. Although it was recognized that the success of overseas producers was due as much to the attention they paid to efficient marketing as to their lower production costs, it was nevertheless decided that there was no possibility of starting on the job of increasing the efficiency of British production and



distribution until competition—that wonderful efficiency-promoting force beloved of bourgeois economists—was safely bound and gagged.

Thus, on page 12 of their Report the Pigs Commission state:

“The organised development of the home bacon industry cannot be initiated in the face of unregulated competition from established Continental industries.”

So it was decided that “the supply of bacon marketed in the United Kingdom should be stabilized,” i.e. reduced, in order to put prices up. And that prices did go up we all know. Similar price-raising measures have been, or are about to be, applied to fish, potatoes, wheat, beef, eggs, sugar and dairy produce, and import duties have also been imposed on numerous consumption goods such as fruit and early vegetables.

Although the technique has been varied, the principle of raising prices to safeguard profits first and considering “efficiency measures” second has been applied throughout, and there can be no doubt that, with profits adequately safeguarded, existing inefficiencies are likely to be perpetuated and new ones created.

Far from taking steps to abolish the existing inefficient distributive organization and methods the Government has repeatedly assured distributive interests—at least the big and powerful ones—that they have nothing to worry about. Typical is the statement of the Milk Commission, which, after reprimanding distributors on the handsome gross margin they were taking and about their cream policy, go on to assure them:

“We do not, however, believe that the large milk distributive undertakings which have a strong hold on the areas which they serve will be prejudiced by the operation of the scheme . . . in fact, it is our opinion that they will be benefited.” (p. 63.)

And the Fat Stock Commissioners state:

“We suggest the retention of the main existing methods of sale.” (p. 37.)

It is already quite clear that little in the way of reduced distribution costs is likely to come out of the Marketing Schemes. A few of the smaller and weaker distributors (e.g. the producer-retailers of milk) may be, and actually are being, squeezed out.

But their share of the distributive spoils is merely transferred to the more powerful distributors who are left, and as the drive towards monopoly proceeds, profits are made more and more secure.

A fairly recent development in marketing practice and one which probably shows up more clearly than any other single phenomenon the sharpening contradictions of capitalism and its trend towards monopoly, is the "co-operative" advertising campaign. In order to boost the product—e.g. tea, beer—in which they are all interested competing firms within an industry devote part of their resources to a common fund which is used for advertising on a scale which few or none of them could undertake alone.

To comment on a system which permits and applauds the expenditure of something like half a million pounds on a campaign to persuade people to buy more bread (of all products! !), while thousands of those appealed to have not the money to buy enough, seems hardly necessary. That may well be the reason why the advertisements of the Millers' Mutual Association have evoked little comment.

But how is it that people so keenly competing in the same field can so far forget their differences as to take collective action of this sort? In the first place "co-operative" advertising is looked upon as a much more respectable and worthy form of advertising than the vulgar competitive sort. The Government directly encourages and promotes it—through its Marketing Boards. Secondly, different commodities are competing with one another just as different brands and varieties of the same commodity compete. And many industries, especially those supplying the staple necessities or older forms of luxuries, are feeling the effect of the selling effort put behind alternative, and often newer, satisfactions which the consumer can buy with a portion of his depleted purchasing power. Thirdly, as some staple commodities, e.g., sugar, margarine, are already in the hands of monopolies or semi-monopolies with large resources which they can devote to sales promotion, the comparatively small concern selling other products is becoming more conscious of the competition between commodities. Producers and/or distributors in one industry, therefore, feeling a stronger competitive draught from rival industries than from rival brands in their own industry, get

together in an attempt to divert more consumer purchasing-power in their direction. Hence the "co-operative" advertising as in the bread, beer and tea campaigns.

But such well-known instances as these are not the only ones. The extent to which competitors are already co-operating is scarcely realized by those not directly concerned with such things. R. J. Sykes, President of the Institute of Incorporated Practitioners in Advertising, quoted in the *Advertiser's Weekly*, 11 April, 1935, said:

"During the past twelve months co-operative advertising has appeared for no fewer than 33 industries, while as many as 300 trades have organised a central marketing body for the purpose of studying the possibilities of co-operative marketing schemes."

As in the case of the competitive advertising of brands, there is no reason to doubt that retaliation on the part of those adversely affected by the competitive advertising of *commodities* is bound to follow.

Participation in co-operative advertising does not necessarily decrease the individual advertising appropriation of the participant. On the contrary, each of the participants tends to increase the advertising of its own brands or varieties in an attempt to cash in on the rise in demand for the commodity which is expected to result from the co-operative campaign. The authority quoted above went on to say:

"My experience of co-operative advertising, extending now over many years, has taught me that it never tends to take the place of individual advertising, but that the general tendency is for individual advertising to be increased."

Co-operative advertising is just another story in *competitive* advertising and merely carries the waste of competitive selling on to a higher plane. It has the added significance that it tends to encourage complete fusion of interests of the rivals within the industry and eventual monopoly. The logical outcome of the trend which co-operative advertising and the Government's Marketing Boards together indicate, is the organization of distribution (and, in the case of manufactured goods, production also) in large monopolistic corporations each fighting furiously for a larger share of the consumer's shilling and thereby causing the shilling to buy progressively less and less.

Unlike convenience goods, in the case of which a high degree of standardization is actually desired by consumers, shopping goods are wanted in reasonable variety. In the interests of private profit, however, this very natural desire for variety and change is exploited to the utmost by capitalist distributors of shopping goods until the cost is out of all proportion to the satisfaction given. This shopping business has developed into a huge parasite, dominating the lives of thousands whether they be engaged in the production and distribution of shopping goods themselves, or consumers trying to make expenditure equal income.

This expensive parasite for the production and distribution of goods purchased by consumers largely on impulse has grown up, of course, through the competitive struggle of rival producers and distributors for a larger share of consumer purchasing power. And the existence of a class of well-to-do idlers, having the necessary time and money to satisfy their every whim, has encouraged its growth.

When consumers tend to want variety, and can be induced to want even more variety, the *entrepreneur* is not slow to take the hint. Hence, two outstanding developments have taken place as a result of the competitive struggle between profit-seeking rivals to seize more consumer purchasing-power:

1. The introduction of a "style" element into goods hitherto staple, or practically so; and
2. An increase in the pace of fashion change all round.

From the seller's point of view, the great advantage of introducing a style element is that the consumer tends to replace an article more frequently—often before the old one is worn out. If the general public can be made sufficiently conscious of the importance of style in relation to the article, then the individual is practically obliged to be in fashion in order to escape ridicule. In addition to a number of articles of men's wear, which, before the War, would have been worn until threadbare, an element of style has been introduced into such diverse products as fountain pens, kitchen furniture and hardware. The determined, and more or less successful, attempts to make certain speciality products—e.g. motor-cars, wireless-cabinets, gas-stoves—subject to definite and more frequent fashion changes is also noteworthy.

Greatest scope for the *entrepreneur's* efforts to draw more

purchasing power in his direction by pandering excessively to the desire for change lay amongst those goods already subject to fashion. If you double the rate of fashion change for women's hats then you anticipate selling about twice as many. But the woman who buys two hats instead of one during a given period will almost certainly have less to spend on other things. This does not worry the seller of hats. But it does worry the seller of frocks, shoes, corsets and everything else that competes with hats for the largest possible share of that woman's dress purchasing power. So the suppliers of rival products get busy and, in turn, try to speed up the pace of fashion change for their particular products also.

Now, requirements of goods subject to fashion change are notoriously difficult to gauge, and the quicker the change the more likely is the trader in fashion goods to have obsolete stocks left on his hands. The effect of introducing new lines into the fashion goods field and of speeding up fashion change is to introduce at the same time additional merchandising difficulties. Consequently, as the "styling" process forges ahead both in scope and speed, the cost of merchandising goes up. More, larger and dearer superstructures of buyers, wholesale and retail, of designers and merchandisers are required to predict, create and select the goods—each to do its little piece in the complex process of forecasting and determining fashion.

On top of higher merchandising costs, more expenditure is required to induce the consumer to buy quickly before the fashion changes again. Fashion speed-up means heavier advertising expenditure. Some idea of the trend in the expenditure on advertising fashion goods is given by Mr. Gordon Selfridge, quoted in the *World's Press News*, 7 March, 1935:

"Last year," said Mr. Selfridge, "I spent 2½ per cent of our receipts in newspaper advertising. We will probably spend more than that in 1935.

"In the 'eighties," he added, "Marshall Field and I thought that when we appropriated seven-eighths of 1 per cent for advertising it was quite liberal."

Again, the faster the fashion changes, the more variety results; and this increase in variety, added to the uncertain length of life of each particular style, reflects adversely on the cost of production. Rush work and short runs always result in higher costs than a regular throughput on a large scale. To obtain some idea

of the recent increase in the variety of shopping goods, we again turn to Mr. Selfridge. Speaking at the annual meeting of Selfridge Provincial Stores, Ltd., he said:

"I estimate that the modern department store is carrying twice as many different kinds of things as it did fifteen years ago.

"My guess is that in one of our branches we have well on the way to a million different kinds of things on regular display. One hosiery department in our organisation has 10,764 different kinds of stockings. We have 12,000 different kinds of gloves, 5,000 different kinds of handkerchiefs; 4,000 different kinds of handbags, and 135 different kinds of toothbrush." (*Advertisers' Weekly*, 4 October, 1934.)

On the retail side, increased merchandising expense due to enormous variety and increased advertising expense to assist each retailer to clear his stocks while the short-lived fashion lasts, are not the only expenses added by the acceleration of fashion change. The retail structure for the physical distribution of shopping goods is also more costly. The growth of the shopping habit, facilitated by the development of transport, on the one hand, and, on the other hand, made "necessary" if a woman does not want to miss anything and fall out of fashion, has resulted in expensive competition for the attention of shoppers while they are actually in the process of shopping around. This takes the form of palatial stores, ostentatious shop-fronts, and expensive "services," such as credits, unprofitable departments, "free" entertainments, etc. Large sums are also spent on institutional advertising (i.e. advertising the store in general, rather than any goods in particular) and even co-operative street advertising.

Ground landlords have benefited considerably from the growth of the shopping habit. Mr. Hore-Belisha, Minister of Transport, opening the Cumberland Garage, Marble Arch, London, on 19 November, 1934, stated that:

"It had been worked out in his department that the capital value of the land surface occupied by a stationary motor-coach in a busy street was £40,000." (*Daily Telegraph*, 20 November, 1934.)

While expenditure on sales promotion activity, including inflated rentals in shopping quarters, is very high in connection with this class of goods, undoubtedly the most important distributive function is merchandising. And it is upon the relative

success of its merchandising work that the profit of the individual firm depends. Now, as a rule, the big firm has every advantage over the small and medium-sized firm in the matter of merchandising. The larger the unit the less expensive per £ of sales and the more efficient the merchandising tends to be. This is because the big unit can obtain wider information about current demand, can hire better brains and can exert greater influence upon the actual course of fashion change. It is well known that in certain narrow fields a dominating wholesaler can, in a large measure, *dictate* the course of fashion. It is not surprising, therefore that, in the fashion goods trade, there is a drive towards trustification, and a prospect of eventual monopoly, or semi-monopoly. The rapidity with which powerful department store chains and multiples of the Woolworth and Marks and Spencer type are developing in Britain to-day leaves little doubt as to the future of the small man in this field.

The workers, when they control their own industries, may choose to spend more on the production and distribution of shopping goods than is spent to-day. Although **Social Effects** it seems doubtful, they may even choose to spend as much upon the *same sort* of shopping goods. But one thing is certain: the provision of decent living accommodation, adequate food and educational opportunities for all will be attained first.

The distribution of shopping goods in present-day Britain stands condemned, not so much perhaps because of its wastefulness, but because, taking its standards from the whims and desires of non-producers, it fosters a demand for shoddy luxuries when many go in need of necessities.

The shopping habit encourages the impulsive purchase of many useless articles which are cleverly advertised and attractively displayed, the purchaser thereby often foregoing necessities upon which the money should have been spent. The distribution of shopping goods for profit fosters parasitism and waste throughout both production and distribution. But perhaps the most depressing outcome of the distribution of this class of goods for profit is the conspiracy of publicity and suggestion—elaborately worked up by all those who stand to gain, from the small draper to the newspaper magnate—which results in that pre-occupation with clothes and idle shop-gazing dominating the lives of so many women to-day.

In terms of sales volume the great bulk of goods now classified as speciality goods are products introduced fairly recently, and their rapid growth in number and importance has coincided with the period of rapidly increasing disparity between production capacity and consumer purchasing-power. It is not surprising, therefore that the distribution of speciality goods as a whole is characterized by a greater emphasis on unproductive selling effort than either convenience goods or shopping goods.

**Speciality Goods**

Although a wide range of products—such as expensive footwear, furniture, suits, corsets, jewellery and even high-grade groceries—are often purchased on speciality lines, most typical of specialities nowadays are those products of the engineering industry the manufacture of which has been cheapened enormously by the application of mass-production methods. The sewing-machine, the wringer and the bicycle are some of the better-known early types. More recently we have the motor-car and motor-cycle, the gramophone and the electrical group of specialities, of which the latest important type is the radio receiving-set. A list of types of mechanical specialities (not to mention those which are non-mechanical) would be very long. If all the different brands and models were enumerated the list would run into thousands.

Among the many different types of mechanical speciality, introduced during the last half century, a few (e.g. the bicycle, motor, radio) have captured the public imagination and, for a time at least, have been easy to sell. As regards the majority of types however it was clear to sellers from the outset that a passive sales policy would not bring in the profits. Twenty or thirty years ago it was easier to sell motor-cars than vacuum cleaners mainly because the satisfactions to be obtained from possessing a motor-car made a stronger appeal to the imagination and emotions than the satisfactions associated with possession of a vacuum cleaner. More recently, the same advantage has been enjoyed by the sellers of radio sets as opposed to most other types of electrical specialities. It is not easy to induce a consumer to acquire a product which calls for a considerable money outlay unless the satisfactions to be derived from possession make a strong appeal to him. Since, therefore, there were numerous other satisfactions which the consumer could obtain for his money—satisfactions which called for a much lower outlay—as well as rival specialities making a stronger emotional appeal, the seller of the less favoured



specialities was soon considering ways and means of *creating* the demand which did not spontaneously arise.

Mass production, to operate efficiently, requires a large and constant throughput. Once the scale of production has been decided upon, the maintenance of a constant sales volume of a size consistent with the scale of operations is a matter of the greatest importance. Both from the demand side, therefore, where the apathy of potential consumers was a handicap to sales, and from the supply side, where efficiency demanded a large and steady output, came the stimulus to embark on an energetic sales policy which, of course, entailed high "distribution" costs.

Thus from the beginning, mechanical speciality goods were *sold* rather than distributed. And then came the multiplication of rival brands further to intensify the competitive struggle for a share of the consumer's purchasing power. Possibilities for the profitable investment of capital brought many rivals into the business of manufacturing and selling every type of speciality invented. As the number of brands increased, the selling task became more and more difficult—and, of course, more expensive. Further, by splitting up the total market between many producers, the unnecessarily great variety reacted upon the cost of producing each unit which tended to rise as throughput declined.

According to "bourgeois" economic theory, with its emphasis on price in relation to supply and demand, the competitive struggle should, "in the long run," cause the more efficient to eliminate the less efficient producers—i.e. those who offer, in relation to price, a poorer article—and leave the more efficient in possession of the field. The more efficient whose position is strengthened by the elimination of their weaker competitors should then proceed from strength to strength, cheapening the product by virtue of the larger scale of their operations and widening their market as the price falls. This theory, however, overlooks one important practical aspect of the matter—the effect of salesmanship. As we found in the case of convenience goods, no matter where it is situated within reason, or how many competitors exist, a shop can always attract some customers; so in the case of speciality goods, however poor the article may be in terms of value for money (again within reason), high-pressure selling is bound to result in some sales. A few people can always be induced to buy if the selling technique is good. And in the speciality field, where the article has a comparatively high unit price, it is possible to apply

the most effective of all forms of selling technique—that of direct personal persuasion.

This factor leads to a peculiar contradiction. Although personal persuasion is the most effective method of sales promotion, it is also, as a rule, the most expensive and difficult effectively to organize on a large scale. Consequently, while efficient manufacture calls for large-scale mass-production methods, the smallest concern can compete with the largest—often most effectively—on the selling job. An energetic *entrepreneur*, employing a few door-to-door salesmen working under his personal supervision, constitutes a more effective selling organization than the large combine with hundreds of men in the field. Men with the energy and flair necessary for the work of speciality selling are few. The great majority so employed are paid by results and their average earnings are pathetically small. Most speciality salesmen find their work very discouraging, their earnings tend to fluctuate violently from week to week and they usually flit from one employer to another. Consequently the expense of supervising and managing a speciality sales force, and the administrative overheads, tend to grow more than proportionately with the size of the organization. But the fact that it is possible to sell almost anything by smart salesmanship minimizes the importance of the price factor. The *entrepreneur* generally concentrates, therefore, on *selling* and not on *giving value for money*, because no matter how excellent his product may be in relation to the price asked, he will not get a look in unless he *sells* as effectively as his rivals who may be offering a much poorer article at the same price. This means virtually that the man with the good proposition must spend as much on selling as his rivals. The comparatively small man with his low overhead costs often sets the pace, the larger—and as regards production, probably more efficient—concern has to keep in step. Thus are the savings of large-scale production off-set by higher direct and indirect sales expense.

Manufacturers are even beginning openly to grumble about it:

“ ‘While manufacturing costs have in the last ten years shown a continual downward trend, selling costs have been on the upgrade,’ stated Sir Herbert Austin. . . .

“Sir Herbert felt that sales aids were becoming something of a millstone round the neck of industry. It was no use disguising the fact that ‘selling’ cost far too much. Were it not for the fact that manufacturing costs had been reduced to an almost impossible

extent, the handicap of selling costs would have proved a great deal more embarrassing than it was.

"Referring to the 'great redundancy of effort' in the selling of any product to-day, Sir Herbert illustrated his point by saying that the motor industry spent hundreds of thousands of pounds each year in advertising, a cost which, together with other selling expenses, had naturally to be included in the price of the car. This extra cost did not add one iota to the intrinsic value or quality of the product." (*Advertisers' Weekly*, 24 January, 1935.)

It is a characteristic of high-pressure selling that it tends to become less effective the more widely it is applied, and as it becomes progressively less effective, the drive for sales demands that more and more should be spent on it.

It is understandable that figures relating to selling costs in the speciality goods field are difficult to obtain, as those in a position to reveal them find it wiser not to. One or two indications of their size and trend can, however, be given. It is well known that the trade discounts (wholesalers' and retailers' margins only) on wireless receiving-sets rarely amount to less than 50 per cent of the price that the consumer pays. To obtain the total "distribution" cost it is necessary to add the selling costs of the manufacturer. And the distribution costs of wireless sets are relatively low. Many speciality concerns selling direct to the consumer can show a sales expense exceeding 70 per cent of the retail price. Moreover, the trend is upwards. Ten years ago the direct selling costs (i.e. excluding advertising and administrative overheads) of a well-known firm of vacuum-cleaner manufacturers was round about 50 per cent of the retail cash price. To-day, that percentage has risen to around 60 per cent, while during the same period manufacturing costs have fallen considerably.

Under the heading of specialities some reference to Instalment Selling is necessary. Since the War there has been a very big increase in the instalment selling of consumer goods, and the growth in facilities for "hire purchase" has particularly influenced the production and sale of specialities. Few people are easily induced to part with a large sum of money all at once, even if they can comfortably spare it. The necessity of demanding a comparatively large sum from a potential purchaser seriously cramps the speciality salesman's style. It is much easier to demand only a small "initial payment," part of a rather larger total sum to be paid in instalments spread over several months. This applies to those potential purchasers who could quite easily raise the money

to buy the article for cash. The great majority of potential users of speciality goods, however, are never in a position to put down the cash price. Hire-purchase facilities converted these potential users into prospective purchasers. The growth of facilities for purchases by instalment, therefore, not only assisted the salesman in his selling job but also immensely widened the potential market for this class of goods. The speciality manufacturers had found a weapon which enabled them to compete in a field hitherto reserved for goods of a lower unit price, and consciousness of this fact stimulated them to make greater efforts to unload their wares.

Now, hire purchase may seem to be an admirable device to the man who wants to buy a motor-car "out of income," but it is doubtful if he would be so pleased if he knew exactly what he was paying for this facility. The costs of instalment selling are high and serve further to increase the spread between the manufactured cost and the price the consumer pays. In addition to a high rate of interest on the money advanced to finance the credit, there are substantial administrative charges.

As usual very little information exists for this country, but in the U.S.A. the cost of financing consumption in the motor-car trade, including insurance, is said to amount to an annual rate of 26 to 38 per cent of the amounts credited. Prof. Seligman shows that "one of the oldest and best-known sewing-machine companies" charges round about 48 per cent, and he quotes the case of an "established publishing house" which appears to charge 84½ per cent.<sup>1</sup> This method of expressing the cost of instalment selling as an annual rate of interest on the amount of credit advanced, may not give a strictly accurate picture because the whole charge is not interest, but covers also the costs of management: credit inquiry, collections, losses, and sometimes also the cost of obtaining repossession, reconditioning and re-selling the goods. It nevertheless serves to show roughly to what extent instalment selling increases "distribution" costs.

Although there may well be a place for the financing of consumption under any economy, instalment selling under capitalism directly and indirectly fosters unproductive activity. By widening the potential market for the more durable consumer goods and by helping to overcome the individual's natural caution, it encourages greater expenditure on selling effort. Instalment selling, in addition, requires an expensive organization to deal

<sup>1</sup> Seligman: *Economics of Instalment Selling*, Vol. I, p. 290.

with the detailed task of administering the credits it has created and demands a high yield on the capital advanced to cover the risk.

Incidentally, no reference has been made to the social evils which result from high-pressure selling of specialities and facilities for their "easy purchase," which in many respects are the same as those attending the advertising of branded convenience goods. Countless individuals are encouraged thereby to attempt to live above their incomes and to deny themselves and their families other and more essential goods. There are few homes in this country without some comparatively useless contrivance "sold," at some time or other, by an enterprising salesman.

No useful purpose would be served by attempting here to deal exhaustively with the wastes involved in the distribution of producer goods under the present economic

**Producer** system. In the first place, producer goods are  
**Goods** so many and varied that they are difficult to classify for the purpose of generalization.

Secondly, accurate and comprehensive information is even more difficult to obtain than in the case of consumer goods. Thirdly, under a planned socialist economy, the methods of distribution, or rather allocation, of producer goods will bear little or no resemblance to the present methods. Consequently, we propose only to touch on some of the main characteristics of producer goods' distribution and their reaction on productive efficiency.

The unplanned nature of production has led in this field to most of the wastes which we found in that of consumer goods. Here, as there, we have excessive variety, redundant outlets and a squandering of effort on selling. In addition, there is more corruption and political wire-pulling.

As regards supplies, small parts, etc., required by producers frequently and in small quantities, and which are largely distributed through merchants rather as convenience consumer goods are distributed through retailers, distributive conditions are similar to those obtaining in the convenience goods field. Too much variety and too many outlets are brought about by the frantic efforts of rival manufacturers and traders to obtain a larger share of the market. In the builder's hardware trade, for instance, it is generally recognized that an unnecessarily wide and increasing variety of patterns, designs and sizes is brought about by the efforts of rival suppliers to meet users' whims and so obtain, or

retain their custom in the face of intense competition. And, while the number of merchants handling builder's hardware have for a long time been more than sufficient to do the distributive job adequately, new ones are constantly given encouragement by suppliers struggling for bigger and bigger sales. This artificially created demand for variety and unnecessary subdivision of retail handling, leads not only to higher distribution costs—e.g. slower stock-turn, more storage space, higher cost of cataloguing, stock-keeping, invoicing, packing, delivery, etc.—but also reacts on production costs by causing a reduction in the scale of manufacture for any one line.

Very similar conditions are to be found in the distribution of all kinds of mill supplies, such as belting, ropes, packings, small tools. While it also sometimes takes the form of severe price competition, the competitive struggle for a larger share of the available business leads to wasteful practices. It is the universal prevalence of these wasteful practices that effectively negatives any of the supposed price-lowering advantages of competition. Although it costs him more to do it, the manufacturer tends to sell direct to a larger and larger number of users. A user who, in a rational economy, would receive the bulk of his supplies from one warehouse is induced to deal direct with a score of specialized manufacturers. All the necessary distributive processes—ordering, packing, delivery, invoicing, etc.—are thus multiplied many times over. Moreover, direct contact with users and small dealers encourages each manufacturer to spend the maximum on selling effort. If one manufacturer sells aggressively others have to, and, although only one can obtain a particular order, all feel obliged to chase after it. The price of the product has to bear the cost of this selling expense just as the price of branded consumer-goods must cover the cost of their advertising.

The distribution of producer goods such as the smaller units of equipment, light machinery, supplies, parts and materials on minor contracts, somewhat resembles the distribution of speciality consumer-goods. Price is perhaps more important than with consumer specialities, because the buyer is more likely to have some technical knowledge of the product, but the same importance attaches to selling effort, and distribution costs are high mainly because of the amount spent on competitive selling.

Manufacturers themselves sometimes attempt to justify this high selling expense on the grounds that it is educational. They claim that the user by being persuaded to purchase their particular

product is going to have the best for his particular purpose and thereby increase his efficiency. The remarkable fact is that manufacturers of mutually exclusive products each claim to have the best product for the same purpose. Even if they are all genuine in their desire to promote efficiency—while of course, there is a profit to be made out of it—they cannot all be right, and the outcome of their illusions is a high competitive selling charge added to the cost of the goods. In the end, moreover, the product which tends to be purchased is not that most suited to the purpose for which it is required, but the one which is most actively “sold.”

This emphasis on selling leads, particularly in the field of producer goods, to an additional evil. Selling effort when you have to hire it, is expensive. Business men are in the habit of working out the cost as a percentage on sales. Further, really good salesmen are hard to come by. Consequently, any device that enables a salesman to cover more ground lowers his cost to his employer and increases “selling efficiency.” When, therefore, a highly paid salesman, rather than waste his valuable time persuading a stupid client what is good for him, just slips the client’s foreman a £5 note to do the persuading for him—this is efficiency. And the salesman passes on to the next job. So long as it produces results, one form of sales promotion is as good as another; and the method vulgarly referred to as bribery is remarkably widely used. The smaller the real difference between the rival products, the more prevalent tends to be the judicious distribution of “gifts” to those in a position to influence the choice of supplier. Because of the law of libel, specific references are dangerous, but any reader who has doubts about the prevalence of corruption in industry should make a few discreet inquiries amongst men in the lubricating-oil business or become friendly with almost any salesman handling producer goods.

When it is a question of finding a market for producer goods involving a really substantial purchase consideration, such as railway equipment, constructional steel, aeroplanes or steamships, or of supplying goods on a large contract, the goods can hardly be said to be “distributed.” Their sale is “engineered.” The costs of effecting the marketing of such goods are nevertheless high. When the purchase price involved is big the profits are correspondingly big and expense is no object. Consequently, in addition to all the arts of salesmanship and a judicious distribution of favours, publicity stunts and political wire-pulling are a useful and necessary part of sales promotion. It is common knowledge

that there is a "lobby" for practically every main industry and sectional interest in the House of Commons. Those controlling each particular section of industry openly use what political "pull" they can command to secure better opportunities for profit-making in that section. The reader is probably acquainted with some of the political activities of the international armament combines which apparently will stop at nothing to achieve sales and therefore profits. But "political" sales promotion is by no means confined to the armaments interests.

A typical case of this form of sales promotion is illustrated in a booklet entitled *Survey and Recommendations* published by the Coal Utilization Council, an organization of coal-producers and distributors formed to promote the sale of coal. Referring to the "fight for the oil tax," in 1933, the booklet shows how the activities of the Council, both inside Parliament and outside, "had considerable influence upon the final result"—viz. a heavy tax on fuel oil.

The booklet shows that the oilmen, who naturally opposed the tax, fought back hard to prevent it:

"Opposition inspired by the oil interests was vociferous not only in Parliament, but in the Press."

But;

"The-Coal-Utilisation Council assumed the task of countering this propaganda in favour of oil. It engaged in correspondence in the newspapers. It stimulated activity in the constituencies through its Area Committees. It printed and distributed widely over the country the 'Coal versus Oil' Bulletin. And it prepared and placed at the disposal of Members of Parliament a detailed technical answer to the various protests raised against the tax.

"The technical case for coal was prepared in collaboration with representatives of the coke, gas, electricity, low-temperature carbonisation, pulverised fuel, and coal-appliance manufacturing interests. It was presented and explained to a selected number of Members of Parliament at a meeting held at the House of Commons during the course of the debate on the Finance Bill and proved highly effective ammunition at a most opportune moment."

On the same page the booklet states:

"It has been possible, and in an increasing number of cases since the tax on fuel oil was introduced, to persuade oil-consumers to convert to solid fuel."



Under the heading "The Flueless House," the booklet reports:

"In July a deputation from the Council proceeded to the Ministry of Health in order to state the case against the Flueless House. A little later the Council had the satisfaction of obtaining, in answer to a parliamentary question, a statement defining the attitude of the Ministry to the question. That attitude is definitely against the Flueless House.

"The Council proceeded to circularise all the local housing authorities in the country drawing their attention to the Minister's statement and inviting their interest and support. The response has been most gratifying."

The Council also tells how it is trying to put the steam-wagon back on the road!

Thus, while every medical officer of health in the country is clamouring for smoke abatement, those profiting from the sale of coal are doing everything in their power to foster the basic causes of the urban smoke evil—and, apparently, succeeding.

Not only is this touting for legislative favours carried on by sectional interests with a fine disregard of its broader social consequences, but it is also expensive. The handsome fees paid to eminent lawyers, publicity men and the remuneration of lesser lights engaged in this sort of work, as well as the substantial contributions often made to party funds, have to be met out of the price of the product.

Another distributive burden carried by producer goods under capitalism is the amount added to the price of raw materials by operations on commodity exchanges. While it may be true that under capitalism organized produce exchanges constitute the best means of levelling out violent price fluctuations and of enabling producers to ensure themselves against unforeseen price changes, they are nevertheless a heavy burden on industry, and are grossly abused by the very speculators who are necessary to make them work. It is not of much use complaining of "speculators" and "gamblers" when the exchange would not work without speculators and gamblers. As was to be expected, capitalism's "best" method of achieving relative price stability reflects little credit on capitalism. The late Sir Charles Macara, cotton magnate and imperialist, fulminated constantly against "gambling" in raw cotton. He also knew who paid. A typical sentence of his is the following:

"I have long denounced the shameful exploitation of the cotton

consumer and wage-earner that has gone on, on the cotton exchanges."<sup>1</sup>

According to J. W. Tout, Sir Charles's estimate of the annual burden added to the price of the world's raw cotton by speculation on the exchanges was £300 million. Tout reckons that Britain's share of this would be about £33 million a year.<sup>2</sup>

As Sir Charles says, either the consumer or the wage-earner has ultimately to pay this levy which enables a handful of people to live very comfortably without producing anything of any value.

These briefly sketched examples of the methods used in the distribution of the chief types of producer goods are sufficient to indicate that under capitalism the distribution of producer goods is no less wasteful than the distribution of consumer goods. Everything that adds to the cost of producer goods must necessarily add to the cost of the consumer goods which they are designed ultimately to make. But perhaps the worst feature of distribution for profit is the way in which all the devices of the selling art are used to direct production into channels which are not necessarily the most useful from the point of view of society as a whole, but are the most profitable to a particular group of capitalists.

In considering the organization of distribution in a Soviet Britain we are dealing with the question of the place of distribution in a planned socialist economy. A planned socialist economy denotes an economy which is consciously organized to meet the requirements of the community, and every aspect of economic activity must, therefore, fit in with the economic plan as a whole. Distribution must fall into line. It is also quite obvious that by its very nature distribution cannot be an independent activity but is essentially a part of the "production" of consumer goods and the nature of its organization must, as a consequence, depend primarily upon the organization and capacities of production. Nevertheless, distribution is of more importance than a mere production process because those engaged in distribution work are in a position to determine what consumers want and, therefore, to indicate what should be produced. The ultimate object of all

<sup>1</sup> *Trade Stability and How to Achieve It*, p. 227, Sir Chas. Macara, Bt.  
<sup>2</sup> See *Home Truths about Cotton*, Frank Machin, published by *Daily Herald*.

economic activity in a socialist community is to supply the people's needs. Only the distributive organization is in a position to interpret these needs accurately, and it will, therefore, be a highly important section of the successful socialist economy. To meet the people's needs, however, entails productive activity, and the prospect of increased needs in the future entails provision for an increased productive activity in the future. Hence, the subordination of the distributive plan to the planned economy as a whole.

As a background to our outline of the socialist distributive structure we envisage a Central Planning Department for planning economic activity as a whole; and another department responsible for supervising the production and distribution of consumer goods from their sources, through the different distributive organizations to the consumer, and for regulating and co-ordinating the work of both producing and distributing organizations. The sources of supply will be mainly collective farms, production trusts, industrial and consumer co-operative societies; also overseas sources, supplies from which will be controlled by a Department for Overseas Trade.

The two principal functions of socialized distribution will be:

1. To determine what goods are wanted, and, therefore, what shall be produced.
2. To provide machinery which will enable consumers to obtain these goods as and how they desire.

We will consider the machinery first.

In order that distribution shall most effectively furnish the goods and services the consumer requires the distributive machinery will be owned by the consumers and workers and will be directly under their control.

**The Machinery of Distribution** To ensure consumers' control distribution under socialism will be organized mainly in consumers' co-operative societies very similar to those now existing. The chief difference will be that the co-operatives will not be competing with capitalist traders so that their policy will no longer have to be framed to counter this competition. Under socialism, therefore, co-operatives will no longer be obliged to pay "dividends" in order to retain and increase their membership of underpaid workers. They will be able to concentrate on achieving efficiency in performing the services which their members require.

While it is obviously impossible to attempt to describe in detail the precise form that the distributive structure will take in outline, the organization of socialized distribution is comparatively simple. The most important part of the distributive structure will be the co-operative movement. The basic or primary co-operative unit will be the local retail society as it is to-day. The local society will be owned and controlled by its members and it will be managed by a committee subject to recall at any time by the members which elected it. In order to ensure that every consumer who so desires has an opportunity to participate in co-operative activity, the primary unit or retail society will tend to be comparatively small. To meet the special needs of particular groups of workers retail societies will probably be founded on an industrial basis, in factories, as well as territorially, in localities.

The primary societies will be grouped into district co-operative unions, each owned and controlled by the primary societies which compose it. The district union will be managed by a committee also elected by the members of its affiliated primary societies. A district union's main functions will correspond to those of a wholesale society. In addition to the work of arranging for supplies to its retail units, either direct from the farms and production trusts or through the Central Union of the co-operative movement, the district union will probably undertake most of the production work—e.g. bread baking, market gardening, cattle slaughtering, which the co-operative movement might decide to do. The district union might also be charged with the task of organizing co-operative educational work, training of personnel, auditing and so on. Circumstances and experience will quickly determine exactly which tasks can best be carried out by the district unions, which tasks are best left to the retail societies and which tasks are more appropriately performed by the Central Union. Experience will also determine the optimum size of both the retail societies and the district unions. It is sufficient to indicate that the district union will constitute a wholesaling and guiding organization for its retail members, the primary societies.

The district unions will, in turn, be affiliated to the Central Union of co-operatives just as the primary societies will be affiliated to their district union. Consumers' control of the Central Union will be achieved by a periodical congress which will be the supreme authority of the movement and to which elected delegates from all the district unions (and any other organizations that happen to be affiliated) will be sent. The con-

gress will elect a board or council to exercise administrative authority between congresses and to supervise the work of an executive committee which will be charged with the detailed work of the central organization.

The work of the Central Union will be to guide and co-ordinate the activities of the whole movement. To facilitate this work it will be necessary to have departments specializing, first, in particular branches of trade or groups of products, e.g. groceries, hardware, drapery; secondly, in particular functions of management, e.g. accounts, staff, planning and stock control; and thirdly, in arranging and encouraging auxiliary activities, such as those production tasks which the co-operative movement decides to undertake.

Although it will be necessary to have a central administration for guidance and control and for performing those functions that can be effectively accomplished only by a central body, the principle of decentralization of function will be applied to the maximum extent. This means that as much as possible of the work undertaken by the co-operative movement will be carried out by the retail societies rather than by the district unions, and by the district unions rather than by the Central Union.

The principle of decentralization leads directly to another probable participant in wholesale distribution—the production trust. It will obviously be advantageous in many cases for the production unit to be as closely in touch with consumers as possible. This will be particularly advantageous in the case of those industries producing consumer goods subject to rapid fashion change. Such factories will undertake the chief wholesale functions and deal direct with the retail co-operative societies.

Further, the organization of the distribution of some classes of consumer goods may well be independent of the co-operative movement. Part of the distribution work will probably be organized in specialized trading trusts, as is the case in U.S.S.R. Meeting the needs of Britain's workers with a high and rapidly rising standard of living will be a very large task, and some degree of additional division of labour will probably not only facilitate the actual day-to-day business of distributing the goods, but, by creating a certain amount of "socialist competition," will also serve to stimulate efficiency. Under socialism competition will not involve overlapping or redundancy, but rather a division of labour between two or more organizations doing a parallel job in different spheres—e.g. two stores in different quarters of

the town—each striving to meet consumers' demands most effectively and at the lowest costs.

When, in a socialist community, every consumer as a member of a co-operative society is able to participate in distributive work, and therefore to assist in moulding the distributive organization into the form which he considers best meets his requirements, the retail distributive structure resulting will certainly meet his requirements better than it does to-day. The number and size of retail outlets, together with the types of goods each will handle, will be determined by the requirements of consumers using the outlets. The exact location of the different classes of shop will probably be planned along with living accommodation.

For "convenience" goods, outlets will be numerous and located near the workers' homes. Those things which are purchased most frequently will be available at many points of sale and at all times. Under socialism shops can remain open as long as required without any fear of sweating distributive workers. Shift work will be as practicable in the shop as in the factory; and, if workers so desire, some shops will remain open all the time.

As regards "shopping" goods, which are purchased less frequently and less casually than convenience goods, and for which a wide range of variety, sizes, colours, etc. is desirable, outlets need not be so numerous. Shopping goods will be sold in shopping centres where everything normally shopped for will be obtainable. Shopping centres will be planned to meet workers' requirements and each will offer a wide range of goods and facilities for shopping in comfort. Every town shopping centre will have its "Harrods" with numerous more specialized shops grouped together in the same area. In areas where the population is sparse the general shop or village store will still be necessary, and, while the range of goods carried *need* no longer be severely restricted by the necessity of making a profit, workers will in all probability prefer to visit a larger centre for most things outside the field of convenience goods.

Under socialism, many types of "speciality" goods now sold to consumers will probably be replaced by services. For example, most workers will probably find it more convenient to hire a car as and when they require one rather than to own one. The worker's house or flat will have gas and/or electric appliances such as cookers, radiators and refrigerators, fitted by the housing department. Instead of cleaning his home with his own vacuum cleaner he will call upon the services of specialized workers with

more effective apparatus to do the job. Nevertheless, some specialities will still be owned by individuals and these can most conveniently be offered for sale in or near the shopping centres where the consumer goes to buy his shopping goods. But speciality shops will no longer be staffed by salesmen whose livelihood depends upon their ability to unload goods on to the consumer whether he needs them or not, but by salaried technical experts capable of giving reliable advice to the consumer on the most suitable type or model for his requirements.

The senseless multiplication of effort which exists under capitalism in connection with such services as the delivery of bread, milk and coal, will be abolished, and they will be carried out in a rational manner. Milk, for instance, will be retailed by the local co-operative society, and the roundsman who visits a particular house or street will deliver *all* the milk required instead of leaving three-quarters of the task to rivals covering exactly the same ground. The same organization which arranges the delivery of milk will also deliver other daily requirements, such as bread and perhaps even groceries. By eliminating the present multiplication of agencies engaged in the service type of retailing, the business of ordering, delivery, account keeping will be immensely simplified, and as a consequence, a far greater number of consumers will be able to receive service, and it will be a better and cheaper service than the few receive now.

In a Soviet Britain the distributive machinery will be used not only to distribute goods already produced but also to determine what consumers want and, consequently, what shall be produced in the future. There are three main aspects of the task of measuring and evaluating demand.

**Determining Requirements**

1. Determining future requirements on the basis of experience, or demand in the past.
2. Out of the new products made possible as the result of invention and technical progress, determining which should be produced and in what precise form.
3. Determining what improvements, alterations and added variety consumers really want from time to time.

So far as statistics of past consumption are concerned, the socialist distributive organization will have complete information for each day, each week, and each year, about the past consumption of every variety of commodity both for the country as a

whole and for sections and sub-sections of it. Given complete information on demand in the past, determining the course of demand in the future for the great majority of products is a simple problem in statistical interpretation. Every reasonably efficient capitalist firm engaged in the production and distribution of consumer goods is to-day forced to attempt to forecast its sales, and despite very inadequate and scrappy data, many of them manage to do so with considerable accuracy. In a socialist state, not only will the data upon which estimates are based be complete, but conditions will be far more stable, consequently forecasting on the basis of past experience will be a more straightforward task and the results will be very reliable indeed.

Starting from the smallest distributive unit, that nearest to the consumer, the distributive organization will collect, collate and analyse figures of day-to-day consumption. The figures from the smaller units will be gathered together by the larger units and re-interpreted by them, until finally a picture of the requirements of the whole community by commodities, areas and time units will be available at the centre. This picture of the requirements of the workers in terms of consumer goods will constitute one of the principal bases for the plan of production as a whole. Further, the daily figures of consumption, or daily sales will serve to guide the day-to-day work of all distributive organizations. Without complete figures of consumption it is virtually impossible for distribution to function efficiently. The lack of such figures is one of the reasons why capitalist distribution is so inefficient.

For some goods, however, there is no past experience. New and more effective products are constantly made available by invention and technical progress. Moreover, Russian experience strongly indicates that, under socialism, the *tempo* of technical progress increases enormously. New goods, emanating from the production side, will obviously have to be fitted in. For the purpose of sifting, examining and adapting invention and technical improvements to consumer goods, special sections of the central distributive organizations will exist. This aspect of their work will consist in adapting new developments to consumer products in the particular form which will give the most satisfaction to consumers. The technique of these special merchandising sections will include experimentation and inquiry amongst consumers and retail distributive organizations—rather similar to what we now know as “market research”—and of course, close consultation with the production organizations.



Some form of advertising may very likely be used to make known the existence and advantages of new products which invention has made available. In a socialist state this is the only use to which advertising will be put so far as the distribution of goods is concerned. The cost of such advertising will be a tiny fraction of the present cost of competitive advertising.

As regards changes and improvements not suggested by technical advances in production, but arising from consumer demand, the initiative must mainly come from the retail end, often from those who want the change. As every consumer will be able to participate in distribution work through membership of the co-operative movement, he will have no difficulty in making known exactly what he wants. It is also probable that the retail distributive worker, in daily contact with consumers, will often anticipate the requirements of consumers as regards new and improved products and services, before the consumer has any need to make his suggestion. Suggestions approved by the management or adopted at a general meeting of a retail co-operative society, and within the scope of its activities, can be put into effect immediately. Those suggestions requiring the collaboration of the wholesale or central organization will be passed on to the merchandising section of the appropriate wholesale or central organization which, as has been stated, will be already charged with the specific task of seeking to effect improvements in the supply of goods and services on its own initiative.

Capitalism will supply anything so long as there is a profit to be made out of it; consequently capitalism throws up quantities of goods which can only appeal to the few eccentric rich, while the needs of the masses of workers are neglected. Socialism will put the needs of the workers first, and the worker-consumers organized in their co-operatives, and owning their factories, will be in a far better position than any capitalist *entrepreneur* to decide what they really want.

The main causes of high distribution costs in capitalist economy were set out in a previous section. A grossly inefficient distributive machine, excessive variety of similar merchandise and fierce competitive selling each adds its quota to high distribution costs, the total of which in Britain is estimated to exceed one-fifth of the national income. A very large reduction in these costs will be achieved when profit-seeking, which motivates existing production

and distribution, is abolished, production for use substituted, and the means of production placed under workers' control.

In the first place, the distributive machine will be completely rationalized. Only those outlets which are genuinely needed for effectively distributing the goods to the workers will remain. This elimination of redundancy will in itself effect an enormous economy. The cost of operating the shops that remain, expressed as a percentage of the value of the goods sold, will fall at once because the volume of sales per shop will immediately rise. Additional savings will be made, first, by further increasing the volume of sales per shop as the worker's standard of life rises, second, by reducing the unnecessary variety of products handled; third, by the maximum use of mechanical methods—e.g. automatic machines, accounting-machines, wrapping- and packeting-machines; and fourth, by eliminating expenditure on selling effort.

Rationalization will go right back to importing and primary wholesaling. Goods will not travel over the same ground several times as they often do now. Goods will pass through the minimum number of hands. Wastages of merchandise will consequently be reduced and there will be no large groups of traders each anxious to secure—and now so effectively securing—their little bit of profit. Those processing operations—e.g. bread- and pastry-making, cattle-slaughtering, bacon-curing and sausage-making—now largely performed by small distributive firms, will be organized on a scale which will permit of the efficient use of mechanical devices and the complete utilization of by-products.

The fact that the distributive machine is working to a *plan* thought out beforehand and laying down the part each section has to play in considerable detail will in itself constitute a direct means of eliminating wastage of both merchandise and effort.

The abolition of excessive variety of closely similar products will cheapen the distribution of those that remain. Simplification means that lower stocks are necessary, less space is occupied and goods are turned over more rapidly. In processing and wrapping—as well as in production proper—the fewer the varieties of similar products, the longer the run and, therefore, the cheaper the process. Simplification effects a further saving in the time and expense of ordering, stock-keeping and accounting, and—very important with perishables and semi-perishables—in less wastage due to deterioration.

The effect of the abolition of competitive selling on distribution costs will be revolutionary. The load removed from distribution

costs will include, among other charges, practically the entire cost of commodity advertising in the Press,<sup>1</sup> something over a half of the money now spent on printed matter and the expense of maintaining the present body of salesmen, canvassers and highly paid sales executives. In a Soviet Britain there will no longer be any need to *sell* because socialist industry will produce only those things that are wanted and the workers who need the goods will have the money to buy them.

Under socialism, not only will the distributive task be carried out more effectively and at a lower cost, but also an immense amount of capital and labour now devoted to the more parasitic aspects of distribution will be released for work on the production side and so will contribute to a rapid increase in the worker's standard of life.

In a Soviet Britain, distribution will not be directly concerned with producer goods. It is true that the distributive machine will require quantities of producer goods for its own use—e.g. building-material for shops, wrapping-material and supplies for its processing activities. **Distribution of Producer Goods** It is also true that the disposition of producer goods will largely be determined by the necessity of producing those consumer goods demanded by the distributive organization. Nevertheless, producer goods will no longer be "distributed" in the present sense of the term, rather will they be allocated to the various production units in accordance with the production plan for industry as a whole. Consequently, the allocation of producer goods must be controlled by those responsible for co-ordinating the economic activities of the entire community. Central depots and regional warehouses for a reserve stock of supplies, parts, etc., will be necessary, of course; but the work of organizing and maintaining them as well as the allocation of producer goods is properly speaking a function of socialist production, and concerns distribution only indirectly.

It is clear that the whole of the present distribution system could not be rationalized and socialized over-night. The workers when they seize power will inherit a distribution structure mainly designed to operate on capitalist lines. The tasks it performs, however badly, are many and intricate, and the workers will

<sup>1</sup> A little informative advertising of new products may sometimes be necessary.

obviously be unable immediately to take over and manage every phase of distribution. Complete socialization of distribution as well as of production will take time. Nevertheless certain steps towards the socialization of distribution will be taken at once. All individuals controlling large aggregates of capital must, in the interests of the safety of the workers' state, be removed from positions of influence and power. As regards distribution, this means that the larger firms engaged in distribution must immediately come under workers' control.

In this country particularly, it will be of the utmost importance to set up a powerful organization to arrange for supplies of food and other essential commodities to industrial workers. And, until the new regime gets under way, a strong and highly centralized Supply Department with wide powers will be necessary for the tasks of maintaining supplies and of reorganizing the present chaotic distributive structure. While the precise measures that will need to be adopted will be determined by the particular circumstances at the time—e.g. the extent to which other countries are already under workers' control and the legacy of events immediately preceding revolution—nevertheless, the chief measures that will be taken in the distributive field to effect the transition from capitalist to workers' control can be outlined.

Overseas trade will at once become a State monopoly, and the different organizations engaged therein, with the aid of the workers in those organizations, will immediately come under the control of the department set up for this purpose. Existing stocks will be confiscated and a continuity of supplies, particularly of necessities, will be the first concern of this department.

It is also clear that immediate steps must be taken to bring under some unified control the internal wholesale trade of the country. To attain this end, all the larger organizations engaged in distribution will first be taken over by the workers engaged therein. The small traders and small shopkeepers, however, who still play such an important part in distribution will be left in possession of their businesses. They will become a part of the socialized machinery of distribution and draw their supplies, not from capitalist manufacturers and wholesalers, but from the new production trusts and co-operative wholesale sections. In fact the small shopkeeper, who to-day is so unsuccessfully struggling against multiple-shop competition, will be far better off when the workers attain power. He will benefit not only by relief from the

crushing burden of rent and rates, but also by the greatly increased purchasing power of the population.

As regards the larger distributive organizations, it follows that if the workers take over the chief production units manufacturing consumer goods (e.g. the food, soap and tobacco trusts) they must also take over the distributive functions which these organizations now perform. It will also be necessary to remove from capitalist control the larger distributive organizations, such as department and chain stores and large wholesale businesses. These will be seized by the workers engaged therein who will form workers' councils to carry on the work until arrangements can be made to fit the various concerns into the planned distributive structure.

Great Britain is fortunate in having a strong co-operative movement to which some 15 per cent of the population even now belong. Although the present movement—operating as it is in a capitalist state and, therefore, influenced by capitalist ideas and restricted by the capitalistic production and financial system—has many weaknesses, it nevertheless constitutes a splendid basis for the socialization of distribution once the workers attain power. The existence of thousands of working-class co-operators with a practical knowledge of consumer co-operative organization and management will greatly facilitate the task of socializing distribution in Britain.

From the outset, it is highly probable that the task of organizing the whole of domestic wholesale supply, at least as regards necessities, will be entrusted to the co-operative movement. Freed from an economy dominated by the capitalist banks and producers, the co-operative movement will have a tremendous opportunity and every encouragement to get on with the job of organizing distribution on a rational, socialist basis. Defects in retail buying facilities can be remedied by forming new retail societies or new branch shops, wholesale warehouses can be established just where they are required to serve the retail societies, and auxiliary production activities set on foot to meet the rapidly growing demands of the workers.

Central control of supplies will result in an immediate saving, for the present waste that arises out of needless transshipment and handling will be at once eliminated.

In spite of a reduction in the working day to seven hours and a partial institution of the shift system, it is almost certain that along with the process of rationalizing the distribution system, the number of distributive workers required will gradually de-

crease. The workers no longer required in distribution, however, will not be thrown on the scrap-heap, as under capitalism. When production is organized for use there can be no involuntary unemployment. Workers released from distribution will at once be absorbed by production which will be operating at capacity. And there is more likely to be a shortage of workers in relation to the work to be done than a surplus. The same applies to the small shopkeeper class. Although at first they will be given every encouragement to carry on as independent traders, eventually their functions will need to be completely absorbed by the socialized distributive organization. Nevertheless, while as a member of a particular group, the small shopkeeper will eventually disappear, as an *individual* he will actually gain by this process. Under Soviet Power the standard of living of the small trader and shopkeeper will begin to rise immediately. The standard of living of the worker in completely socialized productive and distributive units, however, will rise even faster—mainly because of the social services the latter will enjoy. Consequently, great numbers of the small trader and shopkeeper class will go over to socialized activities. While many will certainly be absorbed by production, the more highly trained and expert in distributive work will be in great demand to fill responsible posts in the co-operatives and trading trusts.

The centralization of control which will at first be necessary to ensure a continuity in the supply of necessities and to give direction to the task of re-organizing the distributive structure will gradually give place to decentralization. As soon as the main lines of the new distributive structure have been laid down, responsibility for carrying out the different functions will be taken over by the lower distributive units. In Britain it should not be very long before distribution becomes completely socialized.

# IV

## BUILDING

“We talk a great deal about planning in this country; but our planning is a constant fight against vested interests. Town-planning and housing would be relatively easy if we could act on the advice of our best experts. In fact, the satisfactory re-housing of the people is thwarted at every turn by the dreary and unending fight against people whose personal interests would be damaged if we did the right thing. All this friction is abolished in Russia.”—Sir Ernest Simon in *The New Statesman and Nation*, 14 December 1935.

**T**HE Building Industry in its many aspects so vividly focusses the essential defects of capitalism as almost to represent a self-drawn caricature. Here the zeal of the profit-motive and the private initiative of the small capitalist have reigned with a vengeance! Building our towns and to-day defacing our countryside has been the happy hunting-ground of competition and the speculator and the pioneering *entrepreneur*. As a product we have disease-ridden slums, fog-bound inflated cities and ribbon-development; we have the insanitary hovels of mining valleys and rural villages and the soul-killing ugliness of the dreary slate-roofed streets of our industrial towns. And while the building-speculator, often a “small man” at the outset, has amassed his profits and climbed to power and fortune, the absentee landlord has reaped the increment-value of congestion and has obstructed every attempt at rational planning and improvement. Even such progress as has been made in removing the most uncivilized horrors of cellar-dwellings and back-to-backs and privy-middens has only been achieved by legislation forced by social pressure and obstructed and evaded at every turn by the vested interests of site-owners and the trade. A Hogarth and a Grosz in union would find it hard to compose a caricature equal to the situation as it is. |

This is how the achievements of this industry in a typical centre of capitalist industrialism in the nineteenth century has been described by two authorities who are not given to exaggeration:

"The housing of the working-class population was undertaken by the speculative builder. There was no sort of planning, or even control over the standard or quality of the houses built; the speculative builder was free to put up any sort of house which he thought would command a ready sale. He could, and did, in the poorest districts, crowd as many houses on to an acre as the space could be made to hold. . . . He could build his houses back-to-back, or blind—i.e., with no doors or windows at the back. He was under no necessity to provide yards or air-space round the houses, or to put in a damp-proof course; stone flags were frequently laid directly on the bare earth to form the floor of the house. Windows might be the smallest size possible, and often were not made to open. Sanitary accommodation would consist of one privy-midden, often at a considerable distance, to serve several houses; water-supply of a pump in the street, or a single tap for the use of a number of houses. . . . Not only were the houses built incredibly bad, but their surroundings were also a mass of mud and filth."<sup>1</sup>

And it took an outbreak of cholera, threatening the *bourgeois* suburbs, to stimulate even the most elementary improvements in water-supply and drainage.

This is not surprising in face of the circumstances of the industry. In an industry where the necessity for planning is paramount there reigns the supreme irrationality of small-scale competitive enterprise, dominated by the prospect of large profit-margins on sale in face of an urgent and inelastic demand. In all there are some 50,000 firms, each employing on the average less than twenty men. In an industry where ground-area and position are of such primary importance the obstructive-power of vested-interest, in the shape of the site-owner, is at its maximum. Moreover, while it is an industry on which the health and welfare of the population depend in the most fundamental way, it is an industry in which the divorce between the social interest and the interest of private profit-making is the most pronounced, perhaps, of any industry. In serving the needs of the masses for living-accommodation, it is serving a social need which, in terms of money, "pays" relatively ill—yields less money-return than building luxury flats or shops

<sup>1</sup> Sir E. D. Simon and J. Inman, *The Rebuilding of Manchester*, pp. 3-4.



or country-mansions; while the major part of the social gain from healthy, well-planned, beautiful building is something which is not represented in any money-return to the individual *entrepreneur*. Yet, while the cost of stunting a generation and ruining the health of millions finds no place in the costs on which capitalist accounting is based, capital-cost—the cost of interest-charges—bulks peculiarly large in the money-cost of building and hence in determining its style and amount. For instance, the interest-cost of working-class houses works out at over 60 per cent of the total cost, so that a small change in interest-rates makes a very large difference to the total cost of a house as it is calculated to-day.<sup>1</sup>

The dismal failure to provide housing accommodation even on a minimum scale for the masses is now notorious enough. Even with the aid of the Wheatley Subsidy (which the National Government has now brought to an end) the industry has been very slow even to repair the leeway of twenty years' arrears. The building "boom" of recent years has mainly built houses for *sale* and at rentals *above 10s. a week*—that is, has catered not for the most urgent needs but for the more profitable lower-middle class demand; and, precisely because of the limits of this "paying" market, is already showing signs of coming to an end. Repeatedly progress has been thwarted by the desire of successive Conservative Governments to encourage private enterprise and safeguard landlords, while even Labour Governments have been timid of disturbing propertied interests.<sup>2</sup> "At the present time the rate of return demanded by speculative builders in general is

<sup>1</sup> Sir E. D. Simon in his *Anti-Slum Campaign*, p. 198, gives the following instructive estimates:

	Value of House					
	£300		£400		£500	
With an interest-rate of 3½%—						
Economic Rent (without rates) .. ..	7	2	8	9	10	5
of which interest cost is .. ..	4	0	5	4	6	9
With an interest-rate of 5%—						
Economic Rent (without rates) .. ..	8	11	11	1	13	4
of which interest cost is .. ..	5	9	7	8	9	8

<sup>2</sup> For instance the Moyne Committee opposed the creation of any national housing organization on the ground that it would "drive private enterprise out of the field." (Cit *P.E.P. Report*, "Housing England," p. 16); while the Treasury has been consistently hostile to any guarantee for housing loans to enable capital to be cheaply provided (*ibid.* p. 53). Sir E. D. Simon writes: "Although the pressure of public opinion has been such that there has been a good deal of agreement on the broad issues of house building, yet it would be easy to quote pages from Hansard showing in what a party spirit the subject has been discussed," thereby "preventing consistent national planning." (*Op. cit.*, p. 59.)

still too high to permit the erection of working-class dwellings of the required standard."<sup>1</sup> At the same time, the chaotic state of the industry makes costs absurdly high and hinders improvement. So backward is the industry that building methods and technique have shown scarcely any change over half a century, at least in the construction of dwelling-houses; and it has been estimated that "the real costs of building" have fallen by less than 20 per cent as compared with what they were in 1850.<sup>2</sup> A recent report has declared that "in the building industry itself the reduction of costs through technical economies and improved efficiency has hardly yet been touched."<sup>3</sup> Standardization of methods and materials is prevented by the multiplicity of firms and the smallness of individual orders. Research and experimentation are virtually non-existent; and where research organizations exist, they "scarcely touch the problem of costs at all."<sup>4</sup> Absence of planning of building programmes causes considerable waste, and also unemployment of building-trade operatives, owing to the fluctuations and uncertainty of building activity, and the resulting inability to make building operations themselves and the manufacture of parts and materials a "balanced process" with "a steady load throughout the industry." Even in times of building activity there is an unemployed reserve of labour of 15 per cent. The labour market is little organized, much of the hiring of labour is on a casual basis, and training of juveniles, while it is undertaken in many districts with the co-operation of the N.F.B.T.O., is patently inadequate and unco-ordinated. Moreover, the supply of the principal building materials is to-day dominated by rings and price-associations, which restrict production and take advantage of any substantial increase of building activity to raise the price of materials, which constitute some 60 to 70 per cent of the direct costs of building.<sup>5</sup> Between the upper and nether millstone of monopoly in the supply of materials and the poverty of the masses who constitute its principal market, the industry, not unnaturally, is increasingly incapable, on a capitalist basis, of meeting the social need.

<sup>1</sup> *P.E.P. Report*, p. 53.

<sup>2</sup> Colin Clark, *Memorandum No. 49 of London and Cambridge Economic Service*, p. 15.

<sup>3</sup> *P.E.P.*, p. 152.

<sup>4</sup> *Ibid.*, p. 151.

<sup>5</sup> *Ibid.*, p. 59.

During the twentieth century almost all the large industries have been reorganized—attempts have been made to plan them, and an enormous number of reports, books, forecasts, and so on, have been produced about them. But with the building industry—**Recent Tendencies** at the present moment one of the utmost importance in helping to lift Britain from the general crisis—the position is quite otherwise. Only in the last year or two has there been any attempt on the part of the great building trade employers and the manufacturers of building materials and building equipment and installations to get together in an attempt to plan the most anarchic and fluctuating of all industries. These efforts to reduce order out of chaos are shown in such things as the formation of the Building Industries National Council, the report published by P.E.P., the report of the National Housing Council—on which steel interests are represented—which are all straws in the wind showing a desire to prevent another catastrophic collapse such as that of 1931.

A principal complication in the way of any efficient organization of so complex an industry is the unknown factor of demand. The great variety of materials—products and semi-products—employed on even the smallest building job leads to endless complicated inter-relations. This factor must remain an obstacle even to the most ambitious projects of capitalist rationalization within the trade.

Since the crisis of 1931 the building industry has been looked to as the one industry that showed signs of making a substantial recovery. This expectation has been largely fulfilled, and at the present moment building is the most important field—financially—for capital investment. Capital investments in this industry represented by Building Society advances alone exceeds all other capital investments together. Though the last few years have seen a tremendous stimulus given to house-building (reflected in the profits of the speculative builders) and work on public and social service buildings is once more being carried out, the basic features of the industry remain the same. Among building workers 15 per cent are still unemployed—in public works contracting about 43 per cent are still unemployed. Between 1924 and 1933 the number of building workers employed *rose* 11.5 per cent and the index of building activity *rose* by 43 per cent, and the output per man *increased* by 29 per cent. Money wages *fell* by 12 per cent.

The building industry, like all other productive industries, produces commodities. The commodities in this industry are complex, being buildings and "public works"

**Building Industry:**—houses, ships, public buildings, factories, a Commodity- roads, bridges, sewers, all are commodities  
**Producer** produced by the building industry. Certain

features will at once be noticed respecting these commodities—principally that the raw materials used in their production are themselves manufactured or semi-manufactured commodities—bricks, tiles, steel, cement, paint and timber. The production of these "raw materials" is not carried out for the building industry alone, many of them being products used by other industries, such as steel and timber, for example. The production of these and others of the materials used in building construction constitute industries in themselves. There are, however, great enterprises whose fate is directly dependent on the building industry, such as brick and tile and cement. Such undertakings, together with the actual construction and erection aspect, go to make up the great industrial complex—*the building industry*.

Briefly, there are three stages in the industry each with a separate but closely related function. To have an efficiently functioning industry, it is necessary to have all these three sections perfectly harmonious, both internally and in their external relations.

The three stages are:

- (1) The planning and designing branch—town planners, architects, engineers, sociologists—officials of local authorities—quantity surveyors, education and public health committees—all these various groups have a voice in saying what the building programme will be, and in preparing schedules of requirements, schemes, designs, working drawings, and so on.
- (2) The construction and erection branch—contractors and civil engineers. Under this section is undertaken the bringing into being of the plans prepared by Section 1, using materials manufactured by Section 3. This branch comprises building contractors, steel erecting firms, demolition and excavating contractors and their employees. The National Federation of Building Trades Operatives and the Master Builders Federation are the principal organizational units within this field.

- (3) The manufacturing and distributing branch—this section is concerned with the manufacture of building materials, installations, fittings, furnishings, etc., used by Section 2, and their distribution. At present this section includes manufacturers of such materials as cement, steel windows, sanitary fittings, earthenware pipes, etc., the builders' merchants (who actually take no part in manufacture), saw-mills, etc.

At this stage it might be useful to deal briefly with the method by which the industry carries on its production.

- Method of Production**
- (a) These firms, individuals, or local authorities and public bodies that decide they require buildings submit their requirements to an architect or—only too frequently—to the drawing department of a building contractor. The architect designs the building or groups of buildings, organizes its services, arranges it so that its functions may be fulfilled, and is responsible for the aesthetic gloss desired in the finished building—he has other functions as well, not connected with design, that will come to light later on. This work is undertaken on a commission basis. Most of the work is done by draughtsmen in the architect's office who are paid weekly wages and receive no acknowledgement of their contribution to the efficient designing of the scheme.
- (b) The amount of different materials required in the building is then measured by the quantity surveyor or the estimating department of the contracting firms.
- (c) Estimates of cost are then made for carrying out the work by the contractors, three or four being usually invited to submit estimates. The various block items, such as electric light installations, gas, water, window-frames, etc., are often the subject of special estimates. In each of these cases also three or four firms submit competitive estimates.
- (d) When the price is settled by all parties, the successful contractor then sets to work, erects his plant, engages men—by far the greater part of building work is casual labour of a definitely seasonal character—and proceeds to erect the building under the supervision of the architect.
- (e) In doing this he purchases fittings, installations, etc., from those in Branch 3 (above). These are sometimes fixed or

installed by the contractor, and sometimes by the manufacturer: trade usage varies with the nature of the installation and the size of the manufacturing firm.

Naturally, due to the competitive nature of capitalist society all this inter-relation is by no means frictionless. While there is a continual struggle going on between architect, client, builder and manufacturer in the main divisions, there is a continuous struggle within these divisions. The draughtsmen, the building operatives and the workers in the building materials factories are conducting a ceaseless struggle against architects, builders, manufacturers, etc.

We will now proceed to look more closely into the industry and seek the causes of its present inability to perform its function in society.

Before any building is erected plans must be prepared, the preparation of these being the function of the architect and town planner. The “professional” side of the building industry is in a condition as unsatisfactory as any of the other sections of it.

The ugliness of the majority of the buildings being erected in England to-day is due to this failure of the architectural profession owing to the fact that:

- (1) Most buildings are designed by men totally without training—builders’ clerks, draughtsmen and jobbing builders, surveyors, etc.—people generally incompetent to fulfil the function of the architect.
- (2) The system of patronage by which the vast majority of the jobs designed by architects are bestowed is governed entirely by “influence” of all kinds and bears very little relation to the abilities of the architect involved.
- (3) The multiplicity of small architects employing one or two draughtsmen who are unable to provide any proper office organization—thus having to devote much too much time to the purely business administrative side of their work to the detriment of their purely “architectural” concentration.
- (4) The unsatisfactory nature of the present system of architectural training and education by which there is practically no connexion between the students and building work and none at all between the students and building workers. The pseudo-historical nature of the instruction—entirely

- unrelated to present-day social needs. The emphasis throughout on "presentation" and not on the ability to seize the nature of the need the building is designed to satisfy, and to use structural possibilities to create an environment for the fulfilment of that need; and that too only for the students at the day-schools (a grossly expensive course!)
- (5) The bad attitude towards local authorities shown by the architects working for them. "An easy job": a feeling of rest and peace seems to pervade those who become the officials of local councils.
  - (6) That the most influential organization of architects—the Royal Institute of British Architects—is fighting might and main for the preservation of the private practitioner and the maintenance of the patronage system, and is in constant opposition to the architects working for State or municipal organizations.
  - (7) The lack of organization among architectural and engineering assistants and draughtsmen of which there are some 70,000, 12,000 being organized in the Association of Shipbuilding and Engineering Draughtsmen out of the 18,000 eligible—of the remaining about 52,000 draughtsmen, under 1,000 are organized in the Architectural Assistants trade union<sup>1</sup> which is unfortunately a very ineffectual organization.
  - (8) The establishment of the Architects Registration Act in an endeavour to give trained architects some legal status has been totally ineffective in raising the architectural standard and will result in the profession becoming a mere rigidly "closed" one, and will make it more than ever a preserve of the wealthy.
  - (9) The majority of architectural practices are on a small scale leading to enormous waste of effort, as each petty architect has to examine for himself all the new materials, equipment, installations and technical methods. Moreover the circulation of information among architects is limited by (a) lack of means—there being no journal that can serve as an architectural forum for all technical and theoretical problems relating to the profession, (b) unwillingness of architects to give away their little odd bits of knowledge as long as these can be turned to their own commercial advantage.

<sup>1</sup> A.A.S.T.A.

What however are the main trends observable in the development of the profession as a whole? The most important factor is the tremendous growth of architectural establishments that are nothing more or less than business concerns—the head of which is primarily a business man—whose duty it is to sell the advice and service of his organization at the highest possible price. The quality of the work turned out by such a firm will obviously depend upon the type of man employed as assistant or draughtsman. As these in such a position receive no credit for their work and are usually paid very low salaries—£3 to £5 per week—(to cut down the business overheads of the firm) it is natural that the quality of design should be extremely low—though the technical efficiency is often quite high.

The second feature is the development of architectural departments attached to large business concerns such as Harrods and several of the large brewing firms.

A third is the extension of the work of local authorities. The period since the War has seen a complete change in the scope of the work undertaken by borough and county councils. The stimulus being largely provided by the housing shortage and resulting in the various housing and town planning acts, and the increased agitation and demand for health, education and other services. Work in this field has suffered a good deal due to the comparatively low salary rates and professional status when compared with private practice, and the consequent tendency for those who desire a quiet and peaceful existence rather than active architectural service to enter municipal employment. There are other obstructions in the way of those who try to give real architectural service to the local authorities—bureaucracy in the organization, stupidity, ignorance and often deliberate self-seeking on the part of the councillors. There are of course many councils that have active, far-sighted and disinterested architectural staffs and serious enlightened councillors, but such cases remain the exception.

Now irrespective of the particular form of organization under which he is working, whether as a private practitioner, as a county, municipal or State employee, all architects suffer from serious disadvantages wherever in our existing socio-economic organization. The chief of these difficulties is the limitation of the site available to the architect. Let us say for example an archi-

**Unplanned  
Building**



tect has to design a hospital. He is not able to go to the town it is designed to serve and look about him—studying aspect, winds, views, services and supply possibilities—pick upon the best site and say “we will build here.” No! The process is quite different. The hospital buildings committee will look around, consult with the local council, get together, and discover “old so-and-so, he’s got a nice bit of land, a bit small maybe, a bit cramped, a bit near such and such a factory, but he’s a decent fellow.” The land is bought.

The committee goes to the architect and says: here is our site, here are our requirements, we can only spend so much (almost invariably a totally inadequate sum), get on with the job. Under these conditions it is impossible to give really satisfactory architectural service however capable and willing the architect may be.

In dealing with town sites, the position is even worse. Here all the owners of buildings adjacent to the site the architect has at his disposal are on the watch to make sure that none of their rights, their privileges, are encroached upon. Their “ancient lights,” their “right to support,” their “party walls” must be respected and preserved unless a generous financial compensation is paid over.

Especially is this limiting and paralysing effect of private property observable in dealing with housing work. For example, in the borough of Fulham there are proposed three or four various schemes of twenty-five, fifty-odd, and about a hundred flats. These schemes are in no way connected. One is to be built on the site of a factory—a site of peculiar shape—complicated by the presence of fish-and-chip shops and sundry other vested interests. Moreover on this site there is a street that was condemned by the local authority and eventually found its way to a metropolitan open-spaces organization. This august, and no doubt very public-spirited body, refuses to exchange this site for one of similar area but more awkward shape to allow a more satisfactory housing scheme to be built. All these three housing schemes are but drops in the ocean of need as will be shown later. At the moment the point to consider is that these schemes are being carried out, not because of conscious organization of the borough’s housing resources, but because of the fortuitous vacancy of certain sites. By increasing the density of the buildings on these sites, the traffic problem will become worse, as the street plan remains unaltered. This case is by no means exceptional, but rather typical and general.

The chief difficulty therefore for adequate solution of the housing and building problems, from the architectural side at any rate, is the smallness of scale upon which work is done. Every new building erected in the towns, every new amenity, theatres, libraries, clubs, swimming-baths, tends to add to the already stifling congestion.

There are however other difficulties, the chief of which is prejudice. Prejudice arising from a carefully cultivated habit of thought among those who are to be architects. Prejudice on the part of worthy county, city, and borough councillors against any unfamiliar architectural form.

A further tremendous obstacle to progress in the architectural direction is the influence of bye-laws, steel and concrete codes, and other regulations imposed by greater and lesser authorities. Some day the history of the steel and concrete regulations will come to be written and it will be seen clearly that the great industrial interests here no less than in other life fields of public life exerted a major influence. For example, the advertising value of the considerable reduction in the weight of steel required to be used in steel-framed building was very considerable. The user of steel however benefitted but little, for the price of steel rose. The great cement monopoly also was able to control the regulations relating to the employment of reinforced concrete. By this time it must be fairly clear to the reader that the architect in a capitalist society is able to make only a very poor showing. His functions are meagre, poor and limited—he exerts no decisive influence. He can only lend his weight to the criticism of the system that allows, encourages, and in fact, compels, this state of affairs. His very criticism must not be of too radical a nature if he is to retain that patronage upon which he depends for his livelihood.

One extremely important aspect of the organization of the building industry is the planning of industrial units, their geographical and economic relations, and their association with residential, health, recreational and educational units. It is here that the extreme difficulty, rather impossibility, of serious planning becomes obvious. An examination of the British industrial lay-out reveals the most extraordinary confusion, and the multitude of haphazard factors that together have contributed to the siting of important industrial plants—this confusion is particularly observable in light industry—can only be separated out

with difficulty. On balance moreover it will be seen that a very considerable element in this siting is chance—or personal whim.

There are five main influences in industrial siting:

- (1) Presence of (or access to) necessary raw materials.
- (2) Presence of necessary power-facilities or fuel.
- (3) Suitable transport facilities (especially in the case of an export industry.)
- (4) Presence of adequate labour-power resources.
- (5) In the case of light industry the presence of, or access to, a sufficient number of consumers.

Of course none of these five considerations can be taken in this elementary simplicity, they all act and re-act upon one another.

On careful examination of the siting of industrial undertakings and the residential quarters attached thereto it will be found that the geographical configurations have only played a part where they have directly influenced the cost of transport or of industrial processes themselves. Considerations of geographical fitness to be an urban area have been quite neglected. The new mining village of Aylsham in Kent gives a very good example of this inattention. Situated on the side of a bleak hill, the bitter winds sweep across the vacant lots, marked hopefully with a sign saying "civic centre," "site for cinema," "shopping centre" and so on. Sites that up till now have housed nothing more interesting than a few rusty iron hoops, bicycle tyres, and the square box of red bricks for the electrical transformers. This beautifully "town planned" village instead of being a real home for the miners of the neighbouring pits is an eyesore—bleak and dismal. The chief considerations in its siting being apparently cheap land and proximity to the main pits.

To-day the extension of electrical power and development of non-ferrous metallurgy suggests great possibilities of radical changes of industrial distribution. If we consider Britain to-day, we see a few large towns with a predominately industrial population, and London with a girdle of light industry factories and a tremendous population of distributive and clerical workers as well as the labour for the smaller industries already mentioned. We observe in these large towns gross overcrowding. In Birmingham there are 7,568 *families* living more than two persons per room. In Bradford 2,583, Leeds 4,365, Liverpool 10,480, Salford 2,354, Sheffield 4,765, and in the London boroughs—Camberwell 3,100, Islington 6,218, St. Pancras 4,112, Stepney 5,774. These figures taken from the Housing Census of 1931 reveal the terrible condi-

tions of overcrowding in the main centres of population. Of course there are many places where there are higher percentages of overcrowding, but such cases are not general, whereas in the large towns and cities overcrowding, densely packed houses, acres of slums are the *rule*.

To an ordinary reflective layman observing the phenomena of poverty, ill-health, overcrowding and misery apparently inseparable from large towns or centres of population the question arises: is this massing together necessary? If, as appears to be the case, large concentration of population means the misery we see to-day, is it not possible to re-distribute our population? Need this mean loss of cultural and educational possibilities?

In the pamphlet *Transport, Town Development and Territorial Planning of Industry*, by F. J. Osborn, the reasons for the present growth of large towns are described as follows:

“Speaking very broadly the main immediate thing now determining the growth of towns is the decisions of boards of directors as to the location of factories and offices, largely influenced by current economic theory, the incitements of municipalities wanting more reliable value, clever estate salesmanship, and sheer uncalculating fashion. Without question this farce, in its present mood, will on the whole continue the growth and congestion of towns.

“In a very large town, as the suburban ring grows, some factories will find they can snuggle up to both market and labour supply by tucking into the margin, and perhaps pick up cheap land before the full tide of town values has flowed over it; and so you will get a composite town, but it will grow in congestion centrally no less for this type of sub-centralization. London to-day is a good demonstration case of the phenomenon in an advanced stage.”

If to this be added the fact that all this process is going on on the basis of a street plan of fifty years, one hundred years ago, and even more, when transport as we know it was as yet undreamed of, a fairly accurate picture is presented.

What are the methods proposed by capitalism to overcome this intolerable situation—a situation that will become an even more formidable obstacle to the creaking machine of capital as it intensifies? The L.C.C. propose building ten-story flats in the most overcrowded areas of the East End of London. Liverpool council is building great blocks of cramped “minimum” flats striding across railway cuttings and other unlikely places. “Up and up and on and on” is the watchword. There is of course nothing fundamentally wrong with high dwelling blocks *provided* certain essentials are observed. No flat dweller should have to

climb more than three stories of stairs—lifts should be provided. The present minimum accommodation standards are quite inadequate for decent family life. Moreover the building of high flats should not be made an excuse for merely pumping up the density of any given area—and at the same time maintaining the existing street lay-out. Even if the latter is more or less modified—streets widened, traffic circuses created, trolley-buses substituted for tram-cars, and so on, the effect will be the same—increase in congestion and consequent lowering of the standard of amenities of life.

The Ribbon Development Bill of 1935 will have a certain affect in checking the suburban expansion of towns along main roads, but will not go anywhere towards solving the problem of limiting the size of towns or assist in the re-distribution of the inhabitants with the towns. In our present society the towns will continue to act as a lodestone to all except a few disillusioned intellectuals who seek refuge in country cottages in the Home Counties.

Why is this so? Let us assume the situation existing to-day. Why do the towns already overcrowded and congested continue to expand?

- (1) Small producers see a possible market for their goods, distributors have a centre of customers ready to buy their goods. Shops are opened, they compete madly with each other, they extend, amalgamate, cheapen their prices, improve their premises.
- (2) A population must be fed and clothed, but it must also be amused: cinemas, theatres and other places of amusement edge in, since the public is there.
- (3) Country people, villagers, unable to get variety in clothing, food, or entertainment, tied to a general store and a twice-a-week cinema, quite naturally migrate to these centres where there are nice shops, lively cinemas and there is a general feeling of stir and bustle.

So the process goes on, a seemingly never-ending process of gravitation towards the towns. Such a process however will continue so long as there is an economy based on the purchase of cheap labour-power, and the aim and object of existence is to derive the greatest profit by buying cheap and selling dear.

From the foregoing it will be seen clearly enough that the question of industrial siting, the growth of towns and the centri-

petal movement of the population, is one that needs the most careful study and regulation. For a very large number of British industries, especially in the light industries, there is very little reason for selecting one site in preference to another. To-day quite chance factors frequently determine their location, such as the advertising-value of a site near a frequented main-road or the owner's social ties to a particular city; not to mention the influence of rating-differences and the desire for cheap labour and for districts weak in traditions of trade union organization. In these cases precisely those factors which have been the neglected factors under capitalism ought to be decisive—namely the sociological factors of health and the amenities of town-planning.

Many years ago Engels wrote as follows: "The working-class generally lives in bad overcrowded and unhealthy dwellings.

**The Existing Housing Shortage** *This* shortage is not something peculiar to the present; it is not even one of the sufferings peculiar to the modern proletariat in contradistinction to all earlier oppressed classes. On the contrary all earlier oppressed classes in all periods suffered more or less uniformly from it. In order to make an end of *this* housing shortage there is only one means: to abolish altogether the exploitation and oppression of a working class by a ruling class."<sup>1</sup>

This shortage and overcrowding is no new development in the housing situation, product of temporary circumstances. It has existed throughout the nineteenth century, and throughout previous centuries. There are respects however in which the inadequacy of building development has become more sharply noticeable over the last twenty years. To abolish the housing shortage and to "build Homes for Heroes" was one of the repeated pledges of post-War Ministers, and each Government in succession has pledged itself to interfere in some way or other with the free play of private initiative in order to bridge the gap between the industry's achievement and the crying social need which it is supposed to fulfil. Moreover the shortage was made more acute by the virtual stoppage of building during the War, and by the very slow rate of building immediately after the War, despite various schemes of subsidy such as the Addison scheme and later the Chamberlain and Wheatley schemes, partly due to

<sup>1</sup> F. Engels, *The Housing Question*, p. 21.

the very high level of building costs. In addition to the lack of organization, the irrationality and costliness of building, the fundamental obstacle consists in the fact that building houses of low rentals is a much less profitable (in many cases quite unprofitable) form of investment than producing commodities for the more remunerative market of a higher income-class. The Dudley Report wrote as follows: "The slum problem . . . is fundamentally a problem of poverty, which cannot be wholly solved by improvement, however great, in the quantity and quality of low-rented houses. No attack on poverty can be more direct than a sustained effort to abolish unemployment in every branch of the building and building materials industry." Again the *P.E.P. Report* writes: "There is ample evidence that a considerable proportion of working-class families find rents of 10s. to 11s. beyond their real capacity. If, after all possible efforts to ensure the efficient provision of working-class houses had been made, a gap were still found between the rents which are economic to landlords and the rents which tenants can reasonably pay, this would be *prima facie* evidence of an essential disparity between the cost of house accommodation and the general level of family income of the lowest paid workers. Such disparity would call for adjustment as a problem of poverty and national economy, not of housing."<sup>1</sup>

In the ten years after the War just over one million houses were built. Yet since relatively few of these were suitable houses at lower rentals, Sir E. D. Simon was able to say in 1929 that while "there must have been a substantial spreading out and a big reduction in overcrowding in the clerk-artisan class, it has not penetrated to the slum." He proceeded: "We are therefore forced to the distressing conclusion that nothing has been done for the slum since the War, that overcrowding is practically as bad as it was then, and that the condition of the houses is actually worse. Further that the main obstacle to improvement has been overcrowding, and that this must be dealt with first by the provision of suitable alternative accommodation. Till this has been done it will be impossible to make a beginning either of slum clearance schemes or of the improvement of the existing houses."<sup>2</sup> Since this time rather more than another million houses have been built; but again relatively few of them, and the last year or two very few, at rentals within the reach of the lower-

<sup>1</sup> *Housing England*, p. 5.

<sup>2</sup> E. D. Simon, *How to Abolish the Slums*, pp. 54 and 61.

paid workers. The majority of houses built in recent years have been for *sale* or to let at rentals of over 10s. Moreover in the last three years the present Government has terminated the Wheatley subsidy, and is approaching slum clearance, not by first providing alternative accommodation, as Sir E. D. Simon insists is the only way of solving the problem, but in the purely negative manner of pulling down and clearing slum areas. "Sir Hilton Young is doing everything in his power to get all new houses built by private enterprise. He has offered a subsidy in the hope of inducing private enterprise to build houses to let, and has in the meantime prohibited Local Authorities from building any new houses whatever, even without subsidy, in order to leave a free field for private enterprise."<sup>1</sup>

The shortage of houses within the reach of the mass of the workers, therefore, still remains enormous. It has been estimated that in England and Wales there are nearly 400,000 families living more than two per room (according to the 1931 census) and over 1 million families, or 12 per cent of the total, living between one and a half to two persons per room. In a city like Leeds there are still 75,000 back-to-back houses, in Birmingham some 40,000. In London 500,000 persons live more than two to a room; while in Scotland the position is worse, there being one million and a half persons living more than two to a room. In Greenock more than half the population live in overcrowded conditions; on Tyneside between 30 and 40 per cent. Estimates of the minimum number of dwellings required to provide accommodation sufficient to abolish actual overcrowding vary considerably. Mr. Philip Massey has recently calculated in *The Architects' Journal* (22 June and 26 October, 1933) (on the basis of a maximum of one and a half persons per room) the present housing needs of Great Britain at a minimum of 1,400,000 new dwellings. Over ten years a further 400,000 would be needed to meet increased population, to replace deterioration, etc. Sir E. D. Simon has said: "To meet the existing shortage of houses and the prospective increase in families, nearly 2 million additional houses will be needed by 1951. . . . About 4 million houses to-day are below any acceptable standard. To house the population of England and Wales in good houses means therefore building 6 million new houses: a task offering steady employment for the building trade for thirty years at the present rate of building 200,000 houses each year. There is a great unsatisfied demand for houses

<sup>1</sup> E. D. Simon, *The Anti-Slum Campaign*, pp. 144-5.



at 12s. rent, and there is a demand for at least 1 million houses at rents of about 7s."<sup>1</sup>

Finally, *The Economist*<sup>2</sup> has given the following summary of the minimum needs of building over the period 1931-51.

	<i>Present Shortage and Over-crowding</i>	<i>Expansion of Population</i>	<i>Obsolescence and Replacement</i>	<i>Slum Clearance</i>	<i>Twenty years total</i>	<i>Total per year</i>
Upper Estimate	1,020,000	714,000	3,760,000	1,000,000	6,494,000	325,000
Lower Estimate ..	420,000	714,000	1,880,000	300,000	3,314,000	165,000

In pre-War days some 90,000 houses a year were needed to meet the increase in population alone. With a slower, and slowing-up, increase of the population not more than probably 50,000 houses a year will be needed to meet this increase in the immediate future. The pre-War rate of building was no more than 100,000 houses per annum; leaving a margin of no more than 10,000 to replace old and worn-out houses and to relieve the pressure on the overcrowded slum areas, and to-day no more than 50,000. This was the maximum rate of production of private capitalism in building before the War; and only a sharp fall in interest-rates in the last three years has caused it to exceed this rate of production since. Clearly profit-making capitalism in building is quite inadequate to fulfil the task of meeting the immense gap in building needs such as is represented in the estimates which have just been quoted.

An examination of the hospitals in London shows a disastrous position here also. Westminster, St. George's and Charing Cross Hospitals have been urgently appealing for funds for re-building. The L.C.C. Hospitals which comprise 75 per cent of the available beds in London and Schools are terrible overcrowded. In one of the North London L.C.C. hospitals there were fifty patients in one ward, with the beds not more than two feet apart. These patients were in all conditions: from convalescents after minor operations, there were patients with incurable diseases slowly dying, and serious surgical cases. Patients died every few days, and the

<sup>1</sup> E. D. Simon, *The Anti-Slum Campaign*, p. 144. It should be noted that even a rental of 7s. is much too large a proportion of the income of a large number of working-class families.

<sup>2</sup> 31 March, 1934.

vacant beds were immediately filled. Thousands of new hospital beds are required at once—even to catch up with present overcrowding—and thousands more to enable the treatment to be properly completed. For a simple tonsil operation it is sometimes necessary to wait three weeks or more before a bed can be found. In the voluntary hospitals the situation is even worse. A patient was told she would have to wait for at least six months as it was not an urgent operation. Every day patients are turned away from the hospitals because there are no beds. Every day patients are turned out of the hospitals before they have had any period of convalescence at all, and, in some surgical cases before the wounds are properly healed.

In the schools too there are thousands of classes that are far too big—partly because there are not enough teachers in the schools, but also because buildings are too small. Even in those that are not overcrowded—and this applies especially to the village schools—the buildings are ugly, cramped and unsuitable, hopelessly out of date. Among village schools too there is a good deal of overcrowding, two classes often being conducted in the same room. The majority of English village schools are in need of re-building; they are without electric light and often without gas; the heating is bad—slow-combustion stoves being the normal heating method; distempered walls with crudely varnished boarded dadoes and open roofs constitute the internal decoration. It is in an environment such as this that the majority of the children of the working class in the villages are taught to read and write and do arithmetic. In the towns the conditions are a little better, but here there is gross overcrowding: the classrooms are miserable, bare, bleak and uninspiring. The sanitary arrangements leave much to be desired; there are no kitchens and dining-halls for the pupils in the day schools; gymnasia are inadequate, and changing-rooms at recreation grounds and playing fields are practically non-existent.

Twelve hundred schools have been officially condemned as unfit for human habitation but are still in use.

In the industrial field, too, the amount of building work still to be done is tremendous. The majority of British factories are certainly not fit for human beings to spend their lives in. Low, gloomy, ill-lit, badly ventilated, with no proper facilities for the comfort and convenience of their workers—as buildings they remain a disgrace. Particularly is this so in the smaller factory, and in the semi-rural areas, where small numbers of workers are

employed, and rationalized methods have not yet been introduced. Other writers in their sections have indicated the tremendous needs for further capital construction in the industrial field. Such construction involves not only the laying down of new plant and the development of new technical processes, but also the construction of entirely new types of buildings that enable these processes to be carried out with the maximum efficiency.

Moreover, as will have been shown, even in those industries which are, in England, run on highly mechanized and rationalized lines there is a tremendous need for the provision of more adequate services for the workers in those factories: such as pit-head baths and rest-rooms, proper kitchens and refectories and provision for preparing meals near the job to avoid having a rushed lunch hour. All this will obviously mean tremendous extension of the industrial building programme, which will thus provide a wide field for extension of the building industry. Higher education, too, must not be forgotten, especially on the technical side. The possibilities of a full development of our industrial life also postulates a complete and proper development of our technical and other higher education. Again, there is an urgent need for more schools. The present methods of evening education in technical subjects, such as architecture, which have been referred to before, will have to be changed, and recommendations that will be made later for the adequate training of architectural students will necessitate extension of the existing facilities and the building of many new schools and study workshops. This, again, is quite obvious from only a brief reference to the needs of town planning, to the lay-out of streets to cope with the present-day traffic demands—demands that cannot possibly be met either on our existing street plan and arrangement or with the existing traffic-carrying capacity of our roads. Moreover, in extending the road services attention will have to be paid to such matters of public services as gas, water, electricity, sewage, drainage, and so on, with a view to eliminating the entirely unnecessary and wasteful expense of continually digging up the roads, which is the prevalent system to-day. All this again will provide a tremendous amount of work for the building industry—necessary work, urgent work, which has been too long delayed. And this latter work in a field where, at the end of 1935, there were still about 50 per cent of the insurable workers unemployed, thanks to the

Government's programme of economizing on public works schemes. All this should be sufficient to indicate that there is no fear of there being insufficient work for the building industry were it organized on a more rational basis—on the basis of social control—and organized in the interests of the consumer and of the operative engaged in it, and not in the interests of shareholders and building contractors, and of shareholders in building materials companies.

Now let us turn and see exactly how the building industry to-day gets to work. On what lines does it move when a building is projected and constructed?

**How Buildings are Built** The architect having prepared his plans, as described above, submits them as a rule, except in the case of small buildings, to five or six building contractors for the preparation of estimates. These five contractors have to spend a time, varying naturally according to the size of the job concerned, from one to three or four weeks, preparing prices and estimates and works schedules for the job. We may be sure that all these five contractors are not giving these services away for nothing; the cost of this work is naturally returnable to the industry; future jobs will bear an enhanced price as a result of this duplication of labour. The initial estimate having been made, and one (usually the lowest) having been accepted, further estimates are prepared by other firms for various block items in the contracts, such as the lighting, the heating, flooring, sanitary and other fittings, plastering, and so on. In each of these cases, four, five or maybe more, contractors are invited to tender. Again we get the same process of waste, the same duplication of labour, the same uneconomical effort, and also, which must not be forgotten, the same charge which must eventually be made on the industry. This duplication is observable in a great many cases, not only in the preparation of the original estimates and contracts, but also in the actual execution of the work. This sub-division of work which is observable and becoming more and more prevalent in the building industry, and even at one time threatened to extend to the sub-contracting of building labour—although here unions were able to deal with this situation—has extended even to the smallest detail of building work. There are generally contractors who do practically nothing but engage an office, instal a general foreman, and supervise the work. The plant is hired, the scaffolding is sub-let, the brick-work, the concreting, the joinery, every possible detail is let in separate sub-contracts,

and, as I have pointed out before, many of these sub-contracts will have been tendered for by four or five firms. Two contrasting effects of this process are to be seen (1) in the fact that the majority of bankruptcies are amongst speculative builders, and (2) that the profits of building monopolies increase every year.

The same extraordinary elaboration, duplication and competition, not necessarily, not usually, in the interests of better quality work, better quality workmanship, better quality materials or better conduct of the job, is observable in the building materials industry. In one small town of 25,000 people there are 130 shops that provide building materials for building contractors. Each of these shops must, of course, carry its own overheads, must support its own staff, must do its own book-keeping, must pay its own rent, and earn its own profit. These charges, again, are obviously carried by the building and increase building costs.

The process of amalgamation and monopolization is seen in the manufacture of building materials, though, of course, the effect on builders' merchants is not nearly so considerable. The principal building monopolies are cement, brick, timber, paint, lime and metal windows. The chief companies involved in the production of these commodities have nothing to complain of in the present situation with regard to their own profits.<sup>1</sup>

<sup>1</sup> The following figures of net profits of leading building material firms were given in *Labour Research*, May, 1935, p. 104:

Company		1934	
		£000's	%
<i>I.—The Cement Companies</i>			
Alpha Cement .. .. .	.. .. .	42	5
Tunnel Portland .. .. .	.. .. .	205	18
Associated Portland .. .. .	.. .. .	492	10
British Portland .. .. .	.. .. .	396	17½
Eastwoods Cement .. .. .	.. .. .	19	7½
Eastwood Lewes Cement .. .. .	.. .. .	5	5
Aberthaw and Bristol Channel .. .. .	.. .. .	25	—
<i>II.—The Brick Companies</i>			
London Brick & Forders .. .. .	.. .. .	408	22½
Berry Hill Brickworks .. .. .	.. .. .	28	10
Eastwoods .. .. .	.. .. .	76	12½
Eastwoods Flettons .. .. .	.. .. .	40	12½
<i>III.—Builders' Materials and Merchants</i>			
Tilbury Contracting and Dredging .. .. .	.. .. .	79	15
Twyfords (Sanitary Ware) .. .. .	.. .. .	46	8½
Denny, Mott & Dickson (Timber) .. .. .	.. .. .	95	3
Indestructible Paint .. .. .	.. .. .	44	20
International Paint & Compositions .. .. .	.. .. .	102	10
Pinchin Johnson (Paint) .. .. .	.. .. .	265	17½

In addition to these more or less direct monopolies there are a number of closed rings that operate in certain building manufactures; important among these is sanitary fittings. The effect of these monopolies does not always operate in the direction of higher prices, though in certain of them this is definitely so, particularly in the case of metal windows. An apologist of this particular organization once said that "before we instituted a rigid price control the consumer was being given inferior goods and we (the manufacturers) were losing our profits. This situation was obviously neither good for us nor good for the consumer." In some cases this process of monopolization has resulted in a reduction of prices because mass-production methods have been adopted, a large degree of mechanization and machine production has been introduced. Naturally, these rationalized developments have also their reverse side—short-time, unemployment, "dilution" and speed-up for the operatives.

"The year 1934 was characterized by numerous amalgamations and consolidations amongst manufacturers of bricks, cements, tiles and other building materials, side by side with **The Industry** quota arrangements and price-raising understandings which have been attended with a considerable degree of success—as is indicated by the increased profit shown by most of the large undertakings. Moreover, efforts are now on foot with the object of endeavouring to secure powers under the Industrial Reorganization (Enabling) Bill to make price maintenance agreements compulsory upon dissentients which, if successful, will have the effect of further enhancing building costs. On the other hand, there are signs that the house-purchasing market has practically reached its peak, and there is now a definite tendency for rents of certain types of houses to fall. So far as private enterprise is concerned there seems good reason to anticipate a considerable recession in house building by the autumn of 1938 with corresponding repercussions in the demand for labour and prices of building materials."<sup>1</sup>

In the building industry, one of the last in which there has been a serious attempt to rationalize and re-organize—an industry that has always been somewhat of a gamble for investors in it, although in a great many cases a successful and highly profitable gamble<sup>2</sup>—organization has taken, as usual, two specific courses,

<sup>1</sup> M. Martin, "Facts and Figures regarding the Present Housing Situation in England and Wales," *Economist*, June, 1935.

<sup>2</sup> Cf. *London Speculative Builders*, by W. Fox, pamphlet produced by the L.R.D.

distinct though inter-related (1) the increase of labour productivity (rationalization on the job), (2) the reduction of costs (rationalization in the production of building materials). Unfortunately, it is extremely difficult to obtain precise information and statistics on the effects of rationalization in the building industry. A study of the comparative unemployment figures will, however, give some indication, particularly in the case of joiners, where the wholesale introduction of joinery machinery in the shops has displaced a tremendous amount of skilled labour. On the job the increase in the productive capacity of the labour takes many forms. Most important among these, and one which will undoubtedly play an important part in a socialized industry, is the introduction of Time and Progress Schedules. The principle of this form of rationalization is essentially one of organization of the whole building job from the beginning. Each item in the contract—foundations, brick-work, floors, finishings and fittings—is separately scheduled and organized so that there can be a continual rotation process from one trade to another. By this means the plant in use on one section of the job can be transferred to the next section, and the trade following after can carry on its work with a minimum of lost time. This process, begun on a large scale in America, has been but recently introduced into this country to any large extent. The effect of it, as will be well understood, from the point of view of the building operative, is an increased speed-up on the job, each of the sub-contractors, having a definite finishing date and knowing that he has a long line of further sub-contractors waiting in order to fulfil their respective contracts, naturally will insist on grinding the last possible ounce of energy out of his employees. Hence the Time and Progress Schedule is one of the most hated methods of capitalist rationalization. The introduction of machinery on the job does not seem, at first sight, to have a very important effect on the reduction in the number of those employed. In some cases the total effect is a reduction in the number of working hours, as, for example, in the use of batch-mixers for concrete work. Concrete, a comparatively new material, is one of the first to be considerably rationalized. Concreting processes formerly carried out by labourers with hods, climbing up ladders and over scaffolding, can now be more effectively achieved by the use of pouring chutes, and the latest development in this direction, although not yet used to any very large extent, is the concrete pump. This machine mixes the concrete and pumps it along pipes

to the spot where it is needed on the job. At present its use has been practically confined to civil engineering work, although there is no reason to suppose that, with further research and study, this method may not eventually be used for all large-scale building operations. Many of the causes of the reduction in the number of operatives on any particular job are to be found in the increasing use of new materials and new methods made possible by this. The complete elimination of the old form of wood scaffolding, formerly roped and pinned by skilled men, and the substitution for it of metal scaffolding that can be erected infinitely faster and much more satisfactorily by two men with a spanner, has caused a redundancy of a large number of labourers.

"Some idea of why copper has come to stay in the trade, can be seen on such jobs as that of Holland, Hannen & Cubitt—a block of nine-storey flats with all wastes and vents in copper, recently erected, was completed by no more than 12 pairs—usually a job of this character would normally carry 35–40 pairs."<sup>1</sup>

The introduction of slab materials—plaster-boards, wall-boards and so on that can be erected much faster and are made in pre-fabricated units on factory mass-production methods—again results in a large reduction in the number of men employed, and consequently in the labour costs. The important part these casts play in building can be gathered from the fact that they amount to something in the neighbourhood of 30 per cent of the total cost of normal building work. The other aspect of cost-reduction results from a possible lowering of prices, due to rationalized and more carefully studied methods, and a larger scale in the manufacture of building materials.

The principal difficulties in the building industry, we have seen, are caused by this duplication, this piece-meal nature, and the swollen profits derived from it. Those  
**The Market** optimists who see in the present stimulation of the building industry the possibility of a long and continued development and a new era of prosperity resulting therefrom need only be referred to the prognostications made in the *Building Industry National Council Report*, in which statements are made indicating that the market for the majority of the 300,000 houses erected annually is a dwindling one. They point out:

"Indeed even at a time when interest rates and building costs

<sup>1</sup> *The New Builders' Leader*, January, 1936.



have fallen markedly, it has been necessary further to stimulate demand by successive reductions of the size of the houses erected before the 1934 level of housing activity could be attained. . . . The increased housing activity by private enterprise recently experienced is, therefore, not a permanent feature on which the building industry can rely. In order to maintain the increase in this branch of activity, demands must be further stimulated by further reductions in interest rates, building costs, the accommodation offered, or the quality of the buildings."

They further state:

"Housing activity, however, is not of primary importance to the representative building contractor, and he has not shared the revival to the same extent as other branches of the industry. . . . With regard to industrial and commercial building, an increase in activity depends on two factors: the realization of increased activity and profits, and the anticipation of a continuance of that increase. With the majority of the exporting industries these conditions are not realized on a scale sufficient to lead to a large increase in activity, but for concerns catering for the home market conditions are more favourable. Economic indicators show an expansion in the home market not unconnected with the increase in building activity."

Let us turn to another witness. A confidential report issued by the I.C.I. (which has departments concerned with extensive building activity) suggests the following:

"After about 1944, however, the wave of subsidized house building now rising will have spent its force. Vital statistics do not indicate that the demand for unsubsidized houses will continue at its present level; nor is there reason to suppose that activity in building other than dwellings will increase sufficiently to maintain the total. The probability will, therefore, arise of a serious slump in the building industry, unless the situation can be relieved by entirely new developments on a large scale, such as re-housing under the provisions of the 'Town Planning Acts' or other schemes of the kind."

There is, however, plenty of evidence that the present wave of building activity, though it may not die an immediate death, will, nevertheless, sink very considerably unless a means can be found to build the type of dwelling that would open up an entirely new market: that is, dwellings to let at a rent payable by the lowest-paid worker. This is an extremely unlikely event, as the experience after the tremendous ballyhoo of the five-year plan for the slums has shown. There is extreme unwillingness among local authori-

ties, building contractors and building societies to risk a somewhat doubtful plunge into the field of real working-class dwellings.

There is, moreover, reason to think that the I.C.I. are unduly optimistic in their view that the wave of subsidized houses now arising will extend even to 1944.

As regards the prospects put forward by the I.C.I. for employment in the building industry, the situation in their view, and with some justification, is not a very rosy one. They envisage an average for the coming ten years of 714,000, and they say:

"It being considered unsafe to assume any higher value than this in view of the fact that (1) these totals are derived from the difference between the number of unemployed and the estimated number of insured workers in the building trades, and the latter having risen from 825,000 in 1929 to 890,000 in 1933, already represent a high proportion of the experienced men available, augmented by a considerable influx from the unemployed of other industries; (2) the occupational tables of the population census of 1931 give a total of 692,898 persons who describe themselves as workers in various building trades in England and Wales; and in Scotland this might become about 775,000; but there must be deducted many, although describing themselves as building tradesmen, who are not working in the building industries proper."

The *B.I.N.C. Report* published on 21 June, 1935, gave unemployment in the building industry as 144,146 or 15·4 per cent. This means that there are nearly a million workers engaged in the building industry—of which the I.C.I. consider an average of 775,000 will have a chance of a job during the coming years.

This suggests a permanent surplus of unemployed in the building industries of something in the neighbourhood of 14 per cent, who during the next ten years will be unable to get a job; and this in one of the industries which it is suggested will maintain its present comparatively high condition of prosperity.

It is noticeable in all the reports dealt with on the building industry there are very few suggestions of any large increase in the vital sections of building work such as industrial buildings and public works contracting where, on the 28 January, 1935, 49·5 per cent of the insured workers in this industry were unemployed. Thus, those in the best position in capitalist industry to know the direction of the future development of the industry present what is, in fact, a fairly gloomy picture.

The recent wage settlement giving a five-year agreement and a 1d. rise in two instalments has gone a very little way towards satisfying the demands of building operatives.

**The Building Operatives** However, apart from the question of monetary wages, there are other burning questions among the building operatives that still remain to be settled. During the last few months an acute situation has been growing up with regard to "wet time." Many operatives have lost a large proportion of their wages as a result of stoppage. Further, overtime is steadily increasing, despite the existence of unemployment in sections of the trade.

A survey of the number of local strikes in the building industry during the last two years gives a clear indication that building workers are by no means satisfied with their present conditions.<sup>1</sup>

	<i>Men involved</i>	<i>Days lost</i>
1934 .. .. .	3,200	32,000
1935 (Jan. to Oct.) ..	7,600	120,000

One of the most considerable and most important grievances from the point of view of the operative is the ever-increasing tendency to substitute unskilled for skilled labour: labourers doing painters' work, labourers doing brickies' work, labourers doing carpenters' work. The cases of this are continually becoming more numerous. A very serious repercussion—for the operatives—resulting from this is the splitting of the operatives on a craft basis, a process encouraged by the nature of the unions as mentioned below. A further source of distress is the so-called Civil Engineering Award. Under this arrangement any job that can be classed as Civil Engineering—and this classification is possible for quite arbitrary reasons—results in a reduction in wage rates. The difficulties of the operatives are, however, not only of the capitalists' making; they have, themselves, many weaknesses in their organization. The settling of a five-year agreement on all the operatives organized in the N.F.B.T.O. is an indication, not of a desire for decisive struggle and victory, but an anxiety to temporize. The position is, to a certain extent, the result of the organization of the industries' employees on a craft basis, the various interests from time to time being used one against the other. Particular difficulties are found in the relationship between the labourers' unions and the crafts' unions. These difficulties

<sup>1</sup> *Ministry of Labour Gazette*, November, 1935.

are not only brought about in the industrial struggle but sometimes have other causes. At the present time, among certain sections of the A.S.W. there is evidence of a desire to separate from the N.F.B.T.O., because the former body considers that it has not sufficient representation on the National Council of the latter, in view of the fact that it is the largest contributor to the Federation's funds. Some of its officials say that the N.F.B.T.O. is paid for by the A.S.W. and run by the A.U.B.T.W. These factors indicate quite clearly the need for a homogeneous monolithic union for all building operatives, admitting of no inter-craft jealousy, and enabling more effective organization. Long discussions were held on this question at past conferences of the N.F.B.T.O., notably in 1930 and 1931, but little progress has been made.

One other phenomenon in the capitalist building industry is worthy of notice—that is the system known as "Direct Building."

This system consists of the direct employment of building labour and the ordering of building materials by the authority responsible for the building, and eliminates the profit of the contractors, both in respect of the general contract sum and in respect of the building materials. There is a good deal of evidence in the report published in 1929 by the L.R.D. entitled *Direct Building* that considerable economies can be derived by use of this method. The work of various local authorities, particularly the Works Department of the L.C.C., gives some indication of the possibilities. Certainly there are dangers in the method applied under present-day conditions, when the councils and other local authorities are not vitally interested in providing the best service at the minimum cost, that considerable wastage will take place.

Unfortunately, it is only too true that direct building at present, in a great many cases, is extremely wastefully carried out. But this is not due to the absence of the profit-motive and the building speculator (as the *P.E.P. Report* declares)—this is a motive to little but shoddy building—but to the general inefficiency attaching to enterprises run by departments attached to local authorities as at present constituted. In one particular case where certain small works were carried out by a Borough Council in the West of London, the cost was ridiculously high. The department was completely unorganized; some of the material arrived too soon; some too late; no attempt was made to secure the proper quantity;

men were waiting hanging about on the job for hours and the whole proceeding was a painful example of lack of ability and lack of interest.

It should be clear from what has gone before that the building industry is in a state of intolerable confusion; for it not only does not maintain an adequate supply of the commodity it produces, but it does not provide an adequate living or security for the operatives engaged in it. Bankruptcies occur with surprising frequency. At the same time in other quarters huge profits are made. At the same time duplication and waste is the rule; and methods of building are primitive and unorganized to an extreme degree.

In a Britain where the workers ruled the building industry would clearly be one of the first to expand; and because of the expanding role it had to fill one of the first to require, and benefit from, radical re-organization. Social need, not contractors' profit and a "paying market," would set the pace of the industry; while in the organization of the industry in all its parts social control and co-ordination would need to replace the extreme anarchy and petty individualism of the industry under capitalism.

To this end the institution of some co-ordinating and initiating body such as a National Building Commissariat or Commission, with extensive powers both to finance and to override local authorities, etc., would be a primary necessity. Subordinate to it would need to be technical departments for surveying, research and costing; and among the first tasks of such a body (on which, of course, the building trade unions would be amply represented) would be the undertaking of an exhaustive survey both of building needs and building possibilities, as a basis for a comprehensive plan of building activity for every area. This survey would be carried out in a somewhat similar way to the present overcrowding survey by the local administration. It would have this difference, however; the central administration would need to be directly responsible for relating the investigations to the plan and requirements of the Commissariats of Health, Education, and so on. In the present survey—of overcrowding only—the work of the local authorities is not related to any realistic examination of standards. The slum-clearance survey revealed the absolute necessity of having very strict control over the work of local

authorities; the survey and the estimates of requirements submitted by the various local bodies being grossly behind the real needs. The overcrowding survey could provide the material for an immediate building programme, while the needs for theatres, hospitals, schools were being examined and plans prepared for the expansion of these essential services.

After an exhaustive survey—both quantitative and qualitative—had been made, it would be necessary to prepare a comprehensive plan for each area. Such plans of course cannot be prepared abstractly, but would have to be considered in relation to:

**Survey  
and Planning**

- (1) The present needs and requirements, of housing, of social, administrative, commercial and industrial buildings.
- (2) The requirements postulated by the plans prepared for industrial reorganization, necessitating the assessment of the types of buildings mentioned above.
- (3) Provision for possible extension (for example, suburbs, new towns, etc., should not be planned in such a way that they prevent further development and extension).
- (4) The possible resources of building materials and of skilled labour.

Arising directly out of this plan would come the organization of:

- (a) Architects, engineers, town-planners and technicians, and the planning of their work. (i) the setting up of local, regional and central offices, (ii) research departments, (iii) education for the above categories of professional workers.
- (b) Building operatives' trade unions, to govern wages, conditions of work, technical training, etc.
- (c) Planning of building manufactures. (i) Production of building goods by heavy industry—rod steel, rolled steel joints, paints from the chemical plants, building machines, from the machine-building plants, tube metal from light industrial plants. (ii) Production of building goods in plants for this sole purpose, brick-works, cement plants, fireclay goods, metal goods, taps, sanitary equipment, etc.
- (d) The organization of factory production of some types of buildings—"pre-fabricated" "dry-assembly" houses, etc. This type of enterprise hardly exists at all at the present moment. In the realm of timber buildings there is a certain degree of factory production.

- (e) The distribution of building products, the continuous and organized supply of each job—at the present time a great deal of time and effort is wasted through the ineffective organization of the supply of materials for the job.
- (f) The organization of the construction job itself, the proper socialist use of Time and Progress Schedules—not to grind out extra profits, but to accomplish the construction with the minimum wear and tear and the maximum efficiency.
- (g) The establishment and organization of proper building research laboratories to test materials, to supplement the research undertaken by the various industrial organizations, with a view to extending the variety of building materials and methods. There is a tremendous need for an independent body to conduct work of this type.

An important obstacle in the way under capitalist organization of the building industry is the extreme difficulty of making any reliable forecast of building programmes. This factor is exemplified by the position of contracting firms that rely to a large extent on maintenance work: the profits of such firms maintain a fairly constant level. With those firms that rely entirely upon new building work, profits are subject to quite surprising switchbacks.

Having received from all local administrative bodies a schedule and analysis of their requirements, the central planning authority would have to take into account the estimate of possibilities of development in the various building material industries, the urgency of the needs in the different localities, together with the local resources. Comprehensive building programmes would need to be drawn up covering all building needs, both social and industrial. It would then be the responsibility of local authorities to carry out these schemes. The best form of organization for this is probably an extension of the direct-building system, where there is a special Works Department of the local administration to be responsible for all building work. The architectural and designing work could be done in offices attached to the local authority. The experience in the Soviet Union, where in the early stages architectural work was highly centralized, and was not in close contact with the jobs in distant localities, shows that it is necessary to have the architectural staff in close contact with the jobs. Moreover such close contact makes it possible for the desires and requirements of the inhabitants to be fulfilled more adequately; and it

will be desirable to have conferences with tenants' committees, trade union and other organizations on the question of the new buildings. Experience with various existing local authorities indicates that such widening of relations is essential to defeat a sort of sterile bureaucracy that creeps over local officials. To-day there is very little opportunity for the ordinary architectural draughtsman or assistant to confer with the medical authorities or the nurses when the hospital is designed, or to meet and discuss a project with the education officer and the teachers and pupils committees; the result being that suggestions from junior members of the staff are often looked upon as mere impertinence, and those who are really interested get rapped on the knuckles. Moreover the relationship between the architectural staffs and the building operatives on the job leaves much to be desired. In a Britain without capitalists the meeting of the architects with the works committees would presumably be an inseparable part of the work, without any need or desire for a pose of superiority on the part of the architects, in that they could feel that the works committee's main function was to give the maximum of assistance and that they were really contributing to the well-being of their fellow-men.

Private practising architects would presumably vanish; all architectural work being of a public character, and social service and social responsibilities taking the place of the satisfaction of individual whims.

Architectural education would have the opportunity to be on a different basis also—starting from a study of needs of human beings who eat, walk, sleep, work and fulfil themselves in many ways. It is for those human beings that buildings would be designed, as beautifully as enthusiasm and study could make them—not as an eclectic study in “styles” somehow adjusted to twentieth century purposes. No more classic pastiches masquerading in the guise of “scholarship” and “using the best in the past”! The question of architectural aesthetics is much too controversial a one to be discussed here, but it must be emphasized that the architect's training would put him in touch with:

- (1) People for whom he was designing.
- (2) The operatives who were to build the job.
- (3) And also give him freedom from continual concentration on the profit nature and the need for reducing the service facilities of a building in order to provide a more imposing façade.



An even more striking change would be possible in the work of town-planners. For them there would be one central object in view: the provision of a city to enable the fullest and most healthy life to be lived by *all* its inhabitants. The impossible hindrances—dependence on reducing the buying out of vested interests to the minimum—the impossibility of large-scale planning of housing sites, open spaces, parks, traffic systems—all this makes the job of the town-planner under capitalism an almost laughable one. He is like a swimmer with his hands and feet tied. The most important thing for the town-planner is complete control of the land. This would enable him to re-organize our traffic systems, so that we could move about more quickly and comfortably; to have green lawns and blossoming trees round dwellings, whether cottages or flats, where now we have mews, alleyways, back-to-back houses and slums; to plan schools, libraries, etc. within easy reach of all. The example of the work now being done in Moscow shows what is possible when not the capitalists but the workers are interested in developing a city. Kaganovitch in his report on replanning Moscow quietly stated that in the centre of the city and in the suburbs it was necessary to create large woodlands, parks and wide boulevards: a necessity which is being translated into actuality. These tremendous possibilities do not however mean that the existing city must not be reckoned with. On the contrary it must be very carefully studied and transformed. The town-planners would have to work in very close conjunction with the architects, so as to maintain a constant exchange of ideas between the two groups. The training of the town-planner would become more real as his possibilities became more real: he would be no Utopian schemer, working out ideal cities in his head, but a realist who had the power and the possibilities of changing the life of the people.

There can be no attempt here to describe the precise forms of organization within the building industry when the fetters of private enterprise and profit-making are knocked off. As suggested before the building work could probably be most conveniently done by the local authorities. The experiences of the London County Council's Works Department, and of the Borough Council of Battersea, Monmouthshire County Council (Road Construction), Liverpool, Woolwich (1924-28) (in these housing schemes

there was also an estimated saving in architects' fees amounting to £20,000; while Sheffield and Swansea also had some interesting results from direct labour work before the department had to close down in 1931 as a result of the National Government's economy campaign) are sufficient to show that this form of building-contracting has very considerable advantages. By adopting a form of organization controlled and administered by the local administration, it is easier to adjust the programme, in extent and intensity, to suit the local conditions, while recognized standards are rigidly adhered to. A further advantage is that the local workers who are to use and enjoy the buildings have complete control of the local administration, and shortcomings and bureaucracy can be remedied with the smallest possible delay.

One important preliminary to the carrying out of new building work is a complete revision of the existing regulations governing building work. The mass of local by-laws, originally framed to protect an ignorant purchaser or tenant from the nefarious activities of the speculative builder who admires quantitative profits rather than qualitative buildings, have now become in many places obsolete and often obstructive. With the possibilities of development in the building industry and the opportunities for the development of new materials they will become more so. The interest of the works committees in the production of good work would probably be a sufficient safeguard, and there would be no vested interests to oppose or misuse the introduction of new materials being produced in ever-increasing variety as the building research organizations got under way.

Further possibilities would also be opened up by the institution of recognized standards for the various building materials. At the moment it is impossible for an architect to make a really sound selection of materials, since all the various manufacturers use widely differing standards and in many cases refuse to publish details of the manufacture of their products at all. Such standardization would also make it possible to have more reasonable regulations with regard to steel and reinforced concrete. To-day these two materials, which are controlled by virtual monopolies, cannot in this country be used without tremendous waste. This could be remedied by the use of standard grade materials, with a disinterested body preparing the regulations to control their use.

Within the actual construction units themselves there are great possibilities. When the mechanization of a building job no longer means unemployment, lower wages and intensified labour, but a lightening of the work and an extension of the possibilities of work, then machines can be introduced into the building industry without fear or hindrance. As mentioned before, the building industry after agriculture is probably the least mechanized of any in Great Britain, though rationalization has just begun in certain branches. The use of metal self-supporting scaffolding has already been mentioned. Such machines as an electric hand-saw enable one man to do the work of four. One man with a pom-pom chisel can do the work of ten without. From *The Efficiency Magazine* we hear of "a contractor using a Wadkin cross-cutting and trenching machine, cutting rafters of 45° each end, two housing and Birdsmouth on each, at the rate of 50 per hour, compared to 5 an hour when done by hand." One sanding machine can do the work of 5 men. These few examples give an indication of the directions in which building machinery may be introduced. Moreover at the present time, building labour is not very expensive and the first cost of most machinery is high. Moreover the extremely seasonal nature of building employment lessens the incentives to the wider use of building machinery. Further at the present time the majority of the craftsmen have to provide their own tools; this representing further values the building contractor receives from the craftsmen he employs. The lack of continuity and the small scale of most building work make it uneconomic for most contractors to purchase very extensive plant; though there are now a few firms that hire out ordinary building plant. When there are opportunities for large-scale operations and the jobs are under organized and unified control, the whole task of building can be reorganized from top to bottom, and the productivity of labour enormously increased.

There are great possibilities both for the reduction of costs and for rendering the task of the building operative easier. Such possibilities exist right through the building job, from the excavation to the painting and finishing.

**Productive Possibilities** Great excavators can be used to tear huge mouthfuls of earth and obviate to a large extent the back-breaking fatigue of hand-digging; where digging is essential there are pneumatic picks, shovels and spades. The

bricklayer to-day has invariably to bend down to reach the bricks he uses, and the water bucket and mortar are usually on the same level as his feet, making his job tiring, back-aching and slow. The carpenters work can be eased by the use of machines such as that already mentioned for trimming rafters. The wood-working side of the industry is the most mechanized so far, a large proportion of joinery being machine-shop-made products. For the plasterers there is every possibility that plaster will be all but eliminated in favour of the more economical and more easily applied materials such as plastic boards, wall-boards, synthetic resin boards and plywood. There are great possibilities of rendering unnecessary one of the most unsatisfactory trades, unsatisfactory from the point of view of the operative and from the point of view of the building (i.e., dampness, etc.). For painters the paint-spray lightens the work very considerably and makes a much speedier job. For the plumbers the use of standard shop-assembled pipe-lengths is possible when the buildings are erected on a mass scale, with standardized design. From top to bottom the industry is waiting to be taken in hand to make it possible for the great tasks it has before it to be fulfilled. The technical standards of the operatives are also capable of great development. At present the possibilities of thorough technical training are very slight. The evening schools are inadequate; no real attempt is made to impart an understanding of tools and the technique of their use. Those students who are working all day in this job under most strenuous conditions, under-nourished and poorly clothed and housed, cannot be expected to get much from an evening class that only lasts for an hour or so. At the present time such technical training is sought purely as a means to higher pay and if possible a transference to an office job. There can be under the present conditions of insecurity no real interest in the job. Further it too often happens that the instructors are not up to the job. They are "practical men" who have been "through the mill" and teach as a result by rule-of-thumb methods, with little real understanding. This question of technical education would have to be tackled very seriously, and will be referred to again with the question of Trade Unions.

Fundamental in the transformation of the building industry would be the role of the trade unions. The resolution of the Communist fraction put before the Second All-Russian Trade

Union Congress on 20 January, 1919, said that the capitalist possession of the means of production being overthrown and the working class being in power the trade unions "must participate energetically in the work of the Soviet Power through direct work in all the State organs, the organizing of mass control over their activities, etc., the creation of new organs for accounting, control and the regulation of the whole of production and distribution, which rests on the organized activity of the wide masses of toilers who are themselves interested." This quotation from the resolution, which was adopted, gives some indication of the enormously wide field open for the trade unions in a socialist economy. Instead of merely relentlessly struggling for the maintenance of the wages and conditions of the workers of this and that particular craft or trade, the unions would be directly responsible for the running of the industry itself. At present, as has been previously mentioned, various building unions are engaged in struggling one against the other. When the cause of the differences—the pitiless economic strife—is removed, it will become evident to all how essential is the closest co-operation of the various unions within the industry. The whole of the foregoing has outlined the extreme necessity of having a closely related organized building programme; and the task of carrying out this programme will rest primarily with the trade unions. When every worker is a trade unionist, when the jobs are organized and administered by the works committees in consultation with the local civic authority, the role of the trade unions will be of paramount importance. There will then be no longer any need for a multiplicity of unions within the one industry, with building jobs split up into separate compartments. One job will need one organization; and each job have one works committee, with representatives of the various trades. The functions of the unions under socialism would not stop however at the administration of the jobs and the fixing of rates and terms: there are myriad activities that would be the responsibility of the unions. Culture, training, housing, and so on would be essential parts of their work. With the increased mechanization of the industry the question of training would become a vital one. In the craft days a rule-of-thumb method, in training and in practice, was adequate. Now that is no longer so. It is not sufficient for a worker with a machine-tool simply to press a button. Machine-tools demand skilled operating, no less than hand-tools. It is essential for the

operator to understand his tool, to be able to use it in the right way, to get the maximum effect with the minimum of effort to himself and the minimum wear and tear on the machine. This will all require a training of the polytechnical kind, and this, with the administrative training required to fit every worker for the job he will have to do—collective administration—will necessitate a development as wide as it is profound.

Together with radical changes in the actual construction work would go a change in the manufacture of building materials. Of course, this branch of the building industry, **Building** being more stabilized and of a more continuous **Materials** nature, has already developed very considerably along the lines of mechanization. "It is very difficult to give any indication of such reductions (of production costs) statistically, but the modernization of many plants, the erection of very large and economical plants, and the closing of most of the older and smaller ones, some of which were very inefficient, have made rapid progress in the cement industry during recent years. This is shown by the Census of Production returns of power used—between 1924 and 1930 the installed electrical capacity rose from 21,691 h.p. to 105,309 h.p.—and by the fact that the number of employees fell during the same period from 13,590 to 11,112, while the net output per employee rose from £361 to £417. These figures relate only to firms employing more than ten persons. . . . Owing to the separation of works from quarries in the 1930 Census, moreover, net output for that year has been calculated after allowing for full cost of production at quarries instead of the cost of the materials alone as in 1924. On the basis adopted for 1924, therefore, the net output in 1930 would be larger than that given, with the increase in net output even greater."<sup>1</sup>

Besides the direct cost-reduction indicated above, there would also be the possibility of employing a greater variety of new materials—at the present almost impossible due to the opposition of vested interests, of which the great difficulty in the introduction of ternary lead alloys is an illustration. The majority of building manufacturers show remarkably little interest in developing new methods and using new designs. Anyone in turning over the pages of, say, an electric-lamp manufacturer's catalogue will find

<sup>1</sup> *P.E.P., Housing England*, p. 113.

a host of elaborate, out-of-date, complicated, clumsy cast-fittings, the really well-designed fittings being limited to a few stereotyped modern types. There exist endless opportunities for cost reduction in the manufacture of building fittings: a cost reduction, moreover, not implying cheap design, but simple, straightforward, good design, studied in relation to the manufacturing process and not on some antiquated hand-wrought model. Some very interesting work on these lines was carried out by the Bauhaus School at Dessau and also the standardized elements of the Frankfurt housing schemes, where in some cases whole rooms—principally the kitchens—were built around standardized units.

Apart from the obstruction of vested interests to the introduction of new materials and new methods, there are many legal restrictions, already referred to, preventing the introduction of such things as one-pipe and one-stack plumbing systems and the Garchey slop-sink fitting. Such new technical developments make possible not only a more rapid and efficient conduct of the building job but develop added requirements and comforts of the finished building. When one thinks of the multiplicity of badly designed fittings and equipment, similar in principle but differing in pattern for competitive reasons, it will be clear that when profit-searching competition (which leads to deterioration rather than appreciation of quality) is removed, there will be limitless possibilities in the production of standardized units with variety, but quality, of design and production with economy as the keynote. The development of mass production may take place in two directions:

- (1) The preparation of buildings in the factory, ready to transport in units for erection on the site.
- (2) The production of units on the site to be erected on a steel framework, as, for example, the Mopin system of vibrated concrete.

Both these methods develop the possibilities of building and designing; and only when the designer is unhampered by the limits of proprietary brands, price rings, monopolies and out-of-date by-laws dictated by vested interests, will he be able to do justice to the tremendous services that will be required of him. Even the wildest flights of fancy of a Corbusier could become realities in so far as they correspond to the needs and desires of the people.

In conclusion, the freeing of the building industry from the restrictions of capitalist production would give the opportunity of new life to millions of human beings. Many **A Vision of a** writers, seeing the pitiful condition of the **New Life** building industry and the unawareness of the architects, town-planners, etc. of their urgent social duties, have reached the conclusion that only through the reorganization of the industry can the social chaos be reduced to order. But enough seems to have been said here to show that until the proletarian order arises out of the present chaos there is very little hope of the building industry achieving important conquests.

Then instead of the designer being hedged at every turn by the financial limitations and the shortsightedness of boards of directors and the lack of vision in backward city fathers, he would be free to fulfil the task that is rightfully his: the designing of beautiful buildings. Beauty need no more be divorced from reality: it would rather spring from it and be a part of it. No more classic and bastard Georgian masquerading as beauty in a violent attempt to hide its shallowness! Instead, buildings designed for the people to use them, to give the working people a better and deeper life.

A town would not then be a maze of intricate, over-crowded, dangerous corridors—dirty and unhealthy, with garish shop-fronts, jostling each other for pre-eminence, with squalid hovels hidden in the background. No more need the tired worker travel like a sardine in a suburban train for half an hour after finishing work till he gets to his miserable ill-designed villa. No more need his children tire themselves travelling to school and have no place to play but in the streets. No more need to wait for hospital beds, to be homeless, to be ignorant through lack of schools. No more occasion to refer to the “idiocy of rural life.” No more need for the agricultural labourer to be tortured by rheumatism.

Instead, in a Britain without capitalists—bright clean towns, wide streets and safe crossings, no smoke. The houses, spacious and beautiful, set in a belt of trees, gardens and playgrounds outside every door. Schools within easy reach; hospitals no longer scarce, deficient, crippled by dependence on sparing private charity; no longer cramped smoky factories, hurling soot and fumes onto the workers living around. The housewife’s task lightened and her time freer. No longer, with properly planned



towns and industries, an arduous task to get to and from work. All the possibilities of a full and developing life found in the towns to be had also in the country; the agricultural worker possessed of similar opportunities to those enjoyed by the city dweller. Such is the vision opened-up for a Britain without capitalists. Such is the contribution which a building industry, reorganized, modernized, freed from vested interests and un-planned monopolistic profit-making, has to make towards the future of this country.

## V

# COAL AND POWER

**I**T was the invention and harnessing of the new source of power, steam-power, which precipitated the greatest economic revolution, perhaps, of human history, certainly of a thousand years, and ushered in that century of technical progress when leisure and plenty for the masses of the people for the first time was made a possibility and the productive powers of British industry were increased some four-fold. So intoxicating was the achievement at the time that few, outside the ranks of the workers who were victims of dispossession or exploitation in factory or mine, noticed the waste and the unharnessed potentialities which its development along individualist lines by private capitalists so patently involved. Even in retrospect the industrial transformations of the nineteenth century bulk so large as to blind many to the fact that the achievements of that century would have been more gargantuan had it been historically possible for that age of steam-power to be harnessed to social, and not to private capitalist, control.

It may be that the new forms of power of the twentieth century—electricity and oil—are less likely to constitute a towering historical landmark than did the harnessing of coal to steam a century before. Maybe—maybe the reverse. That remains for the completed century to tell. Yet there are abundant signs that, properly harnessed, the size of their achievements need not fall far below; while in certain parts of the world, particularly in the Soviet Union, their achievements already show signs of being much greater. At the same

time there is accumulating evidence that the potentialities of these new power-sources are being wasted and their development severely cramped, even throttled, by the fact that their control is vested in private capitalists, their development is subordinated to the private profit-incentive, and that they operate on the basis of unco-ordinated and competing individual enterprise. True, here and there, where the deficiencies of the system are so glaring as to have become a brake on other industries and a threat to the interests which control the latter, the capitalist State has stepped in to co-ordinate and to stimulate development. An example of this is in the production and wholesaling of electricity under the Central Electricity Board which was instituted in 1926. But such interference remains rare, and is continually limited and precluded from effecting any radical reorganization by the necessity of respecting capitalist interests and by the jealous opposition of the propertied class in general to anything which might seem to set a precedent for more general socialization. The result has been that even in the case of Electricity the degree of planning introduced has been strictly limited; while in the case of Coal such proposals have been continually frustrated over fifteen years, and have ended merely in legislation which gives State sanction to a price-raising and output-restricting Cartel.

Yet these new forms of power require large-scale organization, and hence social co-ordination and planning, to a very much greater extent even than was previously true of the age of King Coal. What Engels termed the contradiction between "the social character of the means of production and their individual appropriation and control" is therefore greatly magnified. Electricity requires large-scale, planned generation to serve whole regions, if its potentialities are to be fully realized. Oil requires a large-scale and unified distributive mechanism to be efficient. Yet electricity has been allowed in this country to develop anarchically, irrationally, on the basis of small and dissimilar units; while oil has suffered considerable wastes in its productive exploitation, and on its distributive side has to-day fallen under the dominance of a few giant monopolies with periodic war for dominance between them as a major obsession and expense. Moreover, the very existence of alternative sources of power, in which the present century is richer than the last, creates its own problem. With alternative sources, each in separate hands, each

a separate vested interest or cluster of interests, there occurs wasteful competition between them, leading to duplication of processes and overlapping or else to grave gaps and *lacunæ*; followed by costly and disorganizing rivalries to which the methods of racketeering are not alien. Tying-contracts, purely combative price-discrimination, political wire-pulling are familiar incidents of combine-wars, and are to be found in this field. The competition between gas and electricity, for instance, affords many instances of duplication of equipment and services and uneconomic overlapping, which could be removed by planned co-ordination of power supply as a whole. Coal-utilization is a shoddy tale of chaotic or non-existent links between coal and the various uses it serves or could serve. At the same time, an opposite and even more serious product of this competition is that initiative is cramped by fear that a rival development will cut into and steal the field. Progress has added risks—the uncertainty of what the competitor will do. Moreover, it is not only uncertainty as to competitors, but also as to the intentions of power-users as well. When this fact is wedded to monopoly it puts a premium on conservatism—on exploiting existing fields rather than pioneering in new. Caution will seem more profitable than exploration and ambitious research; and to restrict a rival source of supply more profitable than to take risks on developing one's own. As private capitalism in these spheres looks askance at methods of power-economy—for instance in the use of gas and in gas-appliances—so it also looks askance at ambitious development.

This fact is specially serious since in few spheres is it more urgent than in power-supply that development should be pushed *at the expense of immediate profit*—that it should be pushed continually so as to cheapen the supply of power even to the point of subsidizing development over an indefinite period of time. This for the reason that power-supply is the key to the whole range of industrial and social developments which hinge upon it. Most of all must its development be pressed with an eye to the future rather than to the present; and the unrealized achievements and economies which it may promote in the future in a number of directions be weighed against the present cost which expansion entails. With the large plant and initial outlay which modern power-production and

**Power-  
Development  
and Social  
Production**

distribution entail, it may take decades before this equipment is working to full capacity, and before these initial costs can be covered by receipts (short of monopolistic practices). Interests which look short-sightedly at profit-yield and the production of dividends for shareholders will accordingly neglect such investment entirely. Even a non-profit-making concern may need to be subsidized to the extent of part of its construction-outlay, if development is to be as far-sighted and as rapid as the interest of society requires.

It would seem, therefore, that the greatest deficiencies in the sphere of power-development to-day lie in the interstices *between* the various sources of power, and between them and the power-users (e.g. transport, manufactures, agriculture, town-planning authorities) rather than in the *internal* organization of any one industry of power-production itself. This is not to say that the latter is unimportant: this it is far from being. But it is to say that a sectional analysis gives necessarily a very incomplete picture; and that the richest potentialities for a socialist development in this sphere, when capitalist monopoly and the separatism of private interest has been swept away, lies in its capacity to organize and to plan power-production and distribution *as a whole*, and to organize it in relation to industrial development as a whole. Since this is as yet an uncharted realm, its potentialities are hard to specify, and our vision is necessarily dim. But there is little reason to suppose that, if planned and co-ordinated, and harnessed both to scientific research and to a far-sighted social policy which did not restrict itself to the vision of a shareholders' meeting or the life of a Cabinet, it could not lay the foundation for a rate of increase of our productive powers at least as great as that which the nineteenth century witnessed, and probably much greater. To this end it would seem necessary to institute an administrative unit for the whole of power-production—for instance, a Central Commission for Power Supply and Development—with sectional departments subordinate to it, such as electricity, gas, oil, and coal: this central body maintaining close administrative contact with industry in general, transport and agriculture, and having specialized research institutes subordinated to it.

In what follows, the three principal sections of power-production in this country, coal, electricity and gas, are treated separately, and the concrete problems which each section presents are discussed in greater detail.

## (a) "COAL"

"The picture now presented by the greater part of the coal-mining industry is one of haphazard development of each coal-field by a large number of unco-ordinated units, brought into existence on no rational plan, nearly all working below capacity, competing suicidally, whether in capital expenditure or in prices, or both, for a market that cannot absorb the product of all." This description is taken not from a "Left Wing" criticism of the industry, but from the report made to the Secretary for Mines in 1933 by the Coal Mines Reorganization Commission.

The structure of the coal-mining industry is not the result of an accident or of a series of accidents. It is rooted in the feudal past and the individualistic nineteenth century capitalist past of Britain. "Property" is the keynote. The owner of the land also owns everything above the land and everything below the surface right to the centre of the earth. There are about 4,000 owners of land under which the coal is being worked, only a very small proportion of whom are actively concerned with the industry. In the majority of cases their function is confined to drawing royalties, that is to say, to receiving a payment of so much in respect of each ton of coal mined; in some cases royalties being payable even when no coal is brought to the surface. From the earliest days the mining of coal has been haphazard, irrational and uneconomic. In pre-war days there were some 3,000 separate coal-mines in all, owned by as many as some 1,500 colliery companies;<sup>1</sup> and even to-day there are as many as 2,500 in use belonging to some 1,400 firms. Added to the chaos of royalty-owning authorities, and frequently obstruction by them, is the chaos of numerous small mining enterprises. Here "parcellation" of ownership and the frontier-lines between different holdings have had a similar reactionary significance to the "parcellation" of agricultural holdings under the old "open-field system." As the Samuel Commission Report stated: "Proper planning is as necessary for a new mining area as for a new quarter of a town"<sup>2</sup> and

<sup>1</sup> Cf. Redmayne, *British Coal-Mining Industry*, p. 6. By contrast Germany in 1928 had 175 collieries owned by 70 companies producing two-thirds the British output.

<sup>2</sup> *Report of Royal Comm. on the Coal Industry, 1925, Vol. I, Cmd. 2600, p. 82.*

the lack of it in the past is responsible for the chaotic inefficiency of British coal production to-day. Added to this is the limited vision and unimaginative outlook which easy profit-making and short-sighted capitalist interest has bred. As Allen Hutt expresses it: "From its earliest days the 'get-rich-quick' motive dominated the coal-owners even more than it dominated the capitalists in other industries."<sup>1</sup> This has shown itself in a failure to keep abreast with modern mining technique and a preservation of obsolete methods, as well as in a stubborn and conservative resistance to every constructive proposal for administrative change. One authoritative writer has recently said: "There has been undoubtedly a deplorable lack of imaginative leadership and even common sense among those responsible for this basic industry";<sup>2</sup> and, as Lord Melchett put it some years ago, it is an industry which includes "the most crude and out-of-date practices, more worthy of the beginning of the nineteenth century than the first quarter of the twentieth century."<sup>3</sup> Such is the grand unfettered initiative of capitalist enterprise! While, very tardily in the course of fifteen years, certain recent attempts have been made to "rationalize" mining methods, and to increase the use of mechanized cutting and haulage, these have been confined to certain districts, and have been achieved largely at the workers' expense, and still leave the technique and organization of British mining far behind that of most Continental countries and U.S.A. Even so, such rationalization has been married to the rise of restrictive monopoly in the industry and the formation of a price-raising, State-aided Cartel: in other words such capitalist "solution" as there has been for the individualistic chaos has followed the road of that "unification in a private combine under the auspices of the State" which Professor Pigou asserted to the Sankey Commission "would involve the creation of a dangerously powerful monopoly (which) no promise of safeguards would bring people to tolerate."<sup>4</sup> Finally, the industry has seen a disregard by its masters for the interests of its workers which is abnormal even by capitalist standards—disregard for safety and health precautions, until coerced into them by the State (and even here evading regulations as certain recent colliery disasters have shown), disregard of housing needs on company property, and

<sup>1</sup> Horner and Hutt, *Communism and Coal*, p. 34.

<sup>2</sup> G. C. Allen, *British Industries*, p. 44.

<sup>3</sup> Cf. *Daily Telegraph*, 24 November, 1927, cit. Allen Hutt, *op. cit.*

<sup>4</sup> Sankey Commission, 1919, *Minutes of Evidence*, Vol. II (Cmd. 360), p. 417.

stubborn and arrogant contempt for every demand of the miners for decent standards and for a say in the conditions under which their work is carried on and their lives and health are endangered. Colliery owners and colliery shareholders seem destined not to forget that until late in the eighteenth century miners in certain coal-fields in the north were still serfs. It is significant that this is the outstanding industry where coercively imposed "company unions" flourish; and that in many districts of this industry, once the keystone of British industrial supremacy, miners' families are living well below the "starvation minimum" of Mr. Rowntree or of the British Medical Association. It is not surprising that the industry should be the scene of almost continuous and most bitter class-war over fifteen years, giving promise of growing acuteness in the future.

The spectacular growth of Industrial England during the eighteenth and nineteenth century was based on power derived, at a great social cost, from the bowels of the earth. Until a more reliable driving-power than wind or water was available the young capitalism suffered from acute growing pains; since, anxious to take in its grasp the profits to be obtained from a rapidly expanding market, this irresponsible youth was held in check for lack of uniform energy. As is well known coal came to the timely rescue, and on it was built the great iron and steel industries; cotton, wool and the new transport both by land and sea. Like a magnet this black mineral drew to its beds the industries of the new era termed the "Industrial Revolution."

The importance of the Coal Industry in Britain's economy over the last two centuries is at once revealed from the following figures indicating its rapid growth. Output at the beginning of the nineteenth century has been estimated at around 10 million tons. By 1860 it had increased to 80 million tons; 1880 to 147 million tons; 1900 to 225 million tons and in 1913 to 287 million tons. Hence by 1914 this pre-eminent industry could look back upon a past of uninterrupted growth and easy profit. But youth, accustomed to good health, fails to realize the undermining influences of old age; and so we find the vested interests in the Coal Industry looking into a more difficult future with the rose-tinted spectacles of a prosperous past. And there was reason for this. The debacle of 1914-18, the Occupation of the Ruhr and the American strike of 1922 hid from those interested in immedi-



ate profit to be ground out of the industry the calamity which was to befall it with the return to the gold standard in 1925.

Apart from the extremely crude methods of winning coal—for, be it noted, and as will be shown later, capitalism has no incentive to improve methods when profits are good—the system of land ownership prevented the most economical method of winning coal. Considered in this light there is no occasion to be amazed at the chaotic condition in which the industry finds itself to-day; for the past history of an industry largely determines its present form. With the rapid exploitation of the most fertile mines the “law of diminishing returns” began to assert itself at an early age in the industry’s career. Maximum output per head was reached in 1884–8 and from this period it fell continuously till 1924. Only the increasing demand for coal, and therefore higher price, prevented a lapse in the industry’s progress.

No tale for the striving after individual gain—which was highly successful—has a more gruesome taint than that of the coal industry. As has been said, in its early history its workers, including women and children, were virtually slaves. In addition to carrying baskets of coal which it took two men to lift on their backs, the women filled the workhouses with bastard children, who at the age of six followed the footsteps of their unknown fathers. As early as 1794 it had been advocated to collect and record the plans of all mine workings in order to reduce the heavy loss of life due to flooding. This advice was ignored by the owners on the pretext that it would divulge too much of their private affairs. In 1815 Heaton Colliery was flooded with great loss of life owing to the ignorance of adjoining old workings. However, nothing was done towards setting up a records office till 1840 and even to this day records of old mines are hard to come by.

In 1813, a society of well-wishers was formed in order to try and discover a safety lamp which would avoid or at least diminish the numerous explosions in mines. Sir Humphry Davy was called in to assist, and in a resolution of the society expressing the need for a safety lamp reference was made to the terrible death roll on account of explosions. By hard work and by the exercise of great forbearance and tact, “at the request of one proprietor, the number of lives lost was erased from the resolution for fear of giving offence to the coal-owners.” Again, the *Newcastle Journal* was requested to make no reference to explosions as it might deter people from entering the industry. In 1844 when the miners of Durham came out on strike, the then-considered most

enlightened coal-owner, Lord Londonderry, issued orders to all tradesmen, all of whom lived on his land, not to issue credit, and imported blackleg labour from his Irish estate.

As was indicated earlier, the main driving force shaping the contours of the industry was immediate private gain. This implied the concentration of capital and labour on the most easily won coal-seams, and the rapid exploitation of the favourable areas accounts for the decline of output per head after 1884-8. The desire to take advantage of a lucrative form of investment led to the haphazard development of the industry, which consisted of innumerable small undertakings, each one functioning without any reference to the interests of the industry as a whole. But there were two other limiting factors which determined that the size of the productive unit should be small. Firstly, there was the fact that the area of land mined depended upon whether the mine-owner could obtain the rights from the various surface owners to mine under their land on payment of a royalty. How far this restricted the size of mines in general during the early part of the industry's career is hard to say, but there are *a priori* grounds for believing that this would be insignificant, since with shallow mines it is more profitable to sink shafts at frequent distances rather than have a large underground area depending on one shaft. Furthermore, the early mine-owners were large land-owners, which meant they would have scope for their activities without recourse to bargaining with other landowners. But this was not true when mines became deeper. Secondly, the technical problems became extremely severe as the mines got deeper. The danger of flooding and explosions became more potent, and the problem of ventilation restricted the size of the producing unit. Herein, perhaps, lies the greatest criticism against the industry both past and present. As long as it was possible for the workers to endure the strenuous and arduous conditions set by uncontrolled nature, and yield a profit for the mine-owner, little or nothing was done to improve technique or the safety of the mines. Only when increasing depths had to be resorted to in order to win coal did improvements in technique take place.

In one of his lyrical moments Mr. Lloyd George said: "The blood which courses through the veins of industry in the country

is made of distilled coal. It enters into every article of consumption and utility; it is our real international coinage. When we buy goods, food and raw material abroad, we pay not in gold but in coal."<sup>1</sup> In 1913 Great Britain produced one-fifth of the world's coal output, coming second only to U.S.A. One-third of the total value of her coal output was exported; and these coal exports represented one-tenth of the value (and a larger proportion of the volume) of total British exports. Coal-mining afforded employment to one in every ten of the occupied male population. In the previous half-century Britain's coal output had been trebled and the employment given in mining had increased by more than five times.

But the industry itself is a scattered and varied one. British capitalism in the nineteenth century had the unique advantage of coal resources which were close both to iron-ore resources and to ports. But unlike Germany, for example, British deposits of coal are scattered; and it is a minority of English counties which possess no coal deposits at all. These different coal-fields differ widely in the nature of their seams, and hence in the nature of the coal they yield and in the technique and conditions of mining. Consequently the detailed character of their problems is different. With regard to types of coal: there is at one end of the scale bituminous or soft coal, possessing a low proportion of carbon and a high proportion of volatile matter, and at the other end of the scale anthracite or hard coal with as much as 92 per cent (in South Wales) of carbon content. The uses and destination of these different types of coal are very different. While South Wales relies very largely on export and the use of her smokeless steam coal for shipping (as also does Durham), the Midlands produce predominantly for the home market, including coal suited for domestic consumption. South Yorkshire and Notts is a relatively new and unworked coal-field, where "not less than 600 square miles has been definitely added to the hitherto recognized coal-field"<sup>2</sup> within the last thirty years; but it is a field in which the seams are thick and lie deep (up to 6 or 7 ft. thick at a depth of  $\frac{1}{2}$  a mile) particularly in its south-eastern part, with the result that large capital is needed and large firms are here the rule. Northumberland and Durham, on the other hand, are old fields which are becoming exhausted; although they have stolen a march on other coal-fields since 1926 by exceptionally

<sup>1</sup> At National Mining Conference, 29 July, 1915; cit. Redmayne, *op. cit.*

<sup>2</sup> Samuel Comm. Report, Vol. I, p. 46.

drastic wage-cuts and lengthening of hours. Small mines are numerous in South Staffs, Lanark, and districts of South Wales where coal seams are near the surface; whereas in South Yorkshire some colliery companies have an annual output of a million tons. The North-East coast districts, through the neighbouring ports, serve mainly the markets of Scandinavia and Eastern Europe; the South Wales ports serve France and the Mediterranean and South America. To-day Yorkshire, Notts and South Derby combined are responsible for about a third of the British coal output; and these counties together with South Wales and Northumberland and Durham produce 70 per cent of the British output. A further 14 per cent comes from Lancashire, Cheshire and Lanark; while the remaining 16 per cent comes from a variety of smaller coal-fields such as Staffs, Leicester, Fife, Cumberland, North Wales, Warwickshire, Somerset and the Forest of Dean.

Pre-war coal-production in Britain amounted to some 270 to 280 million tons of which some 90 tons were exported and the remaining 180 to 190 millions were devoted to internal uses. In post-war years (with the exception of the specially favourable year 1924) coal output has been little more than 240 million, or a fall of 10 to 15 per cent. This fall has been due to a reduction in demand both internally and for export; but the proportionate fall has been much greater in the latter. In 1925, for instance, the export-demand for British coal showed more than a 20 per cent fall as compared with the pre-war average, and a 30 per cent fall over the "peak" year of 1913. Home consumption in that year showed a smaller fall of 8 or 9 per cent: a reduction which has increased to about 10 per cent to-day. This disparity between the fall in export demand and in internal consumption has aggravated the inequality in the situation of different coal-fields; and has caused South Wales and Durham, which relied so preponderantly on export, to be so abnormally hard-hit. Of the loss of export-demand about a half has come from a decline in demand from Russia, Germany and Scandinavia—in Germany largely due to an increased use of lignite as a substitute, in Scandinavia owing to the competition of the heavily subsidized export of Polish coal. In France and Italy, however, the reduction is mainly due to the disturbances caused by the Treaty of Versailles, with the tribute of reparations coal which it

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Decline**

imposed upon Germany. Although France uses three times as much hydro-electricity as she formerly did, yet her coal consumption increased between pre-war and 1925 by 10 million tons and her coal imports by 6 million. But of these imports British coal represents a smaller proportion. When as a result of Britain's departure from the Gold Standard in 1931 there was a chance of British coal invading French markets, the French Government proceeded to impose a coal quota to protect French producers against this "dumping." While, therefore, world coal-consumption outside Britain had increased between pre-war and 1925 by over 10 per cent, Britain's share in this world consumption outside Britain had fallen from nearly 10 per cent to only 7 per cent.<sup>1</sup>

These causes of declining coal export can be grouped under three main heads. *First*, there is the competition of other sources of fuel and power such as lignite in Germany (which has been estimated to amount to an economizing of 15 million tons of ordinary coal) and hydro-electricity in Scandinavia, France, Italy and Russia. *Secondly*, there are political reasons, attributable to Imperialism, its fostering of economic nationalism and the so-called "Balkanization of Europe"; such as the competition of reparations coal in France and North Italy, the diversion of Polish Silesian coal from its previous market in Germany to markets in Scandinavia and the Baltic and the fostering of coal production in many countries by preferential State-aid, such as tariffs and quotas and cheapened transport facilities. *Thirdly*, there is the effect of the general world crisis with its effect particularly on the requirements of coal for heavy industry.

When the plight of the industry is contemplated fatalistically as an unavoidable "Act of God," as is frequently done, it is well to regard the first of these causes in the light of the second and third. It is true that in this age of oil and electricity the consumption of coal cannot perhaps hope to grow at as fast a rate as it did in the nineteenth century. But that is no reason at all why the demand for coal should decline absolutely, and mining areas become derelict and valleys of despair and desolation. Prof. Jevons in pre-war days propounded the paradoxical thesis that increased economies in the use of coal would ultimately lead, not to a decrease, but to an increased demand for it, owing to the industrial

<sup>1</sup> Cf. Samuel Comm. Report, 1925, Vol. I, pp. 7-9.

expansion (and consequent opening up of new uses for coal) which these very economies would produce. The *elasticity* of industrial expansion is the key to the result. Perhaps in these days of powerful rival power-sources this Jevons-paradox can be maintained with less assurance. Nevertheless, there remains substantial truth in it; to which the example of France, with an increase of hydro-electricity by 3 times and an increased coal consumption of 10 millions, and of Scandinavia, which in 1924 imported 2½ million tons more coal than in pre-war days despite extensive hydro-electrical development, are strong witness. As the *Samuel Commission Report* declared: "France, therefore, like Italy and Scandinavia, affords confirmation of the view expressed to us by more than one witness that the development of water-power, *if it brings with it increased industrial activity* [italics ours], need not necessarily lead to a diminished consumption of coal."<sup>1</sup> More eloquent still is the fact that the Soviet Union has not found a three-fold increase of coal production inconsistent with very big developments of hydro-electricity and oil as well. Viewed in this perspective, it would seem that primary emphasis has to be laid for the plight of the British coal export trade on the third and the second of our main causes—the international crisis of capitalism and its direct or indirect political effects. When the importance of this fact is coupled with the inefficiency and high costs of British coal capitalism, it should be clear that the plight of the industry is far from being something to be treated fatalistically as irremediable.

Similarly with the fall in internal consumption of British coal. In 1934 the population of the United Kingdom was 4 millions greater than in 1910, but the internal consumption of coal had declined during the same period from 180 to 161 million tons. There are technical reasons for this decline; decreased consumption of raw coal both industrially and domestically, and increased fuel-economy in the main coal-using industries: that is to say, that it takes far less coal now to make a ton of steel than it did in 1910. The same statement is true, in different degrees, in respect of the other principal uses of coal. But fuel-economy, if less marked, was also a feature of the nineteenth century; and yet in pre-war days the annual consumption tended to increase and not to decrease. Here again the decisive factor which is undoubtedly responsible for the contrast is the general depression of industry, and in particular of heavy industry. To quote again the *Samuel*

<sup>1</sup> *Ibid.*, p. 7.

*Commission Report*: "It is only to the revival of these heavy industries that the Coal-Mining Industry can look for any substantial increase in the home demand for coal. . . . If the Iron and Steel Trade were working up to its greatly increased capacity, its annual consumption of coal would be about 37 million tons. In 1925 it was only 22 million tons."<sup>1</sup>

CLASSIFIED USES OF COALS<sup>2</sup>

<i>User</i>	<i>Use in million tons</i>	<i>Use in million tons</i>
	1913	1934
Gas works .. .. .	16·7	16·66
Electricity undertakings .. .. .	4·9	11·17
Railways (Locomotive) .. .. .	13·2	12·17
Coastwise Shipping .. .. .	1·9	1·26
Blast Furnaces .. .. .	21·2	10·4
Iron Works and Steel Furnaces .. .. .	10·2	6·81
Collieries (Engine Fuel) .. .. .	18·0	11·68
General manufacture and domestic	97·7	91·33
Total .. .. .	183·8	161·48

An important reason for the decline in the final item on the list is that the domestic use of coal, some 35 million tons a year, is becoming smaller year by year. Apart from the poverty of numerous working-class families, this is due to the fact that gas and electricity are being used in place of coal in houses and flats. The amount of coal required to produce the gas or to generate the electricity is much less than the amount of coal required to produce the same amount of heat, and is constantly decreasing.

The amount of bunker coal (that is, coal sold for consumption on ship-board) has also declined sharply. This is again a joint product of the decline in trade and shipping and of the use of oil as a bunker fuel. The yearly average of bunker coal sold for the years 1908 to 1913 was 19·6 million tons. The post-war figures show a decline on this figure of between 3 and 4 million tons.

<sup>1</sup> *Ibid.*, p. 12.

<sup>2</sup> *Fourteenth Annual Report of the Secretary for Mines for the Year ended 31 December, 1934.* Table 26 (B), p. 150.

We have already seen that for historical reasons the coal industry of this country is split up into a very large number of competing units, varying in size from the very large to the extremely small. It was stated before the Sankey Commission that the average output per man-shift in collieries where from 5 to 200 were employed was 16.22 cwts.; 200 to 400 was 18.34 cwts., and above 2,000 19.76 cwts. The average costs per ton of coal mined in these different-sized undertakings were respectively 20s., 19s. and 17s. But in addition to the very large number—some 700—of quite small colliery firms employing less than 100 men, there are also a number of large and relatively efficient collieries. Indeed, some four-fifths of the output comes from some 300 firms each employing more than 1,000 men. This very disparity of the industry, together with the strong position of these larger firms, has served to strengthen the resistance exerted to prevent even those measures of “planning” which might have been possible on a capitalist basis.

Examples of inefficiency may be divided into two classes: those affecting production and those affecting distribution.

*First*, Royalties are a serious financial burden upon the industry. For 1934, including the rental value of freehold mines where worked by the proprietor, they amounted to £4,840,594. The average cost per ton of coal disposable commercially was stated officially to have been around 6d. But according to Mr. A. J. Cook, giving evidence before the Samuel Commission, “cases have been quoted again and again of royalties being as much as 1s. 6d. per ton and over.” There have been cases where the payment of royalties has meant the closing down of collieries. But it is the obstruction which the power of the royalty-owner is able to exert that is a greater damage than his actual toll. According to the Coal Mines Reorganization Commission, the Commission was unable to carry out a great part of the work for which it had been set up, owing to the fact that “the vast powers that would be possessed by a universal mineral lessor cannot be called in aid.” Sir Richard Redmayne in his evidence before the Sankey Commission referred, as an advantage of nationalizing royalties, to the fact that “obstructive tactics practised by some royalty-owners to the prevention of the exploitation of coal areas would



disappear”;<sup>1</sup> while the Report of Mr. Justice Sankey spoke as follows:

“The seams of coal are now vested in the hands of nearly 4,000 owners, most of whom are reasonable, but some of whom are a real hindrance to the development of the national asset. In certain areas the ownership of the seams of coal is in the hands of many small owners some of whom cannot be found, and this causes great delay and expense in acquiring the right to work the mineral. Barriers of coal are left unworked between the properties of various owners to an extent which is not necessary for safe and proper working . . . and millions of tons of the national asset are thereby wasted. Drainage and pumping is carried on in individual pits at heavy unnecessary expense instead of under a centralised plan covering a whole area. Further, lack of co-operation in drainage has in the past been, and is at the present time, conducive to the abandonment of coal and collieries. Boundaries of undertakings are arbitrary and irregular and make coal in certain places difficult to work or not worth working. . . . Under State ownership there will be one owner instead of nearly 4,000 owners of the national asset, and the difficulties caused under the present system in regard to barriers, drainage, pumping, boundaries and support will largely disappear.”<sup>2</sup>

Similarly the Samuel Commission six years later stated:

“A system which rests the ownership of minerals under the surface in the owner of the surface means that the planning of the mines is influenced continually by surface boundaries and surface rights. But surface boundaries have no relevance at all, and surface rights only a minor relevance to the proper organisation of the industry underground. . . .

“Many of the present defects of the industry in this country are largely due to the fact that the mines have had to adapt themselves to surface ownership. It is found that, on the average, each mine has had to obtain leases from no fewer than five mineral owners. Nevertheless, the areas of coal worked from any particular pit have not necessarily been those areas which could most economically be worked from that pit, but those for which the mine-owner has succeeded in obtaining leases. The consequences have been an undue expense in development and a waste of time for the miners in travelling underground to and from their work. These defects of the past are continuing in the present and will prejudice the future. There is still no proper control over the disposition of the new pits that are continually being sunk. Nor is there any

<sup>1</sup> Sankey Comm., 1919, *Evidence*, Vol. I, Cmd. 359, p. 211.

<sup>2</sup> Sankey Commission, Second Stage, June 1919, Cmd. 210, p. 7.

remedy if an owner, refusing for any reason to lease his coal, withholds this national asset from development. A variety of minor points, dealing with the barriers of coal left between properties, systems of drainage, rights of support of the surface, wayleaves and other matters, may also be instanced."<sup>1</sup>

*Secondly*, many collieries are far too small to be efficient. Large plant, which demands fairly heavy expenditure of capital, is necessary for handling coal, especially small coal, unless seams are near the surface and easy to mine. Mechanization has been carried much less far than in America or in the Ruhr; and it has been introduced to a very uneven extent in different parts of the United Kingdom. In Northumberland in 1934 the proportion of coal cut by machines was as high as 84 per cent, in South Wales as low as 15 per cent; for the whole of Great Britain it amounted to 47 per cent. In the American bituminous field, by contrast, it was already 75 per cent in 1929 and in the Ruhr it was 85 per cent. In the case even of many large collieries little attempt has been made in the past to keep the machinery up to date. Large profits were made during and after the War, but were distributed in dividends instead of being used to modernize the collieries. According to evidence given before the Sankey Commission, the war-time profits of the industry were as follows:

1914	..	..	..	..	£15,000,000
1915	..	..	..	..	£21,000,000
1916	..	..	..	..	£37,800,000
1917	..	..	..	..	£27,750,000

Even in South Wales in 1934, where the industry as a whole is supposed to have been running at a loss, eight companies, controlling more than 80 per cent of production, showed profits of £1,500,000.

With the onset of the depression coal-owners were at last forced to recognize that if they did not resort to more up-to-date methods of winning coal, the industry would go out of existence. As in the past it was only the fear of complete loss of their capital which roused them out of their inertia. Hence, compared with 1913 when only 8 per cent of Britain's coal was cut by machinery 47 per cent was won in this way during 1934. But a more striking comparison would be the percentage for 1924 and 1934. In the

<sup>1</sup> *Royal Comm. on Coal Industry*, 1925, Vol. I, pp. 77-78.

former year machine-got coal was 19 per cent of the total and within a span of ten years this had jumped to 47 per cent. This demonstrates the inability of mine-owners to adapt themselves to new conditions until they have nearly sacrificed the whole industry to abysmal poverty. To offer the excuse that until recently such methods were not known or that they were not congenial to the seams is fallacious; for the technique of cutting coal was known years ago and machines have been installed in mines where it was said that it would be impracticable. Granted, there may be geological difficulties which would be too great to overcome; but it is worth recalling that the 1925 Commission stressed the immense difficulties which would be encountered if machines were installed where the seam was on a gradient. Within two or three years after the publication of the report a colliery employing 3,000 men known to the writer switched completely over to machine-cut coal despite the fact that the seams dipped acutely.

Unquestionably this diffusion of the industry among so many competing units, is as uneconomic in the present as it has been wasteful and has left a legacy of chaos from the past. In his evidence before the Sankey Commission Sir Richard Redmayne stated: "In my opinion the present system of individual ownership of collieries is extravagant and wasteful"; and that with unification of ownership "the cost of administration would be so very much lessened; the question of pumping would be so very much lessened; all matters of buying and selling would be so much simplified when the forces were combined instead of being antagonistic."<sup>1</sup> Lord (then Mr. Justice) Sankey declared: "Unification under State ownership makes it possible to apply the principles of standardization of materials and appliances and thereby to effect economies to an extent which is impossible under a system where there are so many owners."<sup>2</sup> Sir Richard Redmayne has elsewhere spoken of the "important and far-reaching economies (which) could be secured by centralization of pumping and, to some extent, winding plants"; while "underground haulage would be simplified and cheapened by the abolition of eccentric boundaries."<sup>3</sup> Finally, he has summarized the advantages which nationalization of colliery companies could secure as follows:

<sup>1</sup> Cmd. 359, p. 210, and Cmd. 360, p. 1202.

<sup>2</sup> Cmd. 210, p. 11.

<sup>3</sup> Redmayne, *British Coal-Mining Industry*, p. 271.

- “1. Prevention of competition.
2. Control of freights.
3. Economy of administration.
4. Provision of capital allowing of quicker and more extensive development of backward mines.
8. Obliteration to a great extent of vested interests and middlemen.
9. Unification of the best knowledge and skill leading to greater interchange of ideas and comparison of methods.”<sup>1</sup>

However, it would seem to be an error to lay the troubles of the industry simply on the smallness of each undertaking and the lack of amalgamation, as it has become fashionable to do since the publication of the *Samuel Commission Report* in 1925. The matter is less simple than this. That the diffusion of ownership and the competition between so many separate units of varied sizes has led to irrationality and chaotic administration can remain true, without the conclusion being true that everything can be cured by amalgamation into large colliery combines. Indeed, the very vogue of “amalgamation” in recent years in certain districts, precisely because it has built upon a capitalist basis and on the existing irrational structure of the industry, seems to have given birth to an opposite danger: not merely to the threatened creation of “a dangerously powerful monopoly,” but to the danger, in the zest for gaining the monopolistic advantages attaching to large size, of creating indiscriminately large, and hence frequently over-blown and too-large, units. The arguments to sustain the view that unification as a general specific, and as the sole specific, is adequate have never been convincing or wholly true.

The size of a mine measured by the capital invested therein depends chiefly on the depth of the seam from the surface and its thickness. Obviously with a shallow mine (and this type characterized the industry till well on in the nineteenth century) it is uneconomical to work a large area underground, as this means the expense of keeping in repair long tunnels, and a waste of travelling time for both men and material. It is cheaper and more convenient to sink an additional shaft when the seat of working gets a fair distance from the old shaft. Of course when mines became deeper and a more expensive sinking had to be undertaken, it was imperative that it should serve a greater area and therefore

<sup>1</sup> Cit. Sankey Comm. *Interim Report*, Cmd. 85, p. 19.

employ more men, and invariably it does. There is nothing uneconomical about an industry if it consists of various and many-sized *mines* provided natural and technical conditions dictate such discrepancies. But there is abundant reason for believing that as larger underground areas had to be exploited, the multiple ownership of land prevented, in many cases, the *optimum*-sized mine, increased the costs of production as the plan of working had to be adjusted to inconvenient boundaries, and prevented a comprehensive drainage system (as referred to by Sir R. Redmayne) in addition to leading to large waste of nature's resources through unnecessary coal barriers between separate mines.

As a result the discrepancy in size which has developed is not the discrepancy which natural and technical requirements would dictate. The fault lies not so much in the fact that discrepancy exists, but that it is the wrong *sort* of discrepancy; and just as in many districts the administrative unit is too small, so the desire for monopoly among larger coal-interests to-day may tend to make the administrative unit in certain cases too large, and once again to sacrifice technical efficiency to profit-requirements. On this point the statistical data submitted to the Samuel Commission, while it doubtless has relevance to the economies of size, is by no means conclusive in proving the greater efficiency of the large capitalist combine. The shallow and smaller mines of this country, being the oldest, are naturally mines where costs are higher even if they adopt the latest mining technique. Their costs may be high not because they are small but because they are old. A more careful analysis of the 1925 Commission's figures would suggest that (in so far as one can postulate a uniform size of administrative unit for different coal-fields) the *optimum*-sized unit falls within the range of those yielding between 600,000 and 800,000 tons per annum. After this figure is exceeded, profits would seem to fall in every case except South Yorkshire where the seams are exceptionally deep and an abnormally large initial capital outlay is required.

The amalgamation-movement which has been proceeding since 1930 seems to have resulted actually in little but a more intense competition between the various districts, each forming an isolated unit and wasting its strength in endeavours to batter some equally powerful neighbour. Coal-owners, in fact, to-day are speaking less of district amalgamation and more of combining on a national basis to eliminate cut-throat competition. Hence most of the

talk about what capitalist combination could achieve (which was the onus of the Samuel Commission's recommendations) has come down to simple monopoly, where vested interests endeavour to escape from the contradictions inherent in capitalism by exploiting the consumer, and directing attention and expense to controlling the market and restricting supply rather than to removing inefficiency. This is not to say that unification would not play a large part in the industry if it were socialized. But unification would need to be combined with considerable flexibility in the size of the immediate managerial or technical-operative unit, which could then be adapted (because technical efficiency was the prime requirement) to natural and technical requirements and not subordinated to vested interests, whether petty and obstructive or large-scale and monopolistic. With the slate wiped clean of property-rights and vested interests, rationality could then be applied, combining the advantages of co-ordination with the requisite decentralization of administration, without the distorting influence of the other considerations which reign in capitalist economy.

The wastes of distribution in the coal industry are now notorious; and the "cost of distribution now forms a higher proportion of the total cost than it did in the pre-war period."<sup>1</sup> Distribution, especially for domestic purposes, is carried out through numerous merchants and agents, competing with one another. Moreover, not only is the number of such middlemen who compete with one another in each district numerous; but a veritable chain of them extends from the colliery to the final destination. The cost of distribution is consequently absurdly high. The Samuel Commission, which undertook a detailed investigation of the matter, found that "the expenditure of the retail merchants on establishment and clerical salaries is excessive; if all the retail-trade in London could in these respects be conducted as economically as that of the Co-operative Society, a very substantial margin would be available, either for reducing prices to the consumer, or for increasing prices to the colliery, and so increasing wages to the miner." In the case of the handling of coal by the Co-operative Wholesale Society "the gross profits are barely half; the expenses less than two-thirds, and the net profits less than half those recorded for private traders."<sup>2</sup>

<sup>1</sup> G. C. Allen, *op. cit.*, p. 64.

<sup>2</sup> Cmd. 2600, p. 103.

A further waste, typical of capitalism, arises from the imperfect co-ordination of transport and coal production. We believe England to be the only country in the world in which the railway wagons conveying coal from the collieries are privately owned. Of 700,000 coal wagons, 520,000 are privately owned and belong to 10,000 separate owners. This means considerable waste in shunting and haulage as well as of time in which they are empty due to the necessity of returning them to their owners, possibly at the other end of the country. Moreover "it is remunerative for the colliery or for the merchant to keep on hand a supply of wagons above the usual need, on account of the large profits he may make from the sale of coal in times of high prices."<sup>1</sup> Sir Ralph Wedgwood, in his evidence before the Samuel Commission, estimated an additional shunting-time of 9 million engine-hours due to private wagons; and that if these were all railway-owned, some 1,200,000 hours would be saved. English railway wagons make only 2½ journeys per month, and on the L.M.S. barely 2, compared to 5 or 6 in the Ruhr.<sup>1</sup> During the war, the Government Coal-Controller was given compulsory powers to make use of all wagons indiscriminately, regardless of their ownership, and to send coal to the nearest point. Great Britain was divided into twenty areas, each of which was made as far as possible self-supporting so far as wagons were concerned. According to the Coal-Controller, 700 million coal-ton miles were saved per year without increasing the weight of wagons on the journey either from or to the colliery.

In addition, this diffusion of ownership hinders standardization of wagons, with its resulting economies such as greater efficiency, easier shunting, through-braking, etc. It is generally recognized that to-day the 20-ton wagon is the most economical. As against the 10-ton wagon this gives a tare-weight only 33 to 55 per cent greater, an initial capital cost of only 50 per cent more and enables each train to carry 25 per cent more coal. In addition it reduces shunting-costs by reducing the number of wagons and the amount of coupling and re-coupling. It was estimated before the Samuel Commission that its general introduction would give a saving on operating costs alone of 20 per cent and permit a 10 per cent reduction in freight-charges. In addition to the diffused ownership of existing wagons, the factor which obstinately retarded the introduction of the improvement even by the railway companies was the absence of standardization of colliery-

<sup>1</sup> Ibid., p. 101.

equipment permitting the handling of larger wagons, and a similar difficulty at the ports; added to which the irrational mechanism of coal-distribution meant that railway companies were obliged to undertake delivery of coal in small quantities, and the 20-ton wagon would have involved "a widespread reorganization of the coal trade." In other words, the obstacle to improvement lay in the anarchy and lack of co-ordination in the industry and between it and the railways, the docks, etc.<sup>1</sup>

The total number of persons employed in mines in 1934 (including a certain number of non-coal mines) was 657,892.

**The** There are about a quarter of a million registered  
**Exploitation** unemployed. It has been estimated that with  
**of the Miner** full work and present hours for those actually  
employed to-day, the coal-mines could produce  
their present output with not much over half a  
million workers. In the present state of the industry, of course, the  
march of mechanization redounds to the disadvantage not the  
advantage of the miner, and machinery appears as the foe of man.  
This it does in two ways. First, such mechanization as has already  
been carried out has caused a decrease of employment to a larger  
proportionate extent than the decrease of production. Thus, in  
Northumberland a decrease of 7 per cent in output has been  
accompanied by a decrease of 28 per cent in employment. We  
have discussed above what we called the "Jevons-paradox," and  
how far it gives ground for optimism for the industry under  
socialism. Whatever may have been true of cheapened methods  
leading to expanded demand and "compensated" employment in  
the nineteenth century is certainly not true of capitalism's decline.  
Mechanized coal-cutters, like hydro-electricity, remain to-day the  
enemy of the miner. For them to cease to be so, and to become  
instead a relief from toil and an instrument of prosperity, the  
miner will have to look, it seems, to Soviet Power, not alone in  
his own industry, but in all industry, with the constructive  
achievement and the "elasticity" of industrial expansion which it  
alone is potent to bring.

Secondly, there is little doubt that under present capitalist conditions mechanization leads to greater, and not lighter, toil for the miner. The belief among the uninitiated that when machines take over the work of winning coal, the miner's burden

<sup>1</sup> *Ibid.*, 97-98; Allen, *op. cit.*, p. 68; Sankey Comm., *Evidence*, Vol. I, pp. 58-59.



is eased, had better not be told to the collier. Seldom in all the history of mining has the collier had to exert so much energy in order to earn a paltry living. The workers are forced to keep pace with the machine and the rate is such that only the strongest can with difficulty withstand the strain. A few years ago one of the writers of this section was told by a collier who had seen forty years' service at the coal-face that never in his life had he had to work so hard. In a totally different part of the county the same writer descended a mine where the conveyor-system had been introduced; and after conversing with the men discovered that the work was so strenuous that they were all agreed that if the pit were to work full time, they could not possibly manage to hold out for the full week. In short, the selfish end to which machinery has been put has resulted in the cream of the mining community—for the employers have picked their men—being put to tasks which are making them prematurely old. Again, systematic overtime is being worked at some collieries where the miners have been unable to remove all the coal ready for the machine's new position. The miner will be eager enough to accept the machine—when he controls it. To-day it is task-master.

Earnings are fixed, subject to certain minima, in accordance with district "ascertainments" of profits. In other words district wages are made to vary with the profits earned in that district. This system suits the large and prosperous collieries very well; under plea of variable conditions of profitability in the different coal-fields (e.g. the need for keeping costs to the rock-bottom in districts which mainly export coal) and also under the plea of keeping the industry clear of politics (!), the mine-owners refuse to enter into any national agreement about wages and in fact decline to "authorize" the Mining Association to discuss mining questions upon a national basis with the Mine Workers' Federation. But pit "ascertainments" have never been proposed, so that the most profitable undertakings pay wages fixed after striking an average with the results obtained in the smallest and most hopelessly incompetent undertakings in the same district. The extra hour in 1927 under the plea of emergency meant a further sharp fall in wages. As the Samuel Commission admitted this system implies (1) that wages are unfairly reduced by the inefficiency of the high-cost mines in a district, thereby giving not only them but the more prosperous collieries a subsidy at the expense of the men; (2) that it tends to "make wages excessively

fluctuating”—“makes wages more fluctuating in order to make profits less fluctuating.”<sup>1</sup>

Average earnings for 1924 were £120 a year, including receipts in kind. If one or two of the more prosperous districts are left out, this figure is reduced to £115 11s. 6d.; in Durham it was £104. That is to say, that miners in Durham receive 40s. per week if they are “lucky” enough to be on full time. Stoppages for insurance and pit-head baths will easily reach 3s., rent probably 9s., leaving about 28s. on which to feed and clothe a family. The position in South Wales is much worse; there, the subsistence wage of 7s. 6d. a shift is in force.

The number of persons killed by accidents in mines was in 1934, 1,073, and the number of injured 132,859: the latter figure approaches 20 per cent of the total number of persons employed in the industry. The rates per thousand of killed and seriously injured were as follows:

	1932	1933	1934
Killed .. .. .	1·06	1·03	1·35
Killed and seriously injured ..	4·95	4·70	5·38

The accident rates per 100,000 man-shifts worked above and below ground at mines under the Coal Mines Act for the whole country were:

	1932	1933	1934
Killed .. .. .	0·45	0·43	0·53
Killed and seriously injured ..	2·07	1·95	2·13

The figures for 1934 include the 265 miners killed in the Gresford disaster.

It is true that the figures in some other countries are even worse. It is also true that the figures in Great Britain are a great deal worse than they need be. The evidence at inquiries after colliery disasters shows that the statutory precautions are frequently ignored. It pays the owners to insure rather than to take adequate and expensive precautions. Decrease of hours below ground would, by reducing fatigue, undoubtedly have a tremendous effect in reducing “accident-proneness.” The Safety in Mines Research Board has done good work on the technical side. The application of its recommendations has usually been carried out grudgingly and under compulsion where at all.

<sup>1</sup> Cmd. 2600, pp. 143-144.

A great deal more research is required into the means of decreasing, if it is impossible entirely to obviate, miners' occupational diseases: nystagmus, "beat-hand," "beat-knee," "beat-elbow," miner's phthisis, miner's cramp. No less than 8,877 miners were in receipt of compensation under the Workmen's Compensation Act during 1934 on account of nystagmus. 7,135 were "cases continued from previous years," which sufficiently indicates the persistence of this disease. The Samuel Commission estimated that of every 100 men working for twenty years "2 will be killed, 9 will suffer fracture of the head or limb or other serious injury; 8 will contract nystagmus, and 8 more 'beat-hand, knee or elbow' or inflammation of the wrist, a total of 27 out of the 100 who will suffer at one time or other from these more serious dangers. In addition . . . each of the men on the average will incur an accident disabling for a period of more than seven days about once in 6 years." Moreover the annual rate of new cases of nystagmus per 1,000 men underground has *increased* from a pre-war figure of 1.58 to a post-war figure of 3.43; while other diseases special to mining showed a 54 per cent increase.<sup>1</sup>

Nystagmus is largely due to deficient illumination; that is to say, to the use of inefficient, out-of-date pattern safety lamps and to the distance at which lamps are placed from the objects at which the miner has to look. Coal and coal-dust coated surfaces are great absorbers of light. Deficient illumination as a cause is aggravated by position during work, depth of workings, malnutrition and fatigue. It is particularly likely to affect those suffering from the shock after-effects of accident. A Committee which reported to the Samuel Commission recommended:

- (a) increased power of safety lamps,
- (b) use of electric lights which can be brought nearer the working area.
- (c) whitewashing and stone dusting.

Reduced hours and proper food would probably have as great an effect on reducing miners' liability to nystagmus as any technical precautions.

There is an "output levy," out of which and out of the miners' own contributions pithead baths are installed and maintained. The receipts from the output levy, which had generally amounted to about £1 million a year, fell in 1934 to £416,767 in consequence of the Mining Industry (Welfare Fund) Act of 1934, which reduced the amount of the levy from 1d. per ton to  $\frac{1}{4}$ d. per ton.

<sup>1</sup> *Ibid.*, pp. 192-195.

Mr. H. R. Aldridge, the Secretary of the National Housing and Town Planning Association, giving evidence before the Sankey Commission, said that miners' houses, which are almost invariably the property of the colliery company, are worse than in any other industry. In cases in which the company has a lease of the colliery, with a limited number of years to run, the houses are only intended to last until the lease runs out. He added: "under existing conditions there can be no improvement. There is no desire and no organization to plan ahead." The *Interim Report of the Sankey Commission* was similarly outspoken: "There are houses in some districts which are a reproach to our civilization. No judicial language is sufficiently strong or sufficiently severe to apply to their condemnation."<sup>1</sup>

There have always been a sufficiently large number of extremely prosperous mines owned by highly influential men who have been able to "persuade" the Government not to interfere too drastically with the industry. Even in cases in which a colliery undertaking is being run at an apparent loss the reason may be that the coal is being sold at an artificially low price to a by-product works, or to a blast furnace, under the same or allied management. The purchasing undertaking may be making very large profits. For example, it was brought out in evidence before the Samuel Commission that in 1925 45 coal-owners were directly interested in 323 out of 495 blast furnaces in the United Kingdom. The price at which coal is sold in such cases is necessarily an arbitrary one: for instance, the following figures were given for the month of March, 1925:

Pig-iron	..	..	..	..	14s.	9d.
Plates	..	..	..	..	16s.	3d.
Rails	..	..	..	..	16s.	0½d.
Pithead price	..	..	..	..	18s.	6d.

It will be seen that the price of coal used for furnaces was lower in spite of loading and transport.

Whenever the threat of strike action has been sufficiently strong or the complaints of other groups of capitalists, hampered by the inefficiency of the coal-mining industry, have become sufficiently vocal, a commission has been appointed or a piece of legislation

<sup>1</sup> Cmd. 84, p. 7.

has been passed. But the recommendations of commissions and even the provisions of legislation have usually come to nothing. The Sankey Commission in 1919 recommended the nationalization of the whole industry, and Lloyd George promised to give effect to that recommendation. That promise was broken. The Samuel Commission in 1925 recommended the nationalization of royalties, and in 1930 the Labour Government said that they intended without delay to ask Parliament to pass such a measure. The 1930 Act did contemplate the nationalization of royalties, but, once more, nothing was done. The King's Speech in December 1935 promised legislation merely to unify royalties.

It is not our intention to go in detail into the recommendations made by the different Commissions which have been set up since the war to consider the state of the coal industry, since even if such recommendations had been adopted, it is hardly conceivable that they could have had more than the most superficial effects. The Mining Association of Great Britain, the employer's organization, has carried out incessant propaganda against the reorganization of the industry. It was stated in evidence before the Samuel Commission that as much as £72,711 was spent on this account during the year ending 31 December, 1924.

The Mining Industry Act of 1926 provided for amalgamation or absorption schemes, without compulsion. The Act of 1930 set up the Coal Mines Reorganization Commission, which was empowered to require the owners of undertakings to submit schemes to the Board of Trade. This Act also embodied power to constitute a Coal Mines National Industrial Board; but that provision has remained entirely inoperative owing to the refusal of the mine-owners to appoint representatives or to appear before the Board: a position which has been quietly accepted by the Government.

Part II of the Act of 1930 set up a Coal Mines Reorganization Commission, which was given limited powers to enforce amalgamation. In the report of this Commission, referred to on page 187, the Commissioners write: "no doubt, the framers of the Act of 1930 hoped that it would not be necessary to make use of the compulsory powers to enforce amalgamations, or at least that force would be needed only against an obstructive minority." But this "hope" was destined to be disappointed in the main. "Even where—as often happened—the advantages of further integration were not denied, the obstacles to effecting it tended to loom so large as to block the view. The very real

difficulty of getting incongruous personalities to work together, doubt by the prosperous of the possibility of linking them on fair terms with the less prosperous, a reluctance by the less prosperous to see a state of relative inferiority that they hoped was only temporary crystallized in the terms of a merger, a conviction by each that he would weather the storm better than his neighbours, fear of the loss of personal position—all these inevitable consequences of the industry's traditional individualism created an inclination to turn away from amalgamation as a cure for its troubles and to regard with suspicion anybody whose business it was to foster it." A meeting was arranged with the Mining Association, which also, as might have been expected, proved "disappointing." "The experience of the last few years shows clearly enough how difficult it is for the industry, even with the help of an Act of Parliament, to impose price regulations effectively upon so many competitive units." The position may be summed up by saying that five years have passed since the Coal Mines Reorganization Commission was established with the task of rationalizing the coal industry by means of amalgamation. Except in one or two coal-fields, very little has been done. In these coal-fields the growth of powerful combines, reaching out for the fruits of monopoly, has gone some distance. The peculiar dangers and disadvantages of this attempted "solution" have already been discussed. Reorganization of technique and administration, however, seems to-day to be falling into the background, in contrast with the talk of five or ten years ago. Instead coal capitalism seems to be reaching the typically restrictive "solution" of a sales Cartel on the pre-war German pattern.

It should be clear from what has been said above, that in a Soviet Britain, still more in a socialist world, with the unfettering of industrial development and the banishing of economic nationalism, the coal industry would have an essential contribution to make towards the economic life of this country, as well as of many other parts of the world which are deficient in coal and alternative fuels. In a socialist world the "Jevons-paradox" would have a chance to reassert itself; and even if coal is destined to play a smaller relative role in the twentieth century than it did in its nineteenth century hey-day, that is no reason why the demand for British coal should decline absolutely, or even cease to expand. On this score there seems abundant ground for

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optimism, and not for pessimism, with regard to the activity of the coal industry. And even should the utilization of machine-methods, under socialist rationalization, cause man-power to be "saved" more rapidly than the consumption of British coal was expanded, this fact could, surely, be welcomed in a workers' State as a means of lightening the toil of the miner and lessening the need to devote the man-power of the country to an arduous and unpleasant form of labour? Technical progress would then be a friend not an enemy of the worker.

British coals are extraordinarily varied in character. Thanks to the survey which has been carried out with great thoroughness (largely perhaps for military reasons) by the Fuel Research Board, we have a good knowledge of the nature of our coal resources. Owing to capitalist greed and profligacy, the consumable fuel resources of the world have been squandered at a terrible speed. There are some experts who believe that at the present rate of consumption the oil resources of the United States will be exhausted within fifteen to twenty years. No doubt the oil resources of other countries, notably the U.S.S.R., will last for a far longer period. But there is no reason to doubt that the resources of coal are far greater. The "proved" coal resources of Britain have been estimated at some 130,000 million tons, with "probable" additional resources of a further 25,000 million tons, as against present current production of only some 220 million tons, which would allow for consumption at the present rate during some seven hundred years. Even assuming a substantial margin of error and a greatly increased rate of consumption, it will be many years before our descendants will be compelled to draw heat and power from the inexhaustible sources only: the tides, the wind, the processes for taking advantage of the difference between the temperature of surface and subsurface water, and so on, including no doubt the fruits of many inventions yet to be made.

The administrative form which the organization of the coal industry in a Soviet Britain would take is one on which it would be as difficult as it would be unwise to dogmatize. Owing to the diversity of the industry, and the divergent uses to which coal is put, there would need to be considerable flexibility of administrative form—perhaps even a period of experimentation and variety. It seems probable that a

Coal Department or Council, subordinate to the Central Commission for Power Supply and Development, would need to be set up, to supervise and control the plan of coal production and distribution as a whole, to undertake geological surveys, the development of new areas or the closing down of old ones, and to have charge of research and its utilization. The units responsible for most of the decisions of a technical character concerning production, would probably need to be *district* bodies, following the lines of a particular homogeneous coal-field, its boundaries primarily determined by technical and geological considerations (rather than by considerations of marketing). There would be some advantage in these bodies being made into autonomous financial units; and their directorate appointed by the national Coal Council (and removable by it), while consisting predominantly of persons nominated by the workers (manual and clerical workers and technicians) in the locality. Inside each district unit, the actual "plant" or operative unit would be the mine and its mine-management, the number of which and their size would differ according to the technical requirements of mining in the different districts. Arrangements for the distribution of coal would presumably vary with the type of coal and the use for which it was destined. Domestic coal could be marketed either through the co-operatives, placing their orders directly with the district coal councils (or trusts), and/or by the creation of financially autonomous coal-distribution companies attached to and responsible to the various area soviets (or local authorities). Large bulk orders of coal for export or for industrial uses could be handled either through the National Coal Council, or, where the order was a local one in the vicinity of a coal-field, directly with the district coal council (or trust).

To a large extent, however, where the output of a colliery, or a colliery area, was destined for industrial use, particularly in the case of coal for blast furnaces or coking-plants, it might well be advisable in these cases to introduce an alternative form of administration, and integrate these collieries vertically with the industries which they served. Of this type there are examples in the Soviet Union, as, for instance, the famous Kusnetsk combine. Already to-day in Britain over 20 per cent of the coal goes to "associated concerns" (including colliery-owned selling agencies as well as to iron firms owning collieries). This would bring these colliery-managements outside the competence of any District Coal Council (or trust) and subordinate them to some industrial com-



bine; though it might be necessary for certain general powers of supervision over them (for instance, over their area, standardization of technical methods, working conditions, etc.) to be reserved to the National Coal Council. With the increasing co-ordination of coal with the various methods of coal-utilization, this "vertical" form might well become the dominant administrative form in the industry. And it is to permit the development of this, or other, alternative administrative forms, as circumstances proved to require them, that considerable flexibility and even variety of administration would be desirable from the outset.

There is no doubt that a socialist industry could and should increase enormously the allocation for research in coal winning, coal utilization and safety. The amount of  
**Research** research done to-day is small and unplanned, by reason of the short-sightedness of profit-making interests, by lack of co-ordination, by the jealousy of competing units, and by the unwillingness of a capitalist industry to regard investment in research as an "economic" proposition unless it shows a high probability of redounding in financial benefit to the investor himself. Study of the geology of the industry has been fairly thoroughly done by the Department of Scientific and Industrial Research. But until 1925 there was no organized body for pooling any research into technical methods. In that year the Coal Owners' Research Association was formed; but its resources have been very limited, and "it is not at present in a position to carry out adequately the work required."<sup>1</sup> In research into working methods, ventilation and safety very little has been done by the industry, and only tardily and on a limited scale by outside bodies. A department of Sheffield University has researched into ventilation. A little research into working methods has been done by the Industrial Fatigue Research Board and the National Institute of Industrial Psychology; while research into safety-methods has required the intervention of Government finance through the Ministry of Mines. With regard to coal utilization the Samuel Commission expressed surprise at the meagreness of what had been undertaken in this field; and with regard to the attitude of the coal-owners generally to research it expressed the view that their "attitude indicated an insufficient appreciation of the importance of the question."<sup>2</sup> Particularly

<sup>1</sup> Samuel Comm., Vol. I, p. 34.

<sup>2</sup> *Ibid.*, p. 40.

striking is the failure to develop adequately the utilization of smokeless fuel through the process of low-temperature carbonization—an improvement which would have revolutionary effects on the cleanliness of towns and the health of the people, particularly in crowded working-class districts. The *Report of the Fuel Research Board* for 1924 declared that “our knowledge of the composition of coal and of the factors that influence its behaviour when heated is still extremely limited”; and the President of the Mining Association before the Samuel Commission stated that, while they were willing to make certain grants to other bodies for research, “they did not propose initiating or carrying out research themselves” and that the Colliery Owners’ Research Association “had not so far taken the initiative in indicating the type of research that should be done.” In his Presidential Address to the Junior Institution of Engineers on 13 December, 1935, Sir Frank Smith bluntly declared: “We do not know the exact structure of coal, and we are correspondingly handicapped in its treatment.”<sup>1</sup>

Sir Frank Smith concluded his address with the following significant words:

“To me it appears certain that industry will not only continue to burn coal, but will strive and succeed in burning it much more efficiently than is done to-day. This means less coal per unit of output, but such output should be larger, and the benefit to the community should be even greater than at present. Because we have vast resources of coal is no good reason why we should waste them.

“Science will, I believe, gain increased knowledge of the chemical structure of coal and of the various reactions which ensue when coal is burnt, volatilised or dissolved. This will lead to improvements in existing methods of using coal, and will also lead to methods for obtaining products which do not at present exist. The production of liquid fuels should be cheaper, and no doubt lubricating oils will be made. It is well to remember that the motor industry, the aircraft industry, the rayon industry, the radio industry, the artificial nitrates industry and the hydrogenation of coal are all new in our lifetime, and they employ well over a million workers. Why not be optimistic and see in the picture of coal’s future the use of de-ashed pulverised coal in

<sup>1</sup> Some research, it is true, has been done by Professors Bone and Gibb into the “fundamental properties” of coal.

internal combustion engines and new industries that science will produce with coal as the raw material?"

Such optimism is certainly possible when production is organized by the workers for social ends. Indeed it is precisely here, in the connection between coal and its uses and research into coal-utilization that the largest opportunity for a rationalized industry under Soviet Britain is opened up. We have discussed in the main the lack of co-ordination *inside* the industry under capitalism. But it is in the lack of co-ordination *between* the industry and associated plants and industries that the greatest waste and inefficiency of the present system is probably found. To develop the potentialities of such co-ordination is only possible when industry is planned as a whole; and to-day these potentialities are virtually a virgin field. In a Soviet Britain the coal industry will no longer be considered in semi-isolation as the past. Coal will obtain equal or even greater economic gain from the socialization of other industries and the resultant combination of activities, electricity generation, gas production, iron and steel manufacture, coal distillation, oil and chemicals, etc.

Within the coal industry itself, apart from mechanization of the collieries and of coal treatment to the optimum extent, the problem is mainly one of coal "improvement," that is to say, of so treating coal for a given purpose as to obtain the maximum number of units of power or heat. Special pre-treatment is required in connection with (a) gas production, (b) oil, (c) electricity generation. Other possibilities, as yet almost untapped, are waste-heat coke ovens and blast furnaces, waste-heat steam plants, run in conjunction with the electrification of the coal-mines themselves; the utilization of low-grade fuel in connection with hydrogenation. The consumption of pulverized fuel is in its infancy; though it increased from 2,755,000 tons in 1929 to 4½ million tons in 1934, these figures are quite insignificant compared with the figures which will be seen.

But the biggest new use for coal may well lie in the process known as hydrogenation, whereby motor spirit is produced. As is well known, Imperial Chemical Industries, Ltd. have recently brought into production a large plant (capacity 45 million gallons a year). This experiment, as it is described, has been made "commercially" possible by the aid of Government-guaranteed preference on motor spirit produced from indigenous materials. We have already referred to the need for conserving the natural

petroleum resources of the world; and future years may see in hydrogenation one of the principal uses which will be made of coal resources.

We will conclude by quoting once again from the Samuel Commission. In their *Report* the Commissioners after stating that:

- “(1) Present methods utilise as a rule only a fraction of the potential energy of the coal.
- (2) The burning of raw coal is frequently wasteful.”

proceed to show that the problem

“is not one of a simple choice between one or two alternative methods, such as burning raw coal to produce steam power on the one hand, or to produce electricity on the other; but of the balancing of a variety of factors, and often of a combination of possible processes. . . . The question is not the co-ordination, as is often supposed, of two industries—coal and electricity; but of several—coal, electricity, gas, oil, chemical products, blast furnaces, coke ovens, etc. Two or more methods dealing with two, three or more of these, may be used simultaneously in combination, one feeding the other.”<sup>1</sup>

The *Memorandum* submitted by the Miners' Federation to the Commission declared that mining “from being a coal-extracting industry should become increasingly a coal-utilizing industry. . . . Modern development of industry is making it more and more impossible to treat coal-mining as something completely separate and with only accidental connections with other industries.”

Commenting on this, the Commissioners state: “we fully concur in this analysis. We believe that in the future coal-mining will be found to have become an integral part of a great industrial complex, which will comprise also electricity, smokeless fuel, gas, oil, chemical products, blast furnaces and possibly other activities.”<sup>2</sup> This ideal, however, implies a degree of planning and co-ordination impossible in a capitalist economy: only to be realized when the obstruction and conflict of vested interests have been cleared away through the instrument of Soviet Power.

<sup>1</sup> *Ibid.*, p. 66.

<sup>2</sup> *Ibid.*, p. 29.

## (b) "GAS"

Of the vested interests which have arisen from the utilization of the natural coal resources of the country, gas production is one of the oldest. Gas was first sold commercially in the beginning of the nineteenth century, and to-day the number of undertakings (authorized and non-statutory) total nearly 1,400 with a combined output of gas of over 300,000 million cubic feet. The number of workers engaged in the industry is in the neighbourhood of 120,000, and the annual consumption of coal amounts to 17 million tons.

The early history of the gas industry is that of every capitalist monopoly—stagnation, inferior-quality gas, and the highest price that could be extracted from the user. The coming of electricity produced a slump in the value of gas securities, but at the same time was responsible for the economic awakening of the producers of gas. Improvements in technique and efficiency were stimulated. Within the last half century the efficiency of gas production was improved by over 60 per cent. The result of this prosperity in the growth of the industry is seen in the ability of the vested interests of gas to retard seriously the development of low-temperature carbonization and the more extended use of the low-grade gas.

The problem of reorganization of the gas industry is intimately connected with that of a number of industries, iron and steel, chemical, oil and electrical. The close inter-working of the iron and steel, coke-oven producers and gas suppliers is a vital necessity for the more efficient supply of gas to industry and the domestic user. The erection of coke-oven plants in close proximity to iron- and steel-works and inter-connection with the existing gas mains to utilize the surplus coke-oven gas is retarded by the conflict of vested interest in these industries. Long-distance transmission is not justifiable in the case of gas as with electricity, but nevertheless a closely interlinked "grid" in such areas as South Yorkshire is an essential to economic working. The success of such "grids" has been demonstrated in the Ruhr and in the Limburg basin.

In so far as the chemical and oil industries are concerned, these have to be considered in relation to the development of low-temperature carbonization and hydrogenation which will be discussed later.

The first step in the reorganization of gas supply under a socialist regime would be in the elimination of the many small and unnecessary producing units that now exist.

**Economies Available** While small-scale production of gas may be considered economic, small-scale organization cannot. The size of the producing unit is governed by the density of the area, and where areas are small or thinly populated the grouping of such undertakings under unit or area administration is essential to procure administrative and technical efficiency. The result of research undertaken by the large organizations in recent years, in comparison with the method of the earlier years, demonstrates that much remains to be done in improving the efficiency and service of gas to the consumer.

Gas-users can be divided broadly into the classes (a) Domestic and (b) Industrial. The domestic consumer's requirements are lighting, space and water-heating, and heat for cooking. For many years gas had a monopoly in the supply of these services to the people, but it is only within comparatively recent times that any attempts were made to pass to the user the benefits of improvements and research. Efficiency of utilization in the workers' houses would naturally be the first consideration under a Soviet regime. To-day many of the gas appliances in use are wasteful and impose a heavy tax on those least able to bear it. Apart from the relative merits of the two services, gas and electricity, many homes are still lacking in cheap labour-saving and heating and cooking services. Over 40 million tons of raw coal were burned in domestic fires in 1934. The abolition of this waste in human labour, pollution of the atmosphere, production of dirt and disease will be the first task of a reorganized power and fuel regime. The supply of gas or electricity depends ultimately on the cost of supplying heat to the user. Only under a socialist organization will it be possible to secure the most economic production and distribution of heat by the abolition of dividends and wasteful competition.

Cheap gas for the worker: "all your gas for the price of your coal" was the claim put forward by George Helps an engineer of the Nuneaton Gas Works. At the Fuel Conference in London in 1928, Helps claimed that he could distribute low-grade gas at the price of coal, heat for heat. The claim at the time seemed so extraordinary that it was sceptically received. One inquirer, however, had the courage to test the claim put forward by Helps, and found it sound. He maintained that the system would grow in spite of opposition. But powerful interests were at stake and very little has been heard of it since.

Among the outstanding advantages to the community that would arise from the active development of the Nuneaton process, are the following:

1. Cheaper gas of a more manageable character would be available.
2. Instead of aiming, as at present, at the production of a high-grade gas and solid smokeless fuel, we would see the gradual elimination of the distribution of solid fuel either as coal or coke, with enormous savings in transportation by rail or road.
3. The abolition of costly smoke and dirt would follow, because not only the domestic but the industrial coal-handling and coal-burning apparatus would disappear together with the many tall chimneys that decorate the landscapes of the "depressed areas."

In the words of the engineer already referred to, the plant of gas-works would be greatly simplified as well as reduced in cost, and the winning, grading and preparation of coal by the collieries would be simplified. Ample gas-producing plant is available throughout the country for gasifying all kinds of coal. The extraction of ammonia, sulphur and oils would automatically proceed without specific financial promotion, and smokeless fuel could be more cheaply produced if so desired. Little wonder that such great and far-reaching changes and advantages to the common good have been and will continue to be violently opposed and sabotaged under capitalism!

The primary industrial function of gas is heat. In so far as power is concerned, electricity holds the field. The reorganization of the power-producing industries under Soviet organization would result in the still further cheapening of power (electricity) to the industrial user. Power for industry to-day is cheap—the expense of the miner. The improvement in working condi-

tions and wages of the miner might have the effect of increasing the cost of coal for power and heat-producing industries—electricity and gas, although there are abundant economies to be made in the coal industry, as has been shown above, to permit a large improvement in working conditions without any increase in the net cost of coal. But even should the cost of coal be raised this would doubtless be more than offset by the economies in production in those industries as already mentioned. This brings us to the point that so far as power requirements of industry are concerned, gas can play little part—except, of course, in electricity generating stations. In a few isolated cases gas may be required for generating electricity, but for practical purposes these can be ignored.

In regard to heat, however, gas plays a most important role. Many hundreds of industries use gas for heating, such as heavy engineering, furnaces, electric-lamp manufacture, paper-mills, bakeries, etc. The requirements of industry are determined by the economic value of the service in question. Moral: hence the urgency for the complete reorganization of the gas complex of the country, possible only by the sweeping away of all the trammels and the vested interests of capitalism. Cheap heat and cheap fuel for industry is the promise of a Soviet power-industry. The antagonism between the old industry, gas, and the new industry, electricity, must be wiped out by appropriate planning and demarcation of their spheres and functions. The pointer has already been set for this in those municipal undertakings such as Halifax, which have placed the organization and development of their gas and electricity undertakings under one control—a Light, Heat and Power Committee. It is only by such a grouping on a State basis that the senseless and wasteful competition between two public services can be eliminated and the power-industries themselves be directed and developed in the best interests of the people.

Before leaving the gas-producing industry, reference should be made to the most recent developments—low-temperature carbonization and hydrogenation. Briefly, the function of low-temperature distillation of coal is to obtain a maximum quantity of oils and smokeless domestic fuel. Low-temperature carbonization is not new. Experiment and research have been carried out on the Continent for many years and with conspicuous success.



Conditions on the Continent are quite different from those prevailing in England. But this does not account for the hostility with which the process has been received by the vested interests of the older industry. In spite of this opposition, the low-temperature process has now definitely established itself, but intensive research is still needed to improve the national economic value of the industry. The process is closely linked with the other to which reference has already been made—hydrogenation and the distillation of coal or tars for the production of petrol. The latter process is only now being developed in this country, but sufficient has been done to demonstrate that the process is technically successful and has promise of soon being an economic proposition. The importation of petrol amounts annually to 3,000 million gallons. The process for the production of oil from coal is available and could be extended by improved co-ordination and research. No reorganization of coal and power can be considered without taking it into account. Only the economic "If" of the capitalist state stands between.

## (c) "ELECTRICITY"

No one need nowadays be told of the vital importance of an efficiently operated electricity supply system to the economic and social well-being of a country. They need not be reminded, for example, of the importance of electricity to rapid road and rail traction, to efficient factory operation, how it makes possible the setting up of industries in uncongested areas, of its use in communications, in amusements and medical services. All these are well known. The present question is, to what extent is the electricity supply industry as it exists in this country to-day capable of fulfilling the important part entrusted to it? To what extent and in what way should it be reorganized to fit into a socialist Britain?

After fifty years of growth the electricity supply has now assumed very large proportions. There is invested in it some £400 million of capital, while the number of workpeople employed in it at the present time is between 260,000 and 280,000. But in spite of its size, there are still several areas in the country without any available supply of electricity, in certain cases because the number of people in those areas is too few to justify the costs of constructing a distribution system to supply them, but in the majority of cases because the electricity undertakings having legal rights to supply those areas are more concerned with making large profits out of consumers whom they can easily reach than with bringing the benefits of its use to as many people as possible.

There would be little point in tracing the history of the supply industry from its beginning up to the present time. That would require a study all to itself. It is sufficient to say that the industry is at present operating under provisions contained in ten different Electricity Supply Acts passed at various times between 1882 (the date of the first) and 1935 (the date of the last), in addition to which there are six Acts applying to the London Area and two to Scotland. The number of bodies that have come into being as a result of all this legislation are great, as they are varied, but before dealing with them it will be advisable to obtain some picture of the broad structure of the industry as it exists at the present day.

For this purpose it is necessary to distinguish between two aspects of electricity supply: the wholesaling and the retailing.

By the wholesaling aspect is meant, broadly speaking, the production or generation of current at high pressures or voltages and its transmission at these voltages to points at which it is transformed to lower voltages. The retailing aspect of it begins from these points and covers its distribution to further points, where it is again transformed to the still lower voltages at which it is actually used by the ultimate consumers. Had we been explaining the organization of the electricity supply industry ten years ago, such a division between its wholesale and retail aspects would not have been necessary, for the administration of both was in the hands of the numerous individual supply undertakings up and down the country. That is to say, in any area served by a supply station, the business of generating, transmitting, distributing and selling the current was entirely in the hands of the executive operating that station. At the present time, however, the wholesaling of current, from the generation of it to the point at which it is first transformed to a lower voltage, is organized and co-ordinated on a national basis, under the control of the Central Electricity Board set up by the Act of 1926. Only the distribution and sale of current is now in the hands of individual undertakings. Very broadly one can say that the determination of the wholesale price of electricity is now under the control of a national body, while its retail price is still left to the decision of the individual undertakings.

The principles underlying the present position with regard to the wholesaling, or generation and transmission of electricity, are contained in the Act of 1926. These principles are simple. They are directed to remove a large amount of the economic and technical waste resulting from a system in which current to supply what is, after all, a relatively small area such as Great Britain, was being generated in a large number of stations of widely different sizes and efficiencies.

The economies were effected in two ways. In the first place, the number of stations that were to generate (as distinct from distribute) current were reduced from some 660 to 132. These 132 stations are now known as "Selected Stations" and are grouped into ten "Scheme areas" into which the country has

been divided. This means that the needs of the country with regard to current are being met by large generating machines in which the efficiency, both from the point of view of operating costs (amount of coal used per unit of current generated, etc.) and reliability, are very much greater than that of the collection of smaller machines that have hitherto been doing this work.

In the second place, the "Selected Stations" throughout the country are all linked together by a high-voltage transmission system, especially erected for that purpose. This transmission system comprising part of what is known as the "Grid" is a sight one meets wherever one is travelling. By means of this high-voltage transmission system Selected Stations are able freely to interchange supplies of current, and its effect is to make a Selected Station situated in Cornwall act, if necessary, as a reserve to a Selected Station operating in Scotland. In addition to the high-voltage transmission lines there are what are known as the "secondary" transmission lines, also part of the "Grid," which link up Selected Stations with "Non-Selected Stations," or those stations which no longer produce current, but only distribute it. In short, the effect of the construction of the "Grid" has been to link up the whole of the public supply of electricity into a vast network, so that a consumer taking current at any point is not, as before, only being supplied by the generating-station in whose area he is situated, but is, in fact, being supplied by the entire generating resources of the country.

The economies resulting from the "Grid" are two. Firstly, as the "Grid" enables any Selected Station to act as reserve for any other, and as the likelihood of all Selected Stations breaking down at the same time is extremely remote, it means that the proportion of stand-by plant in any one Selected Station can be very much less than it need be if the station were operating entirely independently. This means saving in capital expenditure and saving in maintenance and similar costs. Secondly, as any single Selected Station is, through the "Grid," selling current over a much wider area than before, it is for that reason selling current to a greater variety of consumers. Variety of consumers means usually variety of times at which current is required (either during the day, week, month or year), and this means that the generating-machines will be kept more uniformly busy than they would be if the area supplied were small and the types of consumers few. The significance of this point is, of course, that in so far as generating-machines, and, indeed, any kind of capital equipment

give rise to costs irrespective of whether they are being used or not, the larger the number of units of current produced by this capital equipment, the smaller the proportion of these costs to be covered by the price charged per unit of current sold.

Under the 1926 Act the Selected Stations remain the property of their owners, although they are operated under the direction of the Central Electricity Board. That is to say, the Board directs their operation in respect of the amount of current they are to generate and the times at which generation is to take place. The Central Board buys all the current produced by the Selected Stations and then sells back to the Selected Stations as much current as they themselves require to distribute to consumers in their own area, and the remainder to the Non-Selected, or distributing-stations. Broadly speaking, the effect of this system is to reduce the wholesale price of current throughout the country to something just above the cost of production in the 132 large and efficient Selected Stations, the difference between the actual wholesale price and the Selected Station cost of production being represented by transmission costs and the costs of operating the Central Electricity Board.

In the system developed under the 1926 Act to co-ordinate the wholesaling of electricity supply we have, therefore, the beginnings of national planning, the achievements of which have only been possible by considerable encroachment on the rights of individual capitalists and the anarchy of the previous system. Although there are defects in the system, as will be later pointed out, it presents a scheme which, with certain alterations, could probably be used to serve the needs of a Socialist Britain.

When we examine the retailing or distribution side of electricity in this country, we find, however, all the defects **Retailing and Distribution** and economic waste inherent in an industry grown up in a piece-meal manner, stimulated only by the profit motive and controlled by fifty years of patch-work legislation.

On the technical side there is the waste represented by badly designed distribution networks, incapable of taking any more load without considerably endangering the system and laid with no reference to future development. Such systems at the present time play no small part in hindering the spread and use of electricity in many parts of the larger towns.

Another technical difficulty is the question of the very many

kinds of voltages and frequencies at which current is being sold to consumers. A survey made by the Electricity Commissioners in 1929 showed that in the year 1927-8 the voltages at which electric-lighting supplies throughout the country were being given by undertakings were as follows:

<i>Voltage</i>	<i>Percentage of all Undertakings</i>
Below 200 .. .. .	4
200—215 .. .. .	38
220—240 (excluding 230 volts) .. .. .	32
230 .. .. .	22
Above 240 .. .. .	4

There is no body with any powers at present to enforce standardization of voltages; so the above figures can be taken to represent much the position as it exists to-day. The position is, in fact, more complicated than these figures show, for the reason that they do not indicate the differences which exist between direct and alternating current systems. Such a hotch-potch of "kinds" of current sold frequently means that the joining up of one distribution system with another which may lead to greater efficiencies is often rendered impossible. It also results in considerable trouble and waste when consumers in one area want to move into another and take with them items of electrical apparatus.

On the administrative side there is the irrational multiplication of bodies concerned with the sale of current, each of which have different powers conferred on them by the legislation under which they were set up.

**Unplanned Waste** Firstly, there are the supply undertakings owned by Local Authorities, at present some 380, amongst whom there is always a strong tendency to use profits from the electricity undertaking in their possession to subsidize local rates, instead of applying them to reductions in charges for electricity and thus making it available to as large a number of people as possible. In actual fact, the extent to which profits can be used to the relief of rates is limited by law, but this does not prevent the electricity undertaking from being regarded as an asset in the general scheme of municipal finance instead of, as it should, being considered as an independent economic enterprise to be developed to the utmost of its capacity.

Secondly, there are the privately owned and operated Supply

Companies, about 250, obtaining their powers by Provisional Orders under the Electricity Supply Acts. Quite apart from the large profits which many of these Companies have been able to make in the past, owing to the virtual absence of any form of restrictions upon the price at which they sell current, the position of many of them at the present time is that, under the Provisions of the Act of 1882, they are under the threat of being bought up by the Local Authorities in whose areas they have operating powers. As the terms under which they can be so purchased contain no reference to "goodwill," the tendency is, when the time of purchase draws near, to do nothing towards further developing the undertaking, so that there will in fact be no "goodwill" at the time of purchase. The result is to cramp development and to encourage the persistence of obsolete and inefficient methods.

Thirdly, there are the so-called Power Companies. These are privately owned companies obtaining powers to operate, not by Provisional Orders (the usual way of obtaining the right to supply electricity), but by Private Acts of Parliament. There are relatively few of them (some eighteen at the present time), but the rights granted them in the Acts by which they are incorporated are very much more extensive than those held by other types of authorized undertakers, as the result of which many of them hold, for example, supply rights in the middle of areas operated by other undertakings, with a consequent confusion and muddle in distribution boundaries.

Apart from these bodies already mentioned which are concerned directly with the generation and sale of current, there are a number of others performing various functions in centralized control, either on a territorial or on an administration or financial basis.

Among these come the Financial Companies which, although holding no powers themselves either to generate or sell electricity, earn profits for their shareholders by buying up and operating a number of undertakings, often scattered throughout the country. In addition to this they frequently own concerns which manufacture the electrical equipment required in power stations.

Then follow the four Joint Electricity Authorities which are the solitary remnants of an attempt at voluntary co-ordination on a regional basis, introduced by the Electricity Supply Act of 1919. These Authorities perform co-ordinating functions of varying kinds in the areas in which they are situated, but their legal position in relation to the remainder of the supply industry is an

anomalous one, owing to the fact that the aims of the Act under which they were constituted were never more than partially achieved.

Then there is the Electricity Commission, also set up under the Act of 1919, originally intended as a planning and co-ordinating body, but which is now little more than a licensing and judicial one, with no executive functions of any kind. Finally, there is the Ministry of Transport, the Government Department responsible for a considerable amount of financial control in the present operation of the Central Electricity Board, and whose Minister appoints the members of the Board.

The administrative muddle described above can be expressed directly in terms of economic waste. The Local Government machine was given the job of sponsoring the early development of the electricity supply industry, and when it found that the industry was going to be an asset of considerable value, it decided, in many cases, that it would possess and operate its own electricity undertaking. So it soon came about that all the most valuable "markets" for electricity supply, that is, the large towns, were snapped up by the municipalities themselves, leaving to private enterprise the less lucrative regions represented by the smaller towns and sparsely populated countryside.

This was unfortunate for one main reason. The electrical development of a sparsely populated area can only proceed on a sound economic basis if it takes place in the form of an expansion outwards from a densely populated area. That is to say, both areas must be developed by a single undertaking which can thus obtain a "base load" in a good "market" upon which to carry out extensions into less lucrative areas. The force of this consideration is lessened now by the operation of the Central Electricity Board "Grid" system, but as a factor in determining the very lop-sided development which at present exists between urban and rural electrification, it has been of very great importance.

The haphazard development of the industry has also led to considerable anomalies in the sizes and boundaries of the areas supplied by different supply undertakings. Quite apart from the fact, already indicated, that some undertakings serve only rural areas while others scarcely extend beyond the suburbs of a large town, there are innumerable instances where the shape of the area served is such, that certain parts of it could be much more economically reached by the supply system of the undertaking in an adjoining area. This is to be found in many instances in the



Metropolitan Area of London, where in the relatively confined space of about 30 square miles there are even at the present time no less than 30 undertakings operating, some of whose areas are cut up by "peninsulars" jutting out from neighbouring areas, and are even crossed by the transmission lines of neighbouring undertakings.

In the past, neighbouring undertakings have fought each other for tiny pieces of land on the margin of their areas, and when they won them, held on to them, frequently in spite of the fact that they could not possibly afford to carry supplies of electricity to them. The struggle, in many cases, has been like international conflict for the prestige of size with little consideration for the obligations of the conqueror towards the occupants of the annexed territory. The economic waste resulting from the complicated and irrational intertwining of supply area boundaries is to-day very considerable.

Finally, there comes that aspect of the sale of electricity which is being constantly discussed and criticized by the lay Press: the wide variations in charge for electricity and in service generally which occur from undertaking to undertaking. Everyone has at some time heard of cases where the occupants of houses on one side of a street are paying 6d. a unit for current for lighting and those of the houses on the other side are paying only 3d.; or of cases where one man is paying a "fixed" charge under his electricity tariff depending upon the number of rooms in his house, while half a mile away people are taking electricity under a tariff in which the "fixed" charge is related to the rateable value of the house; or of cases where the consumer in one supply area has had his wiring carried out free of charge, while a consumer in a neighbouring area has had to pay, and perhaps heavily too for his wiring; or of cases where electric cookers have been hired out at 15s. a year in one district, at 40s. a year in another and not at all in a third.

Such difference in costs and service to consumers of electricity in different areas arises, as one might expect, out of the complete independence and attitude of local sovereignty regarding commercial policy, under which the electricity supply industry has developed since its beginning. Supply engineers in the past have conducted the operations of the undertaking over which they are in charge with small knowledge of commercial principles and none of economics. The same is true to-day. In undertakings where the engineer is supreme, the commercial aspects of his

work are his hobby, not to be taken too seriously and to be experimented with to his heart's content. Where he is answerable, as in the case of a Local Authority undertaking, to the overriding decisions of a Committee, the commercial policy of his undertaking becomes the subject matter for debate by men who know nothing of the technicalities of the problem and whose decisions are frequently influenced by political considerations.

In considering the reorganization necessary to make of the electricity supply industry one which would most adequately and efficiently serve the needs of the people, there

**Socialist Reorganization** seems to be little need to consider the possibilities of a period of transition before the ultimate form, which the industry will take, is reached.

Much of the structure that now exists can remain and the main developments will consist rather in an alteration and increase in the powers of existing bodies once these are overhauled and subordinated to the Workers' State than in the formation of new ones.

Under some such body as a Central Commission for Power Supply and Development the National Electricity Department would be the national authority in electricity supply. That is to say, it would control not only the production and distribution of current used in the public supply system, but also the generation of current by separate industries for their own use. The Electricity Department would acquire all the supply undertakings in the country and would control both the generation and distribution of current. The operation of the two aspects of electricity supply would, however, need to be conducted on different administrative lines.

In so far as the generation of electricity is concerned, the mechanism represented by the existing high-tension "Grid" lines connecting up the main sources of current (Selected Stations) could be maintained. One of the first tasks however would have to be the extension of this "Grid" system of transmission lines in order to facilitate the bringing of current to the remoter country districts, particularly in certain of the south-western and eastern counties, in parts of Wales and in Scotland, or to those districts where it was decided to create new areas of industrial activity. New Selected Stations would need to be built on sites where coal and water were easily available, and many of the existing Selected Stations, especially those occupying sites in the centres of large

towns which could better be used for industrial activities of a more essentially "local" character, would be closed down and abolished. Not a few of such Selected Stations are even at the present time being used to the utmost of their capacity, and any extensions carried out to them could only be of a patchwork kind, not in the interests of proper operating efficiency.

The control and operation of Selected Stations by the Electricity Department could be made to achieve a far greater efficiency in generation than is at present being achieved. Under the present system it must be remembered that although nominally the Selected Stations operate according to the directions of the Central Electricity Board, this operation consists in little more than selling to the Board as much current as the Board wants, at prices, however, determined by the Selected Stations. As the engineers of these Stations have the interests of their shareholders (or if the Station is municipally owned, of their ratepayers) to consider, it is quite probable that it is not in their interests in every case to reduce their costs of production, which is the price at which they sell current to the Board, to a minimum. Under direct operation and control by the Electricity Department, such possibilities would once and for all be abolished.

The Department's control over the generation of current would be greatly strengthened by its control over the distribution and sale of current. Hitherto the co-ordination in electricity supply has only reached production and high-tension transmission. That is to say, it has only touched the "wholesale" side of electricity supply. This has been explained above when we were dealing with the shortcomings in the present distribution of electricity. What was not mentioned then, however, and what is of considerable importance is, that until the entire business of both producing and selling current is centralized in the hands of a single body, there will never be the degree of efficiency which the economic conditions of this country (its varied industries, its relative compactness, and so on) should make possible in electricity supply.

At present, it is a question of the constant waste involved in the building of large generating-stations by the Central Board, the utilization of which depends ultimately upon the initiative or otherwise of a number of tiny distributing undertakings, each with its own view as to whether it will make its profits on a large or small turnover; or in the existence of areas, the economic development of which is being held up by the lack of available

power supplies. In other words, it is a waste involved in a constant time-lag between the demand for and supply of power. Such a waste could only be eliminated by the centralized control over both generation and distribution of current so that the developments in one were kept in constant and close contact with those in the other. Centralized control of this nature is also necessary to deal, with a minimum of delay and greatest efficiency, with cases where the giving of a supply to single large consumers, such as a new factory, places a very great strain upon the distribution resources of the supply undertaking in whose area the consumer is situated.

While the reorganization necessary in the wholesale aspects of electricity supply would probably involve few administrative changes in the present system, that concerning the retail aspects would necessitate very drastic alterations.

In the first place, the acquisition and operation of all supply undertakings by the Electricity Department would require a drastic simplification and standardization of the legal position of these bodies. It would require, in fact, a revolutionary change in existing legal rights and relationships. It would mean that municipally owned undertakings would have to be removed from their Local Authority ownership, that Power Companies with special privileges were divested of such privileges, that bodies such as Joint Electricity Authorities were abolished, that the functions of the Electricity Commission were merged into those of the Electricity Supply Department and that the supervisory control held now by the Ministry of Transport was passed over to the Central Commission for Power Supply and Development.

In dealing with the question of the suitable size of distribution areas (either measured in terms of actual square miles, or of number of people served, or number of units of current distributed) it must be remembered that there would be no particular advantage in a socialist Britain in large-scale electricity *distribution* areas. The arguments put forward in support of such areas nearly all turn on questions of the economies of bulk purchase of appliances and equipment used in the distribution of electricity to the ultimate consumer (cables, fuse-boxes, transforming apparatus and the like) that are possible by "large" undertakings; on the ability of such undertakings to employ highly skilled and trained personnel or to carry out research of

**The Size of  
Distribution  
Areas**

various kinds and so on: questions that would clearly not arise in a completely socialized industry where all such purchasing would be done by a single national body, and where the skill of the engineers would be at the disposal of the State and not merely of those bodies who could afford to pay the highest salaries.

It must not be supposed from this that reorganization of distribution need be on the basis of *small* areas, or necessarily upon the areas as they exist at the present time. Once the co-ordination of generation is completed, the boundaries of the distribution areas would be determined according to the circumstances of every case, and this determination would rest upon the application of two basic principles.

The first of these is a simple one. Adequate and successful development of the electricity supply industry depends to a large extent upon detailed and even personal knowledge by those persons responsible for its development of the areas in which supply is being given. For it is only in that way that one can be certain that the development of the industry is kept in constant touch with the needs of the community. It requires also an efficient repair and maintenance service, which can be relied upon to operate with a minimum of delay. These conditions can only be met by avoiding all forms of bureaucratic machinery in the administration of the sale of current. In other words, they can be met only by having as distribution areas those which in respect both of size and density of population are within the scope of administration of a single man constantly in touch with the developments and requirements of his area acting in co-operation with a local committee which represented the feelings and requirements of local consumers. To that extent distribution of electricity to the final consumer is a matter of close *personal* contact and can be conducted successfully only under such conditions. The administration of the distribution aspects should therefore be on the basis of areas within the scope of control of single competent and trained men behind whom would be the technical and commercial skill of the entire supply industry to draw upon when important or difficult problems arose. These men would conduct the administration of their areas according to broad lines determined by the Electricity Department, but in the actual details of their work they would be given the scope required to adjust the national policy to the special economic and other circumstances of their area.

The second principle underlying the determination of the size

of distribution areas is essentially economic in character. Co-ordination of generation will mean, as it means to a certain extent already, that the wholesale prices of electricity will tend towards a level which is the lowest obtainable, having regard to all the circumstances which affect such prices (types of demand for current; times of the day or year at which it is most used, and so on).

In any reorganization of distribution that is carried out the same principle should, in so far as it can, be applied. That is to say, *distribution* costs for the whole supply industry should be brought down to as low a figure as could, under all the circumstances affecting such costs, be justified.

The main factors in distribution costs are: (a) length of cable required to supply any given consumer or group of consumers; (b) whether the cable can be carried overhead or underground; (c) number of "transformers" required to convert the current to voltages at which it can be used by the final consumer; (d) amount of meter inspection to be done, and size of repairs service to be maintained. The factors are therefore, in a sense, less complicated than those affecting generating costs, and reorganization which gave full consideration to them should not be a difficult matter. Existing supply area boundaries should be disregarded. An investigation should be made of what part of the existing distribution systems could be kept and what scrapped. When this has been done the principle will be simply that of connecting up consumers and groups of consumers to distribution points from which they can most easily and cheaply be supplied. Such a process would very naturally take into consideration not only the distribution points as already exist or have to be created to meet present needs, but also the probable future developments in the distribution network to supply new industries or new residential areas, and so on.

The planning of distribution areas to make these two principles effective will involve considerable changes. The anomalous position where a municipal undertaking serves only its own densely populated district and perhaps the outlying suburbs, leaving the rural districts around to be supplied by a Power Company from a station many miles away, will be abolished. The policy of reducing distribution costs for the whole industry to a minimum will probably result in all rural districts being served from undertakings supplying also at least one large town. In those parts of the country where such an arrangement is not possible,

for example, in certain parts of the south-west of England, in Wales and Scotland, special distribution undertakings will have to be created.

The administration of each distribution area would be in the hands of a distribution engineer. The policy of the Electricity Supply Department in regard to the distribution areas would need to cover the following points:

- (a) The Department would determine the broad principles upon which charges were to be made for current and then approve the actual detailed tariffs compiled by the distribution engineer before these were put into operation. The principles underlying tariffs would be that all consumers in an area (and as far as possible throughout the country) were charged the same prices for the same uses of current (lighting, heating, power and so on) and that the charges made for the different uses of current remained in the same ratio throughout each area.
- (b) The Department would see that the same conditions of service were maintained over the whole country. By service here is meant not only repair and maintenance, but conditions under which premises are wired, facilities for hiring apparatus, and so on.

# VI

## AGRICULTURE

**I**N no other country is the disproportion between manufacturing industry and agriculture so marked as in Britain. The peasantry constitute over 30 per cent of the population of Germany and 40 per cent of that of France. One-third of the population depends on farming for a livelihood in U.S.A. To-day only 7 per cent of the working population of Great Britain is occupied in agriculture: a figure which was formerly 8 per cent, before the war, and still seems to be falling. For some 60 per cent of her foodstuffs Britain relies on import from abroad.

Moreover, British agriculture has a negligible peasantry. Like industrial production agriculture is conducted on a capitalist basis. Peasant cultivation disappeared a century

**Historical** and a half ago in the notorious enclosure movement in the late eighteenth and early nineteenth centuries, which dispossessed the English peasantry of some 10 million acres of common land in favour of the enclosing landlords—an enclosure movement, prompted by the growing profitableness of arable farming, which completed what the ruthless enclosure-movement of two centuries earlier, in favour of large-scale pasture-farming, had begun, The English peasant, divorced from the means of production, was transformed into the “farm hand” and the “factory worker.”

Capitalist farming was established side by side with a rapidly



growing manufacturing industry having a world monopoly for British goods, bringing huge profits and creating large fortunes for the British capitalist class. Thus were laid the foundations of a policy which became traditional for British capitalism—a policy of concentrating attention on manufacturing goods for export, developing overseas investments, and the capital-goods industries, and relying increasingly in the import of foodstuffs from abroad to satisfy the needs of the growing town population of Britain. Agriculture flourished for a time. Labour was plentiful and wages miserably low. The growing towns provided a profitable market for farm produce, and the era of competition from abroad had not yet begun.

But the 'seventies brought a new factor into operation. The vast prairie lands, virgin soil of the Americas and Australia, began to be exploited on a scale and at a cost impossible to most European cultivators; and a flood of cheaply grown wheat followed later by other agricultural produce, began to menace European agriculture with bankruptcy. The Continental states met this situation with high tariffs to protect their peasant farmers; but in Britain the industrial capitalists who were in the saddle had imbibed the philosophy of the economists which taught that free imports meant cheap food and cheap food meant cheap labour-power. At the same time, the opening up and development of the new colonial lands provided an outlet for the investment of surplus capital at highly remunerative rates of interest.

At the same time rents remained high, the Church received its tithes, and game preservation for the "sport" of the wealthy flourished.<sup>1</sup> More and more land went slowly but steadily out of cultivation. Every year numbers of agricultural workers drifted to the towns or emigrated to the Colonies. Between 1875 and the outbreak of the Great War, the number of those engaged in agriculture fell by half a million. The burden of maintaining agriculture on a paying basis was inevitably borne by the farm workers and working farmers whose standard of life was much lower than that of the average worker in industry; lower even than that of the unskilled industrial worker in the towns. The average wage of farm workers in England and Wales in 1900 was 14s. 5½d.; and although the cost of living, especially of food,

<sup>1</sup> According to an article by Mr. Christopher Hussey, published in *The Quarterly Review* for April 1924, the cost of shooting and hunting in 1913 was £8½ million respectively.

began to rise from then to the outbreak of war in 1914, the average wage of the agricultural worker only rose to 17s. 6d. in 1907, and to about 19s. in 1912-13.<sup>1</sup>

During the war years the necessity of increasing the supplies of home-grown food called a halt to this decline. But at the conclusion of the war, and the reopening of foreign trade, the process recommenced and continued in a more acute form. Additional land brought under cultivation during the war rapidly went back to permanent grass again, arable acreage fell by 1,700,000 acres between 1918 and 1925, and between 1920 and 1932 the number of workers employed in agriculture was reduced by no less than 160,000. During the immediate post-war years, a number of farmers were compelled, under threat of loss of their holdings, to buy the land they were farming. Inflation and war-time scarcity had raised prices to an artificially high level, and as a consequence these farmers soon found themselves saddled with a burden of mortgage charges out of all proportion to the real value of their land.

In 1923 loans to agriculture by the big banks amounted to a total of £46½ million. This sum increased to £51 million in 1926, —50 per cent for current trading and the other half for land purchase. The Agricultural Mortgage Corporation, formed in 1928, had issued over £10 million, mostly as long-term loans, by the end of 1933. The Lands Improvement Co., at the end of 1933, had issued loans totalling £15½ million, mainly supplied by insurance companies. There, is therefore, at the lowest estimate some £70 million loaned to agriculture by Banks and Insurance Companies in addition to the credits (essential to the average farmer) allowed by merchants, etc., who themselves receive credits from the Banks. This indebtedness is a millstone round the neck of the ordinary working farmer, restricting his oppor-

<sup>1</sup> After careful and thorough investigation into the conditions prevailing among agricultural workers in 1912-13, Mr. Seebohm Rowntree published a book *How the Labourer Lives*, regarding which F. E. Green says (*A History of the English Agricultural Labourer*, p. 203):

"These painstaking investigators delved into the hidden mines of the dark larders of the cottagers and produced a poignant human document, undecorated by literary adornment. Budget after budget, even in 1912-13, showed how the labourer's wife was trying to make both ends meet out of weekly earnings which did not exceed 12s. to 13s., 14s. or 15s. per week. In the northern counties it showed how she managed to luxuriate upon the higher wage of 16s., 17s. or £1 a week. Budget after budget revealed the fact that in the counties overflowing with milk and meat, margarine was eaten instead of butter, and that dinner consisted of suet pudding and potatoes, varied by bread and margarine and cheese."

tunities to find capital for the purpose of improving the cultivation of his holding, and impoverishing the industry as a whole.

Product of this historical development is the characteristic British system of land-tenure: the famous triple division of agriculture into landowner, tenant-farmer and labourer. The theory which agricultural economists in the nineteenth century worked out to justify this system was that it represented a convenient division of function between landlord and tenant; the former supplying the long-term capital sunk in buildings, drainage and permanent improvements of the land; and the tenant-farmer supplying the working-capital in the shape of implements, machines and draught-animals and the purchase of labour-power. In the days of agricultural prosperity in the mid-nineteenth century this argument had some force. Capital was plentiful, attracted by the growing profits of arable farming since the beginning of the century; and in the age of steam-power, the machine had little application to agriculture, at least much less than it had to industry, so that agriculture could remain the domain of the small capitalist, so far as actual operation (as distinct from long-term improvement of the land) was concerned. But in these days of decline, moreover in these days of changed technical methods, when the petrol-engine is replacing steam-power, the old system of land tenure is in ruins and by general admission has nothing left to say in its defence. On the contrary, its obsolete survival operates as a fetter on development, more onerous than do royalty rights on mining; while where it has broken down, little but the decay of agriculture has been left to take its place. Increasingly in recent years the landlord has come "step by step more nearly to the state of a mere receiver of rent," and a "property-defender,"<sup>1</sup> with no function even as a provider of capital. The result has been, not only that obsolete property-rights have maintained irrational boundaries to both farms and fields, cramping the agricultural unit to a size inadequate to give

<sup>1</sup> Orwin and Peel, *The Tenure of Agricultural Land*, p. 1. Lord Bledisloe in a Presidential Address to the Agricultural Section of the British Association in 1922 said of the landowner: ". . . Unless he is himself a farmer (which is seldom the case) he lives a life detached from the industry carried on upon his estate, and often ineffectually seeks relief from his growing poverty by attaching himself to a Property Defence League. He becomes in fact, a mere property-defender. . . ."

scope to twentieth century methods of technique, but the whole industry is in a chronic state of starvation of capital and thwarted initiative and experiment. In other sections something is said of conservatism, lack of initiative and short-sighted choking of experiment and research. Scarcely anywhere can this be more marked than in agriculture. "In no other industry is the *entrepreneur* dependent to such an extent upon another party at once for the factory equipment, so to speak, and for the raw material of his trade."<sup>1</sup> And where the old land-tenure has disappeared and given way either to the small farmer-owner, on the one hand, or to the large urban land-speculator, on the other hand, the last state of the industry is even worse than the first. The small farmer-owner inherits a farming unit which remains too small for the adequate utilization of modern farming technique, while generally he "will not have the capital necessary for the maintenance of the permanent equipment of the land," so that capital-starvation will continue and a steady deterioration of the land is likely to set in.<sup>2</sup> As for the land-speculator, Messrs. Orwin and Peel have referred to him as "that parasite on agriculture," and have painted the following picture of the results of his entrance on the scene: "Farmers are compelled, not only to buy holdings they would prefer to rent, but to pay unduly for them in the fear of losing their homes and means of livelihood; very often they must find ways to finance the purchase, and 'there is no worse landlord than borrowed money.' Thus it is that timber speculators are able to acquire woodlands, and, erecting temporary saw-mills, to proceed to lay them waste, afterwards selling the devastated freehold for what it will fetch. . . . As regards the farmer, he is always obliged to buy at a price which combines an assessment of his necessity for retaining a home and a means of livelihood with the ordinary commercial value of the land; and when it is remembered that the process of dismemberment of estates is most active in a rising market for commodities, it is obvious that he may pay a sum far beyond that which will allow him a fair return on his outlay when times again become normal." Moreover, since the permanency of deadweight debts are much heavier in agriculture than in industry (where greater opportunities exist for "writing down," etc.), the farmer "is hampered and harnessed to an extent unknown by the industrial manager."<sup>3</sup>

<sup>1</sup> C. S. Orwin, *Future of Farming*, p. 13.

<sup>2</sup> Orwin and Peel, *op. cit.*, pp. 22-23.

<sup>3</sup> *Ibid.*, p. 5, and Orwin, *Future of Farming*, p. 18.

Added to these special fetters on agriculture are the effects of unco-ordinated, anarchic production to which we find parallels in other industries. Some of these even echo those disadvantages of the pre-enclosure, open-field system, now so familiar to textbooks of economic history. We hear of the "improving tenant (who is) hindered in the practice of good husbandry through the neglect of his neighbour farming under another landlord. It happens too often nowadays that one man's land gets waterlogged because his neighbour below has failed to clean his ditches; or that his land is sown annually with thistle-seed blowing from his neighbour's fields." Again, "many farms are badly laid out so that they cannot be worked with the maximum of convenience and economy."<sup>1</sup> "The size and shape of the arable enclosures impose severe handicaps upon the use of machinery . . . involv[ing] the tractor or the steam-plough in an unnecessary number of turns, and is sometimes so small as to entail journeys, otherwise unnecessary, from job to job. In shape they are often so irregular as to leave awkward gores to be finished off with horse-labour at much loss of time. All this is without reference to the immense wastage of land and labour represented by the tens of thousands of miles of superfluous hedgerows, spoiling productive land, harbouring weeds and vermin, shading the crops from the ripening sun, employing men in unproductive labour, and restricting the free movement of implements. . . . In every county of England hundreds, if not thousands, of acres of arable land are withdrawn from productive use to provide unwanted field divisions. . . . Nowhere has the farming unit been laid out to give full scope to mechanical aids to labour, nowhere has the science of specialization in labour and management been applied."<sup>2</sup> Added to this is the fact that the lack of planning, combined with the weight of tradition and the small farmer's need to "spread his risks" over a variety of crops, hinders the development of agricultural specialization, which probably offers large but little-explored economies. Lack of co-ordination between agriculture and industries supplying it with machinery, etc., on the one hand, and industries utilizing its products, on the other hand, has hindered the development of standardization. (For instance, "British wool [is] produced from too many breeds and in quantities too small to bulk and grade.")<sup>3</sup> The farmer is

<sup>1</sup> *Ibid.*, p. 70.

<sup>2</sup> Orwin, *op. cit.*, pp. 98-99, 101.

<sup>3</sup> *Ibid.*, p. 3.

under the necessity of diverting probably more of his interest and energies to problems of markets and dealing than to those of productive technique; and the marketing of agricultural produce faces the alternatives of a wasteful and irrational middlemen-apparatus or else of monopolistic marketing combines and rings which can hold both farmer and consumer in their grip.<sup>1</sup> In sum: agriculture represents a backward and decaying industry which consistently over sixty years has shown an outstanding unwillingness to experiment (*vide* the failure of such promising experiments as those of Baylis and Prout to find imitators); starved of capital and harassed by parasitism and debt, with a chronic and "crying need of the land for fresh capital for land drainage, for rural housing, for water-supply, for all the equipment and improvements" for which agriculture thirsts.<sup>2</sup> Only a comprehensive social plan, based on a comprehensive agricultural survey, undertaking a programme of planned investment in land-improvement, changing boundaries and reorganizing farming-units, co-ordinating and harnessing research, co-ordinating agriculture with other industries which are linked with it and revolutionizing the distributive mechanism—nothing short of this is competent to breathe life again into the British countryside.

The value of the output of agriculture in England and Wales in 1931, was estimated at £202 million, made up as follows:

		<i>Million</i>
Livestock and Livestock Products .. ..	.. ..	£142
Farm Crops .. .. .	.. ..	£33
Fruit, Vegetables, Flowers, etc. .. ..	.. ..	£27
		£202

<sup>1</sup> With respect to distribution the Linlithgow Report on *Distribution and Prices of Agricultural Produce*, 1924, referring to the London United Dairies makes this striking comment:

"It has long been customary for large business amalgamations to seek to preserve, in their own interests, the small trader whose operative costs are necessarily heavy in relation to his business. He ensures for the big combination both 'cover from view' and 'cover from fire.' It is true that he is usually left the least remunerative portion of the trade . . . but to imagine that he is effective as a competitive agent is fallacious." (Paragraph 104, p. 46.)

<sup>2</sup> Orwin., *op. cit.*, p. 131.

It will be seen that Livestock and Livestock products account for some 70 per cent of the total value of British agricultural output. The importance of this section of agriculture in relation to the rest of the industry has increasingly grown during the past few years, although there is a slight decline in the number of cattle shown in 1935. This is made up for by a considerable increase in dairy herds and of the output of milk per cow in milk. The Ministry of Agriculture returns for 1935 emphasized the swing over from beef to milk production and the growth of the pig-breeding industry.

The Cultivated Acreage for England and Wales in 1935 was:

					<i>Million</i>
Arable Acreage	..	..	..	..	9.4
Permanent Grass	..	..	..	..	15.6
Rough Grazings	..	..	..	..	5.4
					<hr/>
Total	..	..	..	..	30.4

This table shows a reduction of 800,000 acres in the arable acreage since 1925, and an increase in permanent grass of 500,000 acres and of rough grazings of 400,000 acres. In 1933-34 the number of workers employed on the land fell by 27,800 and in 1934-35 a further reduction of 15,900 occurred. This gives a total of 43,000 fewer workers employed on the land in the past two years. In all, since 1866 some 4 million acres have gone out of arable cultivation in England and Wales; and the arable percentage of about a third of the cultivated area is to be compared to the position on the continent of Europe where nowhere, except in Holland, does the tilling area fall below 70 per cent.<sup>1</sup>

This most recent reduction in employment, be it noted, took place during the period of State assistance by the National Government to the industry, which in addition to restrictions on imports of agricultural produce from abroad, and the imposition of taxes on imported foodstuffs, took the form of subsidies to farmers for wheat and cattle production which together with the subsidy to the sugar beet industry, amounted to approximately £20 million in the two years referred to.

The official returns for 1931 give the estimated capital value of agricultural land in England and Wales as being in the region of £645 million. This is expressly stated to be an underestimate,

<sup>1</sup> Cf. Agricultural Tribunal, *Final Report*, Cmd. 2145, p. 180 *seq.*

however, and with the addition of the appropriate figures for Scotland (not given in this report) the total capital value of agricultural land for Great Britain, with its permanent equipment in the form of buildings, etc., cannot be much less than £800 million. British-grown wheat selling at 28s. to 29s. per quarter (4½ cwts.) meets only less than one-fifth of the country's requirements, and even then is heavily subsidized (about £1 per quarter) because of the competition of wheat available at a much lower cost from America and Australia.

State assistance is also necessary to enable the home producers to supply some 45 per cent only of the total meat requirements, and even with the subsidy to cattle producers they complain that more help is necessary. Home supplies of butter are less than one-eighth of the total necessary to meet requirements, cheese one-quarter, and bacon and pork, one-third. These commodities can be produced abroad, in some cases by countries many thousands of miles away, the cost of transport to Britain met, and even with this handicap be sold at a lower cost than the same commodities produced at home. The transport of a ton of wheat from Somerset to London is stated to cost about 25s. But a ton of wheat can be transported from St. Louis in the U.S.A. to New Orleans (700 miles) for 16s. 7d., and transhipped to London for another 6s. It costs less to send a ton of wheat from the interior of the U.S.A. to London than it does to transport it a comparatively short journey in Britain.

That the big capitalist interests gain the greater part of the benefit from the measures instituted by the National Government to assist Agriculture is demonstrated by the fact that, of the Wheat Subsidy, approximately *one-third* goes to producers with farms of 20 to 150 acres —about 172,000 altogether. *Another third* is paid to occupiers of farms of 150–300 acres, numbering 34,770, and a *third* to 11,870 occupiers of farms of over 300 acres in extent. The big farmers totalling some 46,000 or so in England and Wales get no less than £4½ million of the £6¾ million subsidy to wheat growers. None of the occupiers of holdings of 5 to 20 acres numbering more than 100,000 receive a penny from this subsidy.

Or consider the subsidy given to the sugar beet industry. The major share of this goes to the factories to bribe them to give a price to the farmer sufficiently high to persuade him to grow



the sugar beet. The big growers' crops are better cultivated for obvious reasons, and more cheaply produced, with a higher output per acre; their large consignments are accepted by the factories with a minimum of trouble, and they have their own transport facilities. The small grower is at a very big disadvantage in every respect, and often gets very casual treatment at the hands of the factories. Only 6 per cent of the total acreage in Norfolk under this subsidized crop was occupied by smallholders last year. Whatever the benefits passed on to the grower by the subsidized factory, it is very clear that it is the large grower who gets them.

In the course of an article making a plea for more State aid for the beef producers, in the *Farmers' Weekly*, 27 September, 1935, Professor Ashby of University College, Aberystwyth says:

"A striking feature of the direct financial assistance given to agriculture is that a highly disproportionate part of the benefit has fallen to the larger farmers and to land of medium and better quality. This is the case with the Wheat Deficiency Payments, the Sugar Beet Subsidy and the Fat Cattle Subsidy.

"Partly by general design, the Pigs Marketing Scheme has also provided most opportunities for the larger farmers, and by the distribution of the crop this is also the effect of the Potato Marketing Scheme.

"It is the smaller farmers whose incomes during the last year or two have seen least improvement, and who are now carrying the main burden of the depression."

So the millions of pounds directly paid to agriculture, and the increased profits accruing out of import restrictions and higher prices to the consumer, during the past two or three years of the operation of the National Government's policy to "save Agriculture," have gone almost wholly into the pockets of a minority of large farmers, merchants and middlemen. The larger capitalist farmers admit that this is so, and in fact a correspondent in replying to Prof. Ashby's statement a week later actually argued that the working farmers' wage costs were very low because of the use of family labour on small farms, and that therefore he had very little to complain about.

Thus we get the open expression of the attitude of the big farmer and landowner—that the working farmer should continue to be content to struggle along by virtue of the unpaid labour of his family. For in practice, this is the situation of the average small farmer.

The fact is that the British capitalist class, including the

capitalist farmer, has allowed agriculture to degenerate into a completely backward and disorganized condition. It has reduced those who work on the land to poverty, and pauperized the mass of the agricultural workers. Not a single proposal put forward for the industry by those who support landlordism and capitalist farming is of a character to help the workers. On the contrary, all such schemes would appear to be aimed only at perpetuating existing evils and anomalies while enriching the wealthy and increasing the poverty of those who toil on the land.

**Class Divisions in Agriculture** The following table gives an approximate estimate of the various sections of those engaged in occupations connected with the cultivation of land.

				<i>England and Wales</i>	<i>Scotland</i>
Farmers	..	..	..	260,000	34,000
Market Gardeners	..	..	..	40,000	3,000
Regular Workers	..	..	..	567,000	95,000
Casual Workers	..	..	..	106,000	16,000
				973,000	148,000
Total	..	..	..	..	1,120,000

This table gives only a very general analysis of the position, for of the 290,000 farmers the large proportion are working farmers employing very little outside labour, and that as a rule only seasonally.

The *Ministry of Agriculture Report on Agricultural Output for England and Wales 1930-31*, shows that there are 11,870 holdings of 300 acres and over occupying no less than 22.2 per cent of the land under crops and grass.

The next largest category, consisting of farms of 150 to 300 acres in extent, numbers 34,772 and accounts for 28.8 per cent of the land under crops and grass. These two sections of capitalist farmers together totalling some 46,500, exploit approximately 51 per cent of the agricultural land of England and Wales and employ the bulk of the regular workers engaged in agriculture, and a large proportion of the seasonal workers. Many of these own their own land, and have interests in various undertakings connected with the agricultural industries such as marketing firms, bacon, cheese, and cream factories, agricultural insurance companies, etc.

Farms of 100 to 150 acres number 32,000, and may be regarded as medium-sized farms, employing a certain amount of labour and covering 15.4 per cent of the acreage under cultivation. There are a further 62,380 farms of 50 to 100 acres in extent, accounting for another 17.7 per cent of the agricultural land. These are not large employers of labour and many of these farmers suffer to some extent under the same handicaps and grievances as the smaller working farmers. It would be a mistake to regard the whole of this section as having a complete identity of interests with the big capitalist farmers and landowners.

It is not easy to give any exact estimate of the number of capitalist farms, i.e. those worked entirely by means of hired wage-workers. As has been shown already, however, their number would come somewhere between seventy and eighty thousand, occupying fairly large-sized farms and exploiting some two-thirds of the total land under crops and grass, plus smaller employers of labour to the number of 62,000 or so, bringing the total for England and Wales to 150,000 farmers who exploit over four-fifths of the land. In arriving at this estimate, it must be remembered that a good deal depends on the type of farm. A large acreage under certain conditions such as sheep farming might employ less labour than a holding of 50 acres producing vegetables for the town market.

It is safe to assume that approximately 140,000 farmers in Britain are *mainly* working farmers, whose farms are worked *mainly* as family farms, this figure including the 100,000 odd whose holdings vary in extent from 5 to 20 acres and including almost all those whose holdings are not greater than 50 acres. (20 to 50 acres, 76,901.) Seventy thousand farmers own their land, but their total holdings amount only to  $6\frac{1}{2}$  million acres, which averages out at 90 acres each. As has been stated already, about half of these farms were purchased just after the war at an inflated price; many of the farmers concerned are heavily in debt and cannot be classified simply as capitalists exploiting the land with hired labour.

The average farmer, with rent and tithe or mortgage charges, with a very slow turnover compelling him to rely on credits being extended to him by the banks or the merchants from whom he purchases, cattle food, fertilizers, machinery, etc., or through whom he markets his produce, has many interests which separate him from the landed and capitalist elements connected with agriculture, and a good deal in common with the working class.

The permanent equipment of the farm such as outbuildings, drainage, water supplies, etc, is often in a scandalous state of disrepair and neglect, as a result of the unwillingness of the landlord to incur expense for its proper maintenance. Handicapped by lack of capital and inefficient farm equipment, burdened with debt and often threatened with prospects of losses arising from unseasonable weather, the working farmer has little cause to support policies such as those sponsored by the National Government under the guise of interest in the farmers' welfare, but which mainly serve the interests of landowners, banks and middlemen. He is as much a victim of capitalist exploitation through the medium of rent-exactions, tithe-charges, and interest-payments to the banks as the wage-worker on the land and in the towns.

Indeed, there is evidence that the farmer is ceasing to accept the lead of the landowner and large commercial farmer regarding the policies put forward for the land. Already the effects of the various Marketing Boards, which very much favour the interests of the monopoly-distributors and wealthy farmers, and the very disproportionate share of the various subsidies which accrues to the big farmers as contrasted with the small producer, are making themselves felt. There is a growing discontent with the existing state of affairs in the countryside among many of the farmers, which is specially evident among those who do not employ outside labour to any appreciable extent (for instance, one might cite a certain meeting at Evesham Town Hall early in 1935, when the majority of the small-holder audience vocally protested against a proposed fruit-marketing scheme advanced by the large fruit-growers; or again, discontent exhibited by small-holders in East Bedfordshire recently against the Board restriction schemes).

In 1931 there were 616,307 regular workers employed on the land, including 117,000 under 21 years of age and 64,000 women. In addition, some 100,000 more were employed as casual labourers. By 1935 these figures had been reduced in the case of full-time workers to 566,900, of whom 50,000 were women and 104,000 youths under 21. The casually employed workers had increased in number to 105,800. (Figures for England and Wales only.) Thus the number of regular workers had fallen by approximately 50,000 and those casually employed had slightly increased during the same period.

In 1925 the total value of agricultural output in England and Wales was returned as £223 million, or approximately £180 per head of those engaged in the industry. In 1931, the total value of agricultural output was estimated to have been some £202 million, the fall in comparison with 1925 being accounted for by the drop in prices. Volume had actually increased by about 4 per cent. Taking into account the reduction in the number of workers employed, the output per head of those engaged in the industry was approximately £182.

The average wage of the agricultural worker was 31s. 6d. per week, about £81 per year, and remains at approximately the same figure in 1935. This is the legal wage; but farmers occasionally try to evade their obligations to pay even this inadequate amount. In 1933-34 there were no fewer than 3,340 complaints of underpayment. How many more passed unchallenged because of fear of victimization (a very real thing for the agricultural worker) can only be guessed at. (Wages vary from county to county, being as low as 29s. in Durham and reaching 36s. in Derby and 36s. 6d. in North and East Lancs. The date of expiration of the recognized wage also varies according to county. The workers are thus unable to present a common demand on a national or even regional basis.)

Farmers do not hesitate to take advantage of their opportunities to play all kinds of tricks with wages such as retaining sums due after standing men off, in order to compel them to return and work for them when, in a day or two, work is again awaiting them. The farm-worker gets nothing extra for working under bad weather conditions. His occupation forces him to accept with what philosophy he may wet and cold with fair and hot weather alike. But large numbers of men and women who have worked hard all their lives are crippled by rheumatism by the time they reach middle-age, handicapped in the struggle to keep going, and with their efficiency and earning powers reduced accordingly.

Yet, according to statistics regarding costs-at-farm for crops and livestock at six costing centres in 1927, wages averaged less than 38 per cent of the total, while rent constituted 14 per cent.

The present average wage of the farm-worker, 31s. to 32s. per week, it should be borne in mind, is reduced by periodic unemployment for many workers concerned to an average of about 28s. over the whole year. Even if this were not so, wages are much below the level needed to maintain a reasonable standard of life and health, especially in the case of those men with families dependent

on them. With the cost-of-living index at 145 in September of this year as compared with 1914 prices, agricultural wages to-day are not very much better than those operating before the war.

Another highly unsatisfactory feature of the wages prevalent is the unduly wide variation of the wage-rates from one county to another, which cannot simply be explained by a similar disproportionate degree of prosperity on the part of the employers or by different efficiencies of labour. The rate for farm-workers in Durham is 29s. while only a few miles away in North-East Lancashire, he receives 36s. 6d. In Norfolk it is 31s. 6d. and in Derbyshire 36s. It must also be remembered that hitherto the agricultural worker has not been entitled to unemployment benefit when out of work, although numbers are put off for wet days, and there is a good deal of seasonal unemployment.

One of the biggest disabilities bearing on the farm-worker is the so-called system of Tied Cottages by which the worker is accommodated in a cottage owned by his employer. This system which affects some 150,000 to 200,000 farm-workers, mainly in the South of England, carries with it a number of serious disadvantages for the worker concerned. He is handicapped in respect to demanding necessary repairs and amenities in the way of sanitation. As a rule, his wife is expected to be available for any extra work which arises on the farm, and there are cases where members of the workers' family have been prohibited from choosing other kinds of employment.

Dismissal from his employment means loss of his home also, and lack of unemployment benefit makes the farm-workers' dependence on his employers' slightest wish almost absolute. In the report on "Agricultural Tied Cottages" giving the findings of a committee set up by the Ministry of Agriculture in 1932, to investigate the conditions relating to the Tied Cottage system, a vivid picture of what this system means to the worker concerned is given (para. 34, p. 13):

"They (the witnesses who spoke on behalf of the agricultural worker) contended that while the farmer is as a rule at liberty to engage in public activities without let or hindrance, the farm-worker—because not only his job but his home might be imperilled—cannot fully exercise his political and civic rights. In many cases because of his precarious economic position, he even hesitates to join a trade union, and to take action to protect his legitimate interests as an employed person."

This particular report is a revelation of the grip of the reactionary employers and landed proprietors on the lives of the

workers on the land. It concludes with a line-up of the representatives of the capitalist interests, on the one hand, in favour of the Tied Cottage, and the Labour representatives on the other hand, who were opposed to it; with a Civil Servant member declining to express an opinion either way. The subjection of the worker-tenant to his employer continues to make the farm-workers as a body the most exploited section of the British working class.

It is not to be wondered at under the circumstances, that trade-union organization is (relatively) much weaker among farm-workers than it is among workers in other industries. Another very real factor which adversely affects the building of trade-union organization among agricultural workers is the real hardship which the payment of even a low contribution involves for men with families, and particularly for those whose employment is irregular. The membership of the Agricultural Workers' Union is approximately 30,000, *plus* some 35,000 who are in the Agricultural Section of the Transport and General Workers' Union, and 10,000 who are organized in the Scottish Farm Servants' Union.

According to figures given in the House of Commons by the Minister of Agriculture (16 May, 1935) the number of statutory smallholdings is just under 300,000. The smallholder specializes in growing vegetable produce for the market, and works his land himself having additional help, as a rule, only for gathering the crops, etc. In spite of all the propaganda in support of schemes for settling unemployed from the towns and mining areas on smallholdings, the average smallholder's life is by no means an easy one, nor his income very much better than that of a farm-worker in regular employment. Rents are high, often up to two and three times higher per acre than those charged for bigger holdings and farms. Figures for 1931 (Ministry of Agriculture) showed the following rent-scale in operation:

*Comparison of Rents Paid per Acre*

1 to 5	acres	..	..	..	..	..	61s.
5 to 20	"	..	..	..	..	..	49s.
20 to 50	"	..	..	..	..	..	40s.
50 to 100	"	..	..	..	..	..	32s.
100 to 500	"	..	..	..	..	..	20s.
over 500	"	..	..	..	..	..	15s.

It will be seen from this list that the smallholder pays four times more per acre than the man with over 500 acres, and twice as much as the medium farmer with up to 100 acres. All over the country one can find smallholdings paying a high rent, side by side with a lower-rented large farm. True, the variations in rent depicted in this table are mainly due to differences in the type of soil utilized for large and small holdings, the latter being predominantly soil suitable for the more intensive types of cultivation and probably embodying greater initial capital sunk in the land. But the fact remains that the smallholding is heavily rented, and usually is at a disadvantage compared to the large farm with its greater capital resources and better technique.

Government figures for England and Wales give the variation in the number of holdings as follows:

			<i>Above 1 acre and up to 5 acres</i>	<i>Total up to 50 acres</i>	<i>Grand Total</i>
1921	..	..	81·217	278·343	420·133
1925	..	..	75·283	264·787	405·708
1932	..	..	70·674	249·343	390·469
1933	..	..	69·864	247·356	388·433
					<i>Per cent</i>
Reduction in number of holdings of 1 to 5 acres	..	..			14
Reduction in number of holdings of 1 to 50 acres	..	..			11
Reduction in total holdings	..	..	..	..	7½

A similar tendency to decline was witnessed prior to 1914, despite a big increase in the buying of land by owner-occupiers.<sup>1</sup>

The decrease in rent paid by holdings of 1 to 5 acres has been 1.6 per cent only. The decrease for holdings of 5 to 20 acres is 3.9 per cent. But large farms of 300 to 500 acres have had a reduction of no less than 16.6 per cent during the same period. (Ministry of Agriculture *Agricultural Output of England and Wales 1930-1*, Rents Table, page 51.)

Smallholdings are a profitable proposition for landlords and also for holders of loan capital. In 1933 sixteen County Councils bought 633 acres at a total cost of £40,842 for 60 smallholdings. The rent payable totalled £2,457, or nearly £4 per acre, which gives a return of 6 per cent on the capital invested. The County Councils purchased 4,651 acres in 1933, 5,053 acres in 1932 and 7,827 in 1931. The total rent-roll of the County Councils for

<sup>1</sup> Cf. Orwin and Peel, *op. cit.*, pp. 18-19.



smallholdings on 31 December, 1933 was £975,977 for England and Wales, total area 454,484 acres, with 26,726 tenants. Philanthropic schemes for settling the industrial unemployed on smallholdings are thus seen to be a very good business proposition for those with capital to invest in such undertakings.

High rent is, however, only one of the difficulties which affect smallholders. The risk of failure of crops is very real, and adds to the precarious nature of his living. His credit is limited and he is almost entirely at the mercy of the market salesman who handles his produce. Buyers in the markets prefer the well-graded produce of the large grower whose lots are of average quality, and the small lots of the smallholder generally command a lower price as a consequence. The salesman provides package for the produce at a charge which varies according to the particular commodity, and also charges approximately 10 per cent commission for his services.

The Linlithgow Report, after a very exhaustive investigation into marketing practices in connection with vegetables, etc. strongly criticizes the way in which the producer suffers under the existing system of marketing. Although that Report was drawn up in 1923, it still applies to-day. It states (*Summary of Conclusions and Recommendations*, para. 175):

“Fruit and vegetables are unique in the number and variety of intermediaries who may, at times, be engaged in handling the produce, and whose sole service is that of distribution. Occasionally there may be as many as six intermediaries between grower and consumer . . . this may involve as many as sixteen to twenty different handlings of the produce.”

The cost of all these various middlemen's charges is borne by the grower. Salesmen are charged with making “average returns” to the grower (para. 116). This means that the lowest price received for one lot of a given commodity is given in the return as that received for all the lots sold. The smaller grower has very little choice in the matter of marketing his produce. He is in the salesman's hands and generally is compelled to submit to the methods of doing business which are most favourable to the salesman.

Add to marketing costs the charges for cartage, rail transport, etc., etc., and the grower, on the whole, receives only a fraction of the price paid ultimately by the consumer.

Large-scale vegetable-growers have a very large advantage over the smallholder and are increasing the extent of their activities.

Large growers can use tractors pulling double and triple ploughs, and a variety of labour-saving and intensive cultivating devices. They have their own transport facilities and often have their own sales agency for marketing produce.

An article in the *New Statesmen and Nation*, 6 October, 1934, by Mr. L. F. Easterbrook, gives a number of examples to show the superior advantages which the large-scale cultivator has over the smallholder, among which is an account of a large vegetable farm in the Thames Valley, famous for its intensive cultivation methods. A rain-making apparatus is described in this article. In all parts of the 400-acre farm a main water-supply has been laid. In any field these mains can be connected to portable lengths of perforated pipe which are arranged in parallel lines on light metal pivots. Aerated water is pumped through these at sufficient pressure to spray all the land between each line of perforated pipe. The article goes on:

“On a ten acre plot of land, surrounded by the unlovely bricks and mortar of Hounslow, £1,600 worth of garden produce per acre is being produced annually by French gardening. The wages bill is £320 per acre, and every year 400 tons of stable manure are laid on each acre to make hot-beds for the frames. This is also the work of Mr. Secrett. Here at least, you will say, is a chance for the small man. Sixteen hundred pounds per acre surely gives him sufficient hope. But this is what Mr. Secrett said to me: ‘I can run this plot successfully only because of my other farms. To get the manure in sufficient quantities at the season of the year I want it I must make contracts for all the year round and use the remainder here. At certain seasons, on a particular day sometimes, I need a sudden concentration of labour that I could not obtain unless I had other farms from which to draw it. Transport would offer almost insuperable difficulties unless my other operations provided me with transport I can use all the year round.’ ”

In a talk broadcast by the B.B.C. early in October 1935, Mr. Secrett, the owner of the vegetable farm in question, stated that the prerequisites for success in vegetable production to-day are *more capital, more experience and more skilled labour*. He went on to say that the task was no easy one, and that the right sort of land for vegetable-growing on a paying basis was getting more and more difficult to find.

Mr. Secrett is a famous specialist on vegetable-growing for the market and his opinion is seen to be directly contrary to the arguments of those who would settle many thousands of unemployed on the land as one contribution to the solution of

unemployment. He added that the farmer-grower of vegetables, who is increasing in numbers, competing against the smallholder, can successfully establish himself at least in respect to the production of coarser crops such as cabbage, sprouts, peas and beet.

Thus the smallholder's precarious livelihood is further threatened by the development of highly capitalized specialist growers on an intensive scale, from one angle, and by the farmers from another. The smallholder is up against capitalist producers who can supply better-graded produce at a lower cost, and transport it in large quantities to the market where it commands a figure which the small growers cannot hope to obtain. It is not, therefore, a matter for any surprise to find that the number of smaller holdings has continually tended to decline, while larger ones have slightly increased. This is illustrated by figures given in the House of Commons on 16 May, 1935, which showed that the number of statutory smallholdings in each of the given years was:

1932	..	..	..	..	..	..	299,932
1933	..	..	..	..	..	..	297,758
1934	..	..	..	..	..	..	292,847

A decline of 7,000 in the course of three years.

As far as the big landowners are concerned, the absence of accurate and up-to-date information regarding their numbers and the extent of their land is very significant. We know how many cattle, sheep, pigs and even poultry there are in this country. We can ascertain to the last egg how much food is imported in a given month or year. Potato-growers and milk-producers are all registered and classified; farm-holdings, large and small, are placed in categories according to acreage, reduced to decimal points of percentages of the whole. There are figures and facts about everything relating to agriculture—with one exception, *how many people own the land, and who and what they are.*

Consequently no one can state with any exactness what the real position is in this respect. The Labour Government of 1929-31 established machinery for the purpose of Land Valuation, which would have ultimately provided full particulars regarding private land ownership, but it never got to work effectively, and the succeeding National Government (although the sponsor of Land Valuation, Lord Snowden, was then one of its members)

quickly took steps to liquidate this particular piece of legislation and to stop further investigations.

The total area of Great Britain is  $56\frac{1}{2}$  million acres. This, according to Ministry of Agriculture statistics is approximately made up as follows:

	<i>Million Acres</i>
Farmed .. .. .	30 $\frac{1}{2}$
Rough Grazing .. .. .	14
Deer Forests .. .. .	3 $\frac{1}{2}$
Woods and Plantations .. .. .	3
Urban, Roads, Rails, etc. .. .. .	5 $\frac{1}{2}$
Total .. .. .	56 $\frac{1}{2}$

Allowing for the difficulties already mentioned in respect to obtaining exact figures and facts, some enlightenment on the ownership of the land is afforded by the following:

The so-called *New Domesday Book* compiled in 1875 showed half the agricultural land was owned by just over 2,000 persons. According to another authority (*Dawsons' Unearned Increment*) 1,200 persons owned one-quarter of the land. In his pre-war Land Campaign, Lloyd George stated that the bulk of the land was the possession of 10,000 people.

This much can be said with certainty, that the large proportion of land is owned by a very tiny section of the total population of the country. Only an infinitesimal proportion of landed proprietors makes any pretence of giving any service in return for the wealth drawn from the land. Their private rights and privileges, their interests and prejudices constitute a crushing burden on Agriculture. Not only because of the £40 million or so which they receive annually as rents, but also because of the social and political grip which they maintain on the affairs of the countryside. Notoriously the most reactionary elements among the bourgeoisie of Britain, their economic control of the land gives them the power almost completely to dominate the everyday affairs of the ordinary farmer and the village population. Village halls are usually under Church control. Any other accommodation which is suitable for meetings, social or recreation purposes is generally under the indirect control of the landed interests. It is almost impossible for any sort of activity to take place in the villages unless it meets with the approval of the landowners and big farmers.

The owner of the farmed lands sometimes stipulates how it is to be cropped and cultivated by the tenant farmer. The legal right to do this has been largely eliminated, but the economic control is still there and has a big influence. The landlord often is (or used to be) defended on the ground that he is responsible for equipping the farm with the necessary farm buildings, drainage etc., etc., and maintaining these in repair. But, whatever could be said of the position seventy years ago, to-day such defence can have no meaning; since, generally speaking, such equipment is unsatisfactory and out-of-date, and the landlord is usually unwilling to engage in any more expenditure in this direction than is barely essential, while the tenant farmer quite naturally cannot and will not make improvement to land and equipment to which he has no claim.

The farm is in a sense a factory for carrying on cultivation of the soil. No manufacturer would tolerate the imposition of such a handicap on his factory at the hands of a landowner. The lack of efficient drainage is a serious matter in many parts of the country. Farmland and potential farmland is allowed to remain waterlogged and of little use, while often in the same or neighbouring districts water supplies are inadequate and primitive. The system of private landlordism has been condemned as a heavy useless burden on agriculture for a large number of years, and by a variety of authorities. Even within the Conservative Party there have been critics, and from among the ranks of the landowners themselves. Until the land is freed from this fetter on its productivity very little can be done to improve the condition of agriculture. The workers of Britain cannot afford the moral luxury of compensating the landowners for lost privileges when the land of this country becomes the property of the people as a whole.

How has the National Government approached the problems which press so heavily on the agricultural industry? An examination of the working of its various schemes **Marketing Boards and Restriction** very soon makes it evident that its concern is less to help the agricultural producer than **under the National Government** to safeguard the £70 million owing to the banks by the industry, enable the landowner to be assured of his rent, the Church of its tithes, the middleman of his "rake-off." As has already been said, the chief beneficiaries of the policy of marketing boards, subsidies and the whole gamut of agricultural "restrictionism" have been

the large farmers and distributors; while the small producer and the land-worker as well as the urban consumer have been the losers.

For instance, pig-producers now find prices falling much below a level which pays them, and the greatest confusion reigns once more in this section of the industry during the negotiations for the contracts for autumn 1935. Feeding-stuffs, insurance, and transport costs alone are considerably more costly than in Denmark. The National Government merely faces this fact by giving a guarantee to the various interests concerned that they shall have their price.

The Potato Marketing Board creates an artificial scarcity and gives the growers part of the higher price mulcted from the consumer; but its regulations bear more hardly on the small grower whose produce is intended solely for the market than on the large farmer whose rejected "smalls" can be fed to pigs and cattle. The milk-producers, as the recent ballot showed, are roughly divided into two categories. The big producer who favours the Milk Marketing Board's methods, and a section of the small men who are opposed to the Board because its operations penalize them as against the large producer. The Sugar Beet Subsidy established factories paying a substantial profit to the shareholders. The big growers' crops get preference over those of the small growers, whose expenses for transport, etc., are also proportionately heavier than those borne by the large-scale grower.

As a matter of fact, the biggest achievement of the National Government, apart from its direct gifts of bounties to the wealthier section of the farmers, has been in the direction of restricting supplies by regulating imports and controlling home production, in order to force up prices to the consumer. This policy is in reality a deadly blow against the interests of the agricultural producer, for his market in the last analysis is based on the ability of the mass of the people to purchase fully the quantity of food they need and that of the best quality.

In this policy of agricultural restriction the Fascists wish to go a stage further. In the country districts Sir Oswald Mosley's Blackshirts attempt to popularize their reactionary policy by playing up to the numerous grievances and difficulties of the small producer. Their agricultural policy is simple. It is for the taxation of all imported foodstuffs. Demagogically laying the blame on the "foreigner," who sends good quality food at a low

price into British markets, they indulge in condemnation of "High Finance," "The Bankers," and so on. But the ultra-patriot Fascists, in howling so loudly against the foreign food-producer, screen from the sight of the land-workers the way in which they are exploited and impoverished by British land-owners, middlemen and monopoly food-interests.

This fascist policy would merely turn back the wheel of history and compel the English masses to return to the "Hungry 'Forties" of the nineteenth century, when a much smaller population suffered terrible want because it could not be maintained on British produce alone. High taxes on imported food would of course lead to higher prices for British produce. But this would hardly benefit the average British farmer, still less the smallholder. The purchasing-power of the mass of the people would be disastrously reduced and consumption would inevitably fall. Rents would inevitably rise, placing the bulk of the gain in the hands of the landowner or the mortgagee, while the distributive interests would probably demand larger profit-margins on a smaller turnover.

The Marketing Board and Imports Control policy of the National Government is accepted by the Labour Party, with the proviso that they would allow for consumers' representation on the marketing boards, and oppose tendencies to artificial creation of a shortage in order to maintain high prices or increase the existing ones. They promise cheap credits to farmers, more and better houses for the workers, abolition of the Tied Cottages and (somewhat vaguely) increased wages. The worker would be brought within the scope of State Unemployment Insurance.

But so long as capitalist ownership and control exists, this programme must inevitably remain an ideal and be largely unrealizable in practice. The Tied Cottage could and should be abolished and farm-workers be brought within the benefits of Unemployment Insurance. These two things alone would be of tremendous benefit to the agricultural workers and would stimulate trade-union organization and enable a greater degree of political independence to develop in the villages. But that the large farmers and landowners would fight goes without saying. Being among the most reactionary exploiters of labour in Britain, they would undoubtedly reply by endeavouring further to reduce the number of men they employ. In this they would be assisted

in a whole variety of ways not least among them being the increase of mechanization, already growing (if tardily) and made further possible by cheap credits.

Unless a Labour Government was prepared to rally the rural and town workers behind it in a decisive fight to crush the opposition of the big capitalist farmers and landowners, its land policy would not go very far in practice. Private ownership of the land, with all the deadweight of reactionary control over the life of the people in the villages which accompanies it, is clearly only removable by the power of the working class exercised through its own form of government machinery—a Soviet Government. Lenin long ago made it clear that State ownership of the land under capitalism (which is what the Labour Party stands for), simply facilitated the exploitation of the workers on the land by the commercial capitalists.

Would large farms be broken up? If so this would be a step backward. But if not, the big capitalist farmer would still continue to exploit his workmen's labour to his own profit; his competition could still operate to the detriment of the smaller farmer, adding new acreages to his existing holdings even more freely than at present; while his influence in the countryside would remain dominant. Moreover, anarchy and lack of co-ordination in the industry would still remain.

But there is the further issue for consideration: The Labour Party declares that it would get rid of the landlord by buying him out. That is to say, it would change rent-payment into payment of interest and capital redemption to bondholders. On the general question of compensation something has been said in the first chapter, and there is place to say little more here. But it certainly seems a reactionary proposal, imposing a needless halter on any comprehensive development scheme for the land, to grant to this obsolete and functionless class the continued right to levy a toll on the product of the soil, thereby perpetuating an unjust and intolerable claim on the industry.

With regard to the recent Lloyd George proposals, these do not pretend to cut to the root of the agricultural problem, private property in land, despite the fact that sections of all the political parties have at various times agreed in condemning this evil. The *Liberal Land Report* of 1923-5 devoted a considerable amount of space to the question of landlordism and its detrimental effect on farming, and indicated how repre-

The  
Lloyd George  
Policy



sentative among all the political parties was the feeling that private property in land was an anachronism and would have to go. But the landed interests in Britain are strongly entrenched, and are powerful factors, particularly within the Conservative Party. To-day their interests seem to be watched over, not only by the Conservatives, but even by Mr. Lloyd George, that pre-war bogey of the Tory landowner, in whom they seem to have found a most surprising ally. Perhaps this is for a good reason: namely that the position to-day is such that the challenge must necessarily go beyond landlordism and could not stop there—must go beyond it to the creditor-banks and the distributive monopolies as well, which have grown in recent years into enormous leeches on the industry.

To-day we find the noisy denunciation of the landowner discreetly dropped. Instead we have Mr. Lloyd George, following a vivid description of the disrepair and neglect prevailing among farm buildings, expressing himself in his new programme in the following terms:

“The nation ought not to allow its land to fall into this state of neglect. It must put in hand an extensive programme for the reconditioning and better equipment of its agricultural holdings.” (Page 78, conclusion of Section II, *Organizing Prosperity*.)

The fact that “the nation” does not own “its land,” and that it is the landlord who has allowed the land “to fall into this state of neglect,” is brushed to one side. But this is in order that the former advocate of “the land for the people” may make the following proposition:

“The State must bring its ample financial resources to the help of agriculture. It must organize a great reclamation, reconditioning, rebuilding, improvement and rural housing campaign and itself see to the carrying out of the work. Many owners will doubtless welcome such assistance, which the State could render them at a very low yearly charge for interest and amortisation, since it can borrow the money more cheaply than any private person. There must, of course, be some provision against raising rents above the additional charges attributable to the loans by the State. Where the expense of necessary reclamation or reconditioning is such that the landowner refused to be responsible for it, the State must be prepared to step in and take over the land at fair value as a preliminary to putting it in order.”

**The Question of “Cheap Credits”** Both the Labour Party and Mr. Lloyd George argue the need for enabling farmers to secure credits easily and cheaply for the purpose of improving their working equipment.

“Occupiers have not sufficient capital to keep their buildings in repair, to provide equipment or even to carry on their working business.” (*How Labour Will Save Agriculture*, p. 9.)

“One of the most serious needs of agriculture to-day is a programme on a large scale for the repair of farm buildings or their replacement to suit modern standards of efficiency and cleanliness.” (*Organizing Prosperity*, p. 77.)

Apart from the fact that the preservation and repair of permanent farm equipment is the legal responsibility of the landlord, the question of easy and cheap credit facilities cannot be tackled unless some consideration is given to the fact that farmers are already in debt to the banks, to the extent of at least £70 million for loans, etc., plus credits allowed by merchants to the producers. This is a very considerable burden on the industry and it will not help producers to meet their difficulties in this respect, if they are offered facilities merely to borrow more at a lower rate of interest. It is all very well to promise credit facilities to the farmer, but what of those which he has been compelled to resort to and which have placed the land under the heel of the Banks and Investment Trusts and the land-speculator generally?

For Mr. Lloyd George, whose latest plans for dealing with the land hinge mainly on Government expenditure of huge sums for improvements and in easy credits to producers, the problem of the existing burden of debt apparently does not arise! Yet it is a millstone round the necks of a large number of producers, precisely those, in fact, who are most in need of credits and must be taken into account. Is it possible that banks (or the State itself) could loan more credits, even at low interest-rates, to farmers who are already heavily mortgaged or indebted to the banks? Such proposed cheap credits would presumably need some basis or security. In this situation there is a very strong presumption that those would gain the benefit of them who least need it: namely the large farmers—precisely the same section who have gained most from Subsidies and Marketing Schemes.

The impoverishment of British agriculture cannot be simply dismissed as due to climatic conditions or to lack of fertility of the soil. Skilled labour for work on the land is here in abundance, the resources of science and engineering technique are not lacking. Agricultural research and the application of engineering technique (particularly with the petrol-engine) to the cultivation of the soil offers large possibilities

**Capitalist  
Agriculture  
Has Failed**

in the direction of increasing the productivity of the land. Remarkable results have been achieved by scientists in recent years in experiments covering a wide field; new types of wheat have been evolved, giving higher yield and better quality; the output of milk per cow or heifer in milk has increased; efforts are being made to find a type of wheat suited to certain soils and having certain desired qualities; the introduction of sugar beet has inspired science to search for a suitable wheat for following beet as a spring crop, and so on.

Prof. Stapledon, of the Welsh Plant-Breeding Station at Aberystwyth, has, after years of experiments, shown that good pasture-land can be developed in areas which up to the present time have been left mainly for rough-grazing of little value. At Rothamsted, famous for its achievements in regard to investigations into the qualities of soils for cultivating purposes, scientists are well aware of the big potentialities which exist for increasing productivity. Sir John Orr, head of the Rowlett Institute at Aberdeen, spoke at length to the British Association at Norwich in July on the possibility of increasing the output of foodstuffs and the grave deficiencies in the diet of the mass of the people which could be remedied if science were free to assist the farmer to do this.

But, scientists are pessimistic on this score. In his book *Scientific Research and Social Needs*, Mr. Julian Huxley says:

"But practically all the research-men I have talked to showed an interesting mixture of optimism and pessimism. They all knew the scientific importance of their own work and were convinced of its possible value for practice; several of them said to me that a doubling of the present amount of food grown in this country was not only perfectly possible, but a modest estimate of what could be achieved by applying the scientific knowledge which exists. . . . But in contrast with this optimism as to possibilities was a certain pessimism as to actualities. What is the good of doubling the number of sheep in the country if sheep prices fall so low as to wipe out any reasonable profit for the farmer? What is the good of inventing new brands of wheat to the acre or to push wheat cultivation nearer the pole, if the world wheat producers have on their hands vast surpluses they cannot dispose of profitably and are clamouring for a restriction of output of cultivation? . . .

"Then there are the conflicts of interests at home. There is the interest of the breeder of pedigree cattle of a certain breed against the general livestock interest; that of the seedsman as against the farmer; of the wool merchant against the sheep breeder; of the

middleman as against the producer and consumer . . . one could go on almost indefinitely! . . .

“That however is not the fault of science, but of our economic system, and how that is to be remedied is a question for economists and administrators. Meanwhile it does lie like a barrier across our hopes for a well-nourished healthy nation.”

Thus we have summed up as serious a condemnation of the situation which capitalist economy has created as anything said by Marx and Lenin. Capitalist agriculture cannot deliver the goods which the scientist and agricultural engineer could assist the farmer to produce to the fullest extent needed to supply all man's needs in abundance. The main problem for the producer under capitalism is that of marketing his produce; questions of improved methods of cultivation, elimination of diseases, etc. and the increase of output, must always be subordinated to the major problem of marketing what is grown. In so far as science has assisted in this, in making profit more certain or guaranteeing an increased return, those able to afford to apply the results of scientific research are interested. But these are a minority of farmers and a very small one at that.

Similarly, mechanized farming is restricted so far as its fullest and most economic application is concerned to those farms where the occupier has the financial resources necessary for the purchase of machinery and whose acreage is sufficiently large to allow of mechanization being a paying proposition. In respect of labour-saving by the speed-up of work which mechanization makes possible, and also the fuller utilization of the potential productive capacity of the land farmed, only a small minority of farms get the benefit. Naturally these are run by the wealthier section of the farmers and their advantage over the small man is further increased as a consequence. Furthermore, private property-rights, as has been said, bar the way to progress in the direction of more efficient cultivation. To quote again Mr. C. S. Orwin, of the Agricultural Economics Research Institute, Oxford:

“Granted an area delineated as suitable, for example, for corn production, it will be found at once that existing field boundaries in many cases impose handicaps on the economic use of machinery, being at once too small and too irregular. In the same direction farms of 400, 500 or even 1,000 acres would not be large enough in scope either for machinery or management. And not infrequently it would be found that there was no agreement between the bounds of an estate in one ownership and of the groups of

farms which the survey would disclose as going to make up an efficient unit."<sup>1</sup>

Added to this is the fact that agriculture, in so far as it serves the needs of the masses, is precluded by the poverty of the masses from having an "effective demand" on the market for its produce which "pays." Speaking at the meeting of the British Association in Norwich last summer, Sir John Orr made reference to this state of affairs, and said, after dealing with the possibilities for improving the diet of all classes at present below a certain economic level:

"What effect would such an improvement in the national dietary have on consumption? It is estimated that there are about twenty millions of the population below this economic level. To raise the diet of this twenty millions to the required standard would involve an increased consumption of about 10%, representing at retail prices about £100 million per annum. The diet at the 25s. per head income level is about an optimum. With such a superabundance of foodstuffs embarrassing the economist, there is no reason why everyone should not have an optimum diet. To bring all diets up to this generous level would mean an increased consumption of about 20% representing an increased trade of about £200 million per annum."

Sir John Orr poses the question without taking any account of the obstacles which a class society creates as a barrier to its solution. Prof. Julian Huxley rightly places the blame on the economic system for this state of affairs; but he is being oddly unrealistic in leaving the solution to economists and administrators!

Clearly the solution of this whole problem goes far beyond any policy of adjustments within the frame-work of existing class-relations, or of tinkering reforms, restrictions of imports, and subsidies to this or that section of agriculture. The land must be freed from the shackles of private landlordism, the exploitation of the capitalist farmers, the burden of the middlemen whose intervention between producer and market is such a drain on the industry.<sup>2</sup> The handicap which bank debts impose on the producer must also be eliminated. The agricultural industry needs to be completely reorganized in the interests of the farm-workers and small producers along such lines as best meet the requirements of the mass of the people.

<sup>1</sup> *Future of Farming*, pp. 123-124.

<sup>2</sup> Sir A. Fielding is quoted by the *Liberal Land Report*, 1923-5, page 270, as having computed a gap of £170 millions between producers' and consumers' prices for four main food commodities.

Brought into being as a consequence of the determination of the working class to end poverty and exploitation and to build a new social order, a Soviet government for

**A Soviet Government and Agriculture** Britain would be the representative and custodian of the welfare of the working class and of all those whose activities contribute

to the needs of the people. This welfare would of necessity be their dominating concern. It goes without saying that its agricultural policy would need to be part of, and related to, a general social and economic policy designed to forward the well-being of the people. As the necessary preliminary to developing its agricultural programme, such a Government would require to carry through such immediate measures as the following:

The legal right of individuals to the ownership of land would be abolished, and vested in the Workers' State on behalf of the people. No compensation would be given to landowners for the loss of their private rights and privileges (save, perhaps, in exceptional "hard cases"), but owner-occupiers, cultivating their holdings would be fully compensated, and mortgages to the banks, etc. liquidated. All other outstanding debts to banks and investment trusts incurred on account of loans or credits would be abolished, as also would tithe-charges. Working farmers and smallholders would be allowed to continue to cultivate their holdings and guaranteed security of tenure on certain conditions attaching to efficient maintenance and cultivation.

The huge apparatus built by the food combines, rings, and various types of middlemen for the purpose of intercepting agricultural produce between producer and consumer in order to make profits for private enterprise would be replaced by a system of co-operative distribution in the interests of both producer and consumer. The Co-operative Societies would become responsible for handling agricultural produce and would take over the abbatoirs, dairy-produce factories, milk distribution, flour mills, food-canning factories, bacon factories, etc., etc. Many drastic improvements would be necessary in this sphere before all the anomalies connected with capitalist marketing were dispensed with. But the Co-operatives would be well able to carry out this task; they are the largest and most efficient millers in Britain, and already handle some 15 per cent of the nation's total food supplies.

It is possible that the immediate situation in the country would compel the Soviet Government to concentrate its most immediate attention on increasing the amount of food produced in order to meet emergency, although it is very unlikely indeed that supplies would be unobtainable from abroad (e.g. from U.S.S.R.).<sup>1</sup>

Food stocks in hand at warehouses, docks, etc., are usually fairly considerable, and could be requisitioned to meet requirements. Sufficient potatoes are available from home-grown producers to meet the whole of our needs in this respect, and supplies of liquid milk are already embarrassingly "plentiful" (an increased production of 120 million gallons in 1934 created an artificial "surplus" of milk). A recent investigation by the Ministry of Agriculture into the quantity of dried and condensed milk in the hands of various importers revealed that there were  $2\frac{1}{2}$  to 3 years' supplies in stock. The Ministry of Agriculture returns for June 1935 showed that there were at that date on British farms over 1 million cattle over 2 years old, and 1,300,000 over a year but below 2 years. There were 1,166,000 less than 1 year and more than 800,000 cows in calf. The average number of cattle sold for slaughter off farms in England and Wales during 1920-1 to 1924-5, according to figures given in the *Agricultural Output for England and Wales 1925* (page 56), was 1,225,000. This figure represented some 45 per cent of the requirements, and it can therefore be estimated that  $2\frac{3}{4}$  million cattle over 2 years of age would be needed to meet the country's requirements in beef for a year. It will be seen therefore that supplies for approximately 5 months are available, with additional numbers of cattle maturing during that period, in all probability sufficient to meet requirements for a further period of two or three months without much difficulty, and without resorting to any depletion of the basic breeding resources of the cattle industry. With the stocks of chilled and frozen beef in warehouses added to home resources an emergency would not find the new government facing any very serious or difficult problems so far as beef supplies were concerned.

Requirements of bacon and pork could be met by at least 4 months from home resources; and stocks of bacon on hand would be available to supplement these. In June, 1935, there were approximately 500,000 breeding sows in Britain, and  $2\frac{1}{2}$  million

<sup>1</sup> See Chapter I.

pigs over 4 months old, plus twelve hundred thousand below that age, a total of 3,811,000. This shows an increase of 9.7 per cent over 1934, and compares with the 5-year average for 1921-5 of 2,658,000. So far as the pig-breeding industry is concerned, the statistics quoted indicate that approximately some 5½ million pigs, or almost 5 months' supplies, are available.

On the basis of a total of less than 16 million sheep and lambs in 1925, when 4½ million sheep and lambs were sold for food, meeting approximately 44 per cent of requirements, the figures for 1935 which give a total of almost 16½ million sheep and lambs, show that home resources could provide 5 months' supply of mutton and lamb for food purposes. This could be increased to some degree (as was done during the war), although this would mean some reduction of the available breeding resources. On the other hand emergency measures to increase supplies of mutton and lamb for food purposes could be taken in conjunction with clearance and reclamation of semi-moorland, etc., as described later.

Home-grown sugar beet can now supply full requirements of sugar for at least 3 months, apart from stocks on hand in various stages of distribution.

The big problem would be that of meeting bread-requirements and there would be a definite shortage of butter. This latter problem could be somewhat eased by using margarine stocks, which are fairly large, to supplement butter-supplies. Stocks of wheat and flour in the hands of the big milling combines and the C.W.S. and in course of distribution total at a conservative estimate, at least 2½ to 3 months' supplies for the whole population, and although home-grown wheat suffices to meet only one-fifth of the needs of the population, this together with stocks on hand from imported supplies would ensure a minimum of 4 and very probably 6 months' full requirements for bread at a conservative estimate. Supplies of fish could also be increased over normal. It is worth remembering that in recent years the fishing industry has suffered like others from artificial surpluses, so that catches have even been deliberately reduced by curtailing fishing activity in an endeavour to maintain prices.

It is clear, therefore, that the situation would in no sense be desperate. Under control to prevent waste and ration consumption there would be sufficient food to maintain the population of socialist Britain without danger of acute difficulties for at least 6 months, and probably longer, even on the extreme assumption



that import of wheat (e.g. from Russia) or dairy produce from Denmark was *totally* impossible.

Side by side with emergency measures to control and distribute food supplies in case of need, a Soviet Government would need to take very adequate and decisive steps to increase the productivity of the soil, capable of results within a space of less than 12 months.

**How Food Production could be Intensified**

During the war of 1914-18, the ability of the State to increase the production of home-grown foodstuffs was handicapped by a shortage of labour which became increasingly acute. Private interests also played a very considerable part in preventing full use being made of every acre of land suitable for food cultivation. A Soviet Government would face a totally different situation in these respects.

The acreage under wheat could be extended considerably for one emergency crop at least, for it has been proved that crop-rotation is not essential on all soils, and in fact soils sown for wheat in the year previous could quite well in a temporary emergency be put under wheat again; and, given proper fertilizers and adequate cultivation, a good crop would be assured. In 1935 the wheat acreage was 1,770,000 acres, and total acreage under cereal crops 4 millions, 2½ million acres under clover and rotational grasses or fallow, and 800,000 under barley (much of this used for brewing purposes). There is no reason whatever why at the very least 3½ million acres could not be sown with wheat, and this would assure the country sufficient supplies to meet its needs for at least 5 or 6 months. (The wheat acreage for 1918 was over 2½ million and total cereal crops 7 million acres.)

Acreage under potatoes could also be largely extended, for a doubled acreage would only mean bringing another half million acres under this crop. With 5½ million acres of rough grazing in England and Wales and 8 million more in Scotland, there is no doubt that at least a percentage of this could be brought into cultivation, in order to meet increased demands for land for crops.

Conditions have radically changed even in the last few years so far as possibilities in the direction of intensifying cultivation are concerned, as a consequence of the work carried out by agricultural scientists and developments in respect to mechanized farming and cultivation.

Considerable areas of the land, some 14 million acres, now described as "rough grazing," and of small value for food production, could, in an emergency, be quickly brought into better condition, and would add to the acreage available for growing foodstuffs, and more especially increase the amount of good grassland needed for increasing the number of sheep and, to a less extent, cattle also. Professor Stapledon of Aberystwyth University, an authority of international standing on this subject, has proved that this can be done with land rising up to 2,000 feet above sea level, by ridding it of existing vegetation and breaking up the soil, sowing a suitable mixture of grass and clover seed and applying appropriate fertilizers. Large-scale operations of this kind would, within a few months, result in adding a fair extent of good pastureland to existing grazing resources. There is no lack of means for carrying out such work effectively. Agricultural engineers have developed machines like the rotary tiller which grubs up furze, stubble, and heather, etc. by the roots and prepares the most difficult land for cultivation. The track-layer tractor enables implements to be used for breaking up and cultivating land quickly and efficiently and in a way previously impossible except by steam-cable ploughing, over which the tractor has big advantages.

On deep soil the utilization of the gyro-tiller has shown that rough grassland can be broken up and prepared rapidly and with a minimum of labour, to become highly productive for cropping. An instance of this was published in the *Farmer's Weekly* recently from a correspondent who said:

"Gyro-tilling was tried last year with good results, a 28 acre field of old poor pasture had never yielded to treatment in the form of heavy dressings of dung and artificials. This was tilled in the spring of 1934 and, with no manures of any sort, produced a good crop of oats on part of it, and six tons of potatoes to the acre on the remainder."

Cultivating machinery gives tremendous possibilities for increasing the yield of the soil, while many problems arising from prospects of unseasonable weather, etc., can now be largely discounted. The speed of drilling and sowing by tractor enables a job to be carried out in one day, which the incidence of bad weather might delay over a period of three or four weeks were only horse-drawn implements used. One or two fine days for harvesting is sufficient, with the use of up-to-date machinery, to enable the whole process to be completed and the grain in sacks

ready for the miller. The danger of storms and wet delaying operations and causing damage is very much reduced. Hay can be harvested and stacked in a quarter or less of the time that was necessary only a few years ago, and the newly devised processes for cutting and drying grass by machinery have greatly increased potential production of high-quality fodder.

Although it is true to say that the amount of food grown on British soil could be doubled and probably ultimately trebled, as well as improved in quality, no attempts would be made (after the problems of the transition were passed) to achieve so-called "national self-sufficiency" in this direction.

**The Development of Agricultural Production** The variations in climatic conditions and of the qualities of the soil in the different parts of the country would naturally be taken into consideration with the object of making the best use of them for producing crops or raising stock under the most suitable economic conditions. Fascist "autarky," in other words, would have no place in a socialist world.

It would probably be uneconomic for instance to attempt the clearance for cultivation, on any wide scale, of semi-moorland, or even of much of the land characterized as rough grazing. The better cultivation of the best soil at lower levels, more favourably situated, would ensure increased returns which would considerably outweigh other considerations, although there is a certain amount of land of good quality which, through neglect, has gone back to rough grazing. Such land as this could be reclaimed and brought under cultivation again.

Agricultural produce which can be more easily and cheaply grown abroad would be imported in preference to endeavours to cultivate it at home. For example, wheat production could be intensified to some extent, and perhaps the acreage under wheat and cereal crops increased a little, but it would be impossible as well as irrational to grow sufficient wheat to feed the population of this country out of home supplies. Attention, rather, would need to be concentrated on increasing and improving the output of high-quality milk and dairy produce, developing fruit and vegetable production, and the output of beef, mutton, etc. In each of these sections of agriculture the advantage of home-grown foodstuffs over imported is considerable at least in certain areas, and existing supplies are much below the requirements of the population.

This need not imply a further reduction of the arable land. In fact it is quite likely that arable acreage would increase as more intensive and extensive cultivation is made possible by the establishment of large-scale State farms and the parallel development of co-operative farming among small farmers on a gradually increasing scale.

The large capitalist farms it would be necessary to convert into State farms as the property of the people, administered by the workpeople employed on them through the institution of Farm Soviets. Farms in this **Large-Scale State Farms** category are a small minority of the total, comprising some 46,000 of the 290,000 holdings.

But although a numerical minority, they account for approximately 51 per cent of the land under cultivation and would thus play a major role in developing food production, enabling it to be planned and controlled in accordance with national needs, and specializing in particular types of crops, breeding of thoroughbred stock, etc. Wherever possible they would be reorganized or amalgamated in order to enable the farm unit to include some thousands of acres, under central management, but with separate departments responsible for special attention to livestock, arable cultivation, machinery, etc. Such a unification of large acreages would enable mechanization to be made 100 per cent effective, and allow of more intensive and profitable cultivation.

The State farms could, however, be much more than agricultural factories utilizing the most up-to-date and efficient farming methods. They could co-operate with agricultural colleges and universities for experimental and practical training purposes, enabling selected farm-workers to qualify for administrative and technical positions, and encouraging and assisting working farmers and smallholders who preferred to continue to work their own holdings individually.

The advantages of this system of conducting agriculture would be considerable. Agricultural research would be encouraged to the utmost in order to secure heavier and better-quality crops, improved types of vegetables and livestock, and eliminate plant diseases, weeds and insect pests. Better attention to the requirements of the soil in the direction of lime and manures, natural and artificial, would considerably increase output and eliminate much waste. The extension of these operations to other holdings would follow as a matter of course.

Agricultural science is stifled and stultified by the limitations imposed on the industry under capitalism. Freed from these and welcomed by the Soviet Power as valued assistants in building the new social order, large numbers of scientists would for the first time be able to give their ability and knowledge full scope.

Probably the greatest change made possible by the establishment of State farms on the lines indicated is the extension and improvement of mechanized cultivation on a **Mechanization** wide and thorough-going scale. The obstacles to effective mechanization of farming under private land-ownership have already been referred to; but it is worth quoting again from C. S. Orwin on this point: "The problem of the boundaries of estates in private ownership raises at once the whole question of rights of property, and this issue must be faced. It is obvious that the economic use of the land is independent of anything so artificial as the boundaries of a private estate, particularly where mechanization on a factory scale is indicated."<sup>1</sup>

The abolition of these "artificial boundaries" and the organization of large-scale Soviet farms would thus clear the way for considerable developments in the direction of mechanized cultivation, with all that it offers for increasing output, minimizing losses due to unfavourable weather conditions, and above all the release of those who work on the land from a major proportion of the age-long enslavement to nature which the cultivation of the soil has traditionally demanded.

The variety of types of tractors now available for cultivation purposes is very considerable. Sizes range from small-powered machines to powerful crawler-types capable of exerting a tremendous pulling power. Tractors fitted with wide-rimmed steel wheels, pneumatic tyres and caterpillar treads lend themselves, each according to its type, to the most varied tasks on the land. Improvements in the direction of adapting various cultivating-instruments for use with tractors have led to remarkable developments in this respect. Binders have been fitted with ball-bearings and roller chains, and the power-drive introduced. Compared with the horse-drawn binder which cuts a width of 5 or 6 feet and requires three good horses working about 5 hours a day and can ordinarily cut about 10 to 12 acres daily, the tractor enables a cut 8 feet in width to be made, the rate of travel is faster, and about 25 acres a day can easily be dealt with.

<sup>1</sup> *Future of Farming*, p. 127.

A 20-h.p. tractor in moderate soil will plough an acre per hour against a man and two horses ploughing one acre a day. The same tractor can pull three 8-foot drills and sow 50 acres a day with the same amount of labour as 3 or 4 horses in one drill sowing 8 to 10 acres per day. It takes 10 men to thresh grain from the rick with a 100 sacks as their average day's work, but a 10-foot Combine Harvester can cut and thresh 300 4-bushel sacks in a day with only 3 men needed. The giant gyro-tiller breaks up the soil to a depth of 20 inches. It ploughs, rolls and heavy-harrows the soil in one operation. An example of the value of the gyro-tiller is given from an experience in the great potato-growing area around Spalding, Lincs. During the past two seasons this machine has been used to break up an extensive area of virgin land. Remarkably good crops of potatoes have resulted. The beet sugar crop has also benefited considerably by the introduction of the gyro-tiller.

Beet-lifting by means of a tractor drawing a specially adapted lifter was recently demonstrated to be capable of dealing with  $1\frac{1}{4}$  acres an hour at a cost of 2s. 6d. per acre. In the hay-field hay-loaders are coming increasingly into use. The hay sweep, used in combination with an old motor-car, is everywhere being operated. Stacking machinery is similarly becoming quite common in the farmyard. Machinery for short grass and fodder-crop drying has also been evolved. This is an extremely important advance in farming technique as the crop is a valuable one. The grass is mowed and conveyed directly into rubber-tyred trailers with tractor haulage for the complete outfit; it is then dried and finds a ready market as meal or in bales.

At a demonstration of farm machinery at Carsholt recently a tractor was shown capable of running a plough without human guidance, a robot-planter for planting purposes, a tractor drawing two four-furrow ploughs and a tractor with a three-row moulding-plough for potato-growing. The mechanization of dairy-farming has made especially big strides in recent years. Milking by machinery is now a feature on almost every farm of any size, and the introduction of a movable milking-apparatus for use in the open air has led to big developments in this respect also. Scientists have enabled improved results to be achieved in the breeding of cows so as to increase milk-yield; and this, together with the developments of special feeding and care of cows and heifers in milk, has led to a considerable increase in the production of milk per cow, and correspondingly of the total output of milk

throughout the industry. The average production per cow in milk in 1925 was 416 gallons per annum, in 1931 it had risen to 462 gallons, and has increased still further since that time.

On the large State farms it would be possible to achieve increased output with a smaller expenditure of labour, enabling working hours to be reduced to seven, or probably even six per day, and ultimately to less. The worker need not be displaced by the labour-saving machine; instead his hours of labour would be shortened. The increased wealth resulting from an increased production as a consequence of better cultivation would be a factor enabling the land-workers' standard of life to be maintained on a level as high as that achieved in other industries, and to rise with increasing output. Free medical service, a fortnight's holiday annually with full pay, and maintenance benefit while sick would be other necessary benefits to be introduced.

The question of maintaining the daily routine of the farm could be solved on the basis of a rota or shift system for the staff, allowing also for every worker to have at least one free day per week. Problems of extra seasonal work, in so far as they cannot be dealt with by existing staffs, could be met by the organization of work on a regional basis. In any case there would be no great difficulty encountered in meeting such calls for additional labour by organizing all the labour available as and when it might be required.

Most small farms and a number of medium-sized farms, particularly those held by working-farmers, are handicapped by being inconveniently laid out and badly equipped both in the case of the farmhouse and more particularly the outbuildings, etc. Fields are often small, awkwardly shaped for cultivation, and arbitrarily designed to meet old property-boundaries, etc. Farm roads are frequently narrow and ill-made; not adapted to easy use by modern machinery and transport. Inefficient fencing, over-grown hedges and small copses (the latter generally preserved by the landlord to serve as cover for foxes) are the cause of much land being wasted and also add to the labour necessary on the farm.

A Soviet Government would need to make itself responsible for improving the equipment of such farms, repairing farm buildings and putting up new ones where necessary. It would need to carry out field-drainage operations on those farms (a

large proportion of the total) where it is badly needed. Cheap electric power could be made available on every farm, for use in carrying out the hundred-and-one operations connected with farm work, and as a source of illumination for farm buildings, cowsheds, etc. New roads could be made, and existing roads repaired and widened; wasteful hedging could be grubbed up, and fencing replaced or repaired.

In some cases, adjoining holdings would require to be merged together, awkwardly laid-out fields re-shaped. Such work as this is vitally necessary to enable the agricultural industry to play an effective part in the economy of the country, but it would have to be planned on a national scale and carried out on a regional basis, taking districts as a whole. This would mean that some little time would be needed for a special survey to be made, and plans drawn up. To assist and encourage the working farmers, co-operatives for the joint purchase and use of seed, fertilizers, machinery and cultivating-implements, as well as for the purpose of disposing of their produce, would presumably play an important role. The centralization of groups of farms best suited to form a co-operative group in an area would also facilitate economies and improvements being introduced in the form of co-operatively owned transport, etc., for meeting the requirements of the farmers concerned. Combined with this the greatest degree of freedom of initiative of the individual farmers could continue so far as the working of their own holdings was concerned.

The same general approach to the problems of smallholders would be made as that outlined for the working farmer cultivating his own farm. The need for co-operative organization among smallholders is if anything even greater than for the small farmer. Co-operation is of course nothing new for the smallholder. Its history goes back many years, and has been on the whole a record of very limited success. This is not only due to the opposition of dealers and the competitive advantages of large commercial farms: it is mainly due to the whole anarchic condition of the agricultural industry. For most sections of cultivation co-operative purchase of working-implements, seed, manures, etc. are insufficient. Even when supplemented by co-operative marketing of produce, the smallholders are still handicapped by the excessive individualism of their methods of work.

The fork and horse-drawn plough must give place to the tractor; transport must be centralized. Large-scale cultivation of



wide areas is the only economic method. Hence co-operation would need ultimately to be extended to include collective working of the combined smallholdings, with a pooling of land, cultivating-machinery and produce, under the democratic control of the smallholders concerned. It is this form of co-operation which the Soviet Government would aim at achieving and developing. A socialist country could not be content with backward and less productive methods of work, which would lower the standard of life of those concerned. But there would be no arbitrary attempts made to coerce smallholders in this regard. Rather would they be shown by example and in practice, from the experience of State farms, how great the benefits of collective farming or cultivation could be to individual cultivators. Hours of labour could be reduced with an increased output and improved quality, the major part of the proceeds going to the smallholders concerned and thus raising their standard of life both economically, from the point of view of lightened labour, and also culturally.

Accompanying the foregoing policy of reorganization, a programme of land drainage and reclamation, and the development of afforestation on land unsuited to

**Land Drainage, Reclamation and Afforestation** cultivation would need to have its place. According to the *Report of the Royal Commission on Land Drainage* in 1927, land to the extent of 1,750,000 acres in England and

Wales alone was in immediate need of drainage. Included in the total estimate was some 200,000 acres of land completely flooded and useless, which if drained would be available for cultivation. Large stretches of coastal land, along the East Anglian coast for example, can be reclaimed and made fertile and crops suitable for cultivation on this light soil developed. These various measures could in the period of two or three years or so bring at least a quarter of a million acres of land under cultivation, and very considerably increase the productive capacity of another 1½ million acres.

Afforestation is a highly important question in view of the large areas of land which, although unsuited to cultivation, are capable of growing very valuable timber, but which remain undeveloped. Estimates of experts differ regarding the extent of land available for afforestation purposes, but the lowest estimate places it at 3 million acres. Some authorities go as high as

7 million acres, and there is no doubt whatever that an afforestation plan would enable large areas of land to be planted with timber. A Soviet Government would be particularly concerned to preserve the beauty of the countryside while carrying through plans for the regeneration of agriculture. Private property preserves many parklands only for the eyes of the few. Such amenities as these, including the beauty spots already preserved for public use, would doubtless be maintained and used in the manner most suited to the requirements of the people—as holiday homes and recuperative centres for working men and women, or in certain cases as workers' colleges for scientific and technical research.

What advantages would the political and economic measures which have been outlined bring to British agriculture in increased production and improved quality of produce?

**How Socialist Agriculture Could Develop** It should be understood that there are few farms in this country which, under existing conditions, are capable of being effectively mechanized, and in any case the results of their operations are not available in any detailed or statistical form. It is possible however, to give instances based on the results achieved on farms whose large size and modern methods give an approximation to the conditions aimed at for socialist State farms. These, together with the general description already given of the various advantages of mechanized processes, will enable us to appreciate the big advance which State farms and co-operative cultivation could make possible.

An account was published a short time ago of what was done on two adjacent farms under single management, near Stamford, having a total acreage of 560. This account went as follows:

"The arable land was in bad condition and full of couch. Hedges were so high and spreading that several yards of land on either side were lost to cultivation. In many cases drains were decayed and useless, and considerable areas of land were water-logged.

A great deal of reclamation work was therefore necessary in the first few years. (Details of replacement of hedges by fencing, increasing the size of fields, etc. are then given.)

"Practically all the permanent improvements were carried out by the farm staff, and *all were paid for out of the profits made by the farm.*

"Yields of crops increased during this period, especially the

crops grown for stock; the output was considerably increased despite a falling price level; more men were employed, and the time required to turn over capital was reduced from over 25 months to 14½ months. . . . Tractors are used for all land work, and a motor lorry for all road-transport work. Haymaking also is fully mechanised. . . .

“When Mr. — started farming prices were high. Nevertheless his receipts per acre are now £16 against £6 in 1917–8; wages are now £4 per acre against £2 14s., yet the output per man has increased from £103 to £417. . . .”

In an article describing the experience gained from the use of Combine Harvesters during 1935 (N.B.—only sixty of these machines were then in use in the whole country), Mr. Newman of Oxford is quoted as having reported several cases of 100 quarters (22½ tons) of grain being harvested in a single day by these machines, and in one instance no fewer than 485 acres were dealt with by a single machine. Mr. G. H. Neville, speaking at the Harper-Adams Power Conference in 1934, stated that with the ordinary methods of harvesting corn the cost per acre might be put down at 35s. to 40s. With a Combine Harvester the cost should not exceed 18s., or approximately half. But the Combine Harvester can only be used effectively on exceptionally large farms. One further example, which appeared in the Press in November of 1935: a farmer in Honington “last week prepared and sowed a 24-acre field with wheat all in one day. He used a tractor to which was harnessed a set of disc harrows, ordinary harrows, seed drill and light harrows. Only two men were employed. One drove the tractor and the other attended to the drill.”

Turning to the question of fodder crops, recent experiments in the direction of improving the quality of grassland and making better use of grass for fodder have proved that large-scale methods in this important sphere of farming have the guarantee of amazingly good results. In the course of a report issued a few weeks ago the Agricultural Research Council stated that it has been shown that grass cut at monthly intervals has an energy value comparable to that of oats and a protein value somewhat higher than that of dried brewers' grains and rather lower than that of undecorticated cotton cake. Thus, while young pasture grass is capable of supporting a milk production of five or six gallons per cow per day, a good hay will only support a production of about two gallons. Professor Hanley, an authority on this subject, has expressed the opinion that estimates to the effect that the

productivity of grassland could be doubled are conservative; but it is worth noting that he based his calculations on acreages running from 200 acres and upwards.

It seems not unreasonable to claim that the various measures which have already been described (such as the reclamation of good land which through neglect has gone back to rough grazing, bigger farm units and consequent intensified cultivation, improvements in the quality of grassland by the application of up-to-date methods of cropping and fertilizing, plus better farm equipment, adequate supplies of water for stock, etc.) *should make it possible to double the productivity of the industry in the course of six or seven years or so.*

In terms of milk production, even this increase would be no more than adequate to meet the requirements of the population in the increased consumption of liquid milk necessary for health.

A further increase in the number of dairy cattle would still be necessary, and any margin over and above liquid milk requirements could be used for the manufacture of more butter, cheese and cream. But the ability of the Irish, Australian, New Zealand and Danish farmers to supply good-quality butter and cheese cheaply and easily for consumption in Britain would by no means be regarded as a misfortune for the people or for the agricultural industry of this country. On the contrary such supplies could be used to supplement those from home sources as a contribution towards improving the standards of life of the mass of the people. This would also apply to the importation of bacon from Ireland and Denmark. The increased consumption of liquid milk, as distinct from applying increased output to the manufacture of a greater quantity of butter and cheese, would militate against the large-scale breeding of pigs, which Danish farming is able to conduct cheaply, because of its specialized character. So long as bacon can be more economically imported from abroad than it can be fed and cured in this country, a Soviet Government would see no advantage in attempts to restrict imports in order to replace them by goods less economically produced at home. But this would not imply a policy of going to the opposite extreme and discouraging pig-breeding in Britain. As a matter of fact, mechanized farming of arable land would allow of the development of pig-breeding on many State farms, as incidental to their general operations, quite economically; and this could be done where occasion warranted it.

Certain improvements made possible as a result of the clearance of some portion of the land now of a semi-moorland character, together with the better utilization of existing possibilities for improving the quality of land used mainly for grazing sheep, would enable the number of sheep in this country to be increased considerably. But so long as Australia and New Zealand can supply high-quality mutton for the British market, there would be no good reason for exceptional measures being taken merely in order to achieve a doubling or trebling of the number of sheep as an end in itself.

So far as the production of vegetables for human consumption is concerned, large-scale cultivation, on the basis of using special farms for this purpose as well as the development of collective cultivation of smallholdings, could undoubtedly increase output enormously so far as the coarse vegetables such as cabbage, peas, sprouts, etc. are concerned. More intensive methods of cultivation of finer crops along the lines which experts such as Mr. Secrett advocate, as his experience and that of others has proved, could add very considerably to production. The direct gains resulting from large-scale farming and better cultivation would be augmented by the indirect economies secured from the greater centralization of transport and distribution.

There would be little point in attempting to reduce these estimated increases to figures; but it is of interest to compare them in general terms with the present output of the industry, and to arrive at an approximation of what socialist agriculture could achieve in terms of increased values. Agricultural production for 1935 is estimated at some £220—£230 million. Of this total, milk alone represents 25 per cent of the whole, and butter, cheese, etc., another 4 per cent. To succeed in doubling the value of this section of agriculture would mean achieving an output of some £120 million in value. Beef output to-day accounts for about 15 per cent of the total value of agricultural production, or some £30 million. It should be easily possible to increase this to £50 million under a Workers' Government, or, alternatively, to increase dairy-farming output still further. Farm crops of various kinds, mainly for cattle-feeding purposes, plus sugar beet, are valued at about £18 million. This figure could probably be raised to at least £30 million by the methods which State farming could introduce. Vegetables for human consumption realize some £8 million under existing conditions. This output could also be very considerably increased.

Under these heads alone agricultural output could increase in value by at least £100 million, while greater efficiency and the reduction of unnecessary waste would add to this amount; making the total value of output (at present prices) somewhere in the neighbourhood of £320 million. The costs of administration, wages, and farming operations generally would all be largely increased also. To double wages and reduce hours would increase the cost of this item alone up to approximately £120 million. The cost of farming operations would probably be in the region of £150 million, allowing for greater intensity of operations, use of fertilizers, etc., etc. (In 1935 this charge would amount to about £70—£80 million at the outside.) These two items of expenditure, the main ones, would therefore be likely to total about £270 million. But this is a generous estimate, put at a deliberately high figure.

Contrasted with restriction-policies and decay of agriculture in the rest of the world, we see large-scale cultivation, combined with electrification, mechanization and science, enabling the Russian workers to develop their agriculture until it leads the world. While Britain has 60 Combine Harvesters, U.S.S.R. intends to have 60,000 of them in operation next year. The Soviet Union in 1935 set itself the task of increasing its agricultural output by 16 per cent and succeeded in achieving this task. In the case of dairy-farming alone, to which it might be thought, perhaps, that Soviet methods were the least adapted, the following testimony is significant. In the course of a letter which appeared in the *Farmers' Weekly* of 30 August, 1935, dealing with issues under discussion among British farmers at that time, Mr. G. Sutherland Thompson of Kenmore Farm, Chesham, Bucks, said:

“As dairy adviser and consultant to the U.S.S.R. and other governments, I have all along taken a stand against the farm-separator. *I have no hesitation in saying that in a few years the dairying industry in Russia will be the most up to date and the biggest in the world.*”

Meantime we read that the Danish Board of Agriculture has decided that 40,000 sows shall be slaughtered in order to reduce the surplus of pigs! It is not economic measures alone, but emancipation from propertied interests, which opens the path to prosperity for agriculture and the countryside.

Soviet agriculture would not only mean increased wages and shorter hours. Of equal importance is the fact that all the sources of higher education and specialized training would be freely open for the first time to the workers on the land. The farm-worker of to-day cannot hope to meet the cost of a course at an agricultural college or at a university. The very lowest charges for such courses involve an expense running into well over a hundred pounds, and a three- or four-year course at a university is quite out of the question. It is true, of course, that scholarships are open to the children of farm or land-workers; but poverty still remains an almost impassable barrier to the taking of such courses.

**Education,  
Culture and  
Social Life**

A Workers' Government would require many thousands of experienced men and women, drawn from the land, who with some technical training would be able to undertake administrative positions on State farms, etc. It would have to take steps to ensure a general and considerable raising of the educational level of the workers in the industry in order to make certain that the fullest advantages accrued from the development of more scientific methods of cultivation. Full and free facilities for specialist courses at agricultural colleges and at the universities would therefore need to be made available to the farm-workers, small farmers and smallholders desirous of taking them, as well as for the working-class youth in the villages, who would be given the greatest assistance to fit themselves for scientific research and agricultural engineering as well as administrative posts. For not only would this country and its industries belong to the working people, but the responsibility for controlling and developing them; and the Government would need the services of every scientist, engineer or technician for carrying out its policy. But the existing barriers to the advancement of the agricultural worker and his family in the industry would be destroyed.

Equally necessary is a policy which, in a very few years, would transform the social life of the people in the villages and farm cottages. There are slums to be found in the rural areas which are quite as bad as any in the towns. Numbers of cottages are dark, mean, inconvenient and unhealthy; they lack proper sanitary conveniences, frequently even piped-water supplies are absent. In many villages and farm cottages the only source of light is by means of oil-lamps. Neither gas nor electricity is

available. There are few free library facilities; halls or rooms for meetings are under the control of the parson or squire. Such backward social conditions would hinder the development of agriculture in the scientific and technical sphere; and for this reason, quite apart from other considerations, the Workers' Government would have to carry through measures for abolishing the slums, and replacing them with new houses, larger, having up-to-date sanitation, piped-water supplies, electric light, etc. Special steps would be needed also to provide cottages for the workers and their families employed on the State farms. Houses for them would have to be built either on the farm itself or within easy reach of it, and provision for recreation and educational facilities be made for the staffs of the State farms, in the shape of club, library, dramatic and dance halls, etc.

The old dream of rebuilding social life and social centres in the countryside could thus be realized; but in a countryside revived by a new-found social equality and a new sense of community, freed from the stultifying patronage of rector and squire. It would be rebuilt not on the basis of any romantic separation of the village and its life and customs from the town, but on the basis of closer unity with the town and a removal of the dark backwardness of rural areas. The farm would have a new tie with the factory, not only in its technique, but in a sense of a joint dependence: each as specialized parts of the economy of a new and better Britain, in which the needs and welfare of the whole people was paramount instead of as at present the enrichment of the few to the detriment of the many.



# VII

## CHEMICAL INDUSTRY

**C**HEMICAL industry transforms the raw materials of nature into products which may become the working material for other industries or agents in further chemical transformations. Certain products may be final commodities themselves, and are used without undergoing further manufacturing or chemical operations.

There are sometimes alternative natural supplies of a raw material: nitrogen is present, for example, in the air, in coal, in nitrate deposits. Further, the supply of a raw material, in reasonable quantities, may be widespread, as is the case with nitrogen, or it may be highly localized, as with nickel ore. It is immediately obvious that from these factors, the distribution and relative abundance of raw materials, spring problems which demand careful scientific attention for their solution. They are problems which are simultaneously technical, economic and social. Under the present organization of society, with its sharp national and imperialist barriers, the attention which is paid to these questions is the reverse of rational, and the difficulties become aggravated. In the first place, each large imperialist state attempts to grasp as much as it can of an essential raw material. This immediately provides a basis for "national" antagonism and war; it prevents any rational consideration of *where* that raw material might most economically, in the interests of man as a whole, undergo its subsequent chemical operations. Again, if there are, for example, two alternative natural sources as starting-points for the manufacture of a vital chemical product, and a

capitalist country finds itself without one of these, it may develop production on the basis of the other source. Such measures often spring from the attempt to gain national self-sufficiency for war purposes. But their enactment means further dislocation of international trade, followed by economic reprisals and finally war.

Just as there may be alternative *sources* of raw materials, so there are often alternative chemical *processes* for making a chemical product, or one section may make the product as its chief manufacture while the same product may arise as a by-product in the normal working of another section. Here again there is a necessity for careful consideration of the industrial economy and social well-being of the community *as a whole*. Capitalism is bankrupt before such a prospect, because it is unplanned, its decisions are influenced by monopoly and motives of monopoly-profit, and at best it can only operate on the basis of the valuations which the market supplies. It may happen that technically the successful process is the more desirable; but under capitalism a technical advance may mean the dole and the Means Test for working men. Further, in an attempt to save the wreck, the declining industry often starts intensive work to develop a by-product. This may bring it into collision with other sections of industry, and have as its result the usual consequence of severe competition—overlapping, duplication of processes and the worsening of men's conditions of labour. Technically, it may mean the waste of much labour and scientific effort by driving technicians to explore, with misplaced ingenuity, uneconomic methods and processes.

So long as this country is under capitalist control there is good reason for many people to look askance, as they do, at applied science. Scientific invention makes existing processes and methods obsolete. Within the chemical industry itself, the progress of science may mean new technique, new final products, and usually, bound up with these, increase in mechanical operations with consequently reduced labour. Inventions in the chemical industry may have repercussions outside the industry itself. Thus the new plastics and synthetic resins may eventually have serious effects upon the pottery trade. Under capitalism this means yet another derelict area. It is because of such happenings that, under the present system, many people fear new discoveries in chemical industry.

For all of us, however, there is reason to dread a chemical industry under capitalist control. And that is because of its key

position as a war industry. It holds this because it actually manufactures explosives, poison gas, etc. and necessary intermediates for their manufacture, and also because the chemical industry is, more and more, becoming the basis for all industry. In this sense the heavy chemical industry is the centre of a complex network of relationships with practically all phases of industrial activity. A great deal of the present development and orientation of the chemical industry in Britain to-day is due to its importance for war-making. This complicates any survey of the industry and must necessarily be considered. So long as capitalism exists in Britain, chemical industry remains active and willing to aid and abet war preparations.

To-day, control of the British Chemical Industry is concentrated in the directorate of Imperial Chemical Industries, Ltd.

The anatomy of this huge trust, its financial structure, its connections with the banks, its **Monopolization of Chemical Industry** internal ramifications, and some account of its technical operations are given in the pamphlet *I.C.I., Ltd.*, by W. Fox (Martin Lawrence).

The monopolization of the industry was virtually accomplished in 1926 by the fusion of Brunner, Mond & Co., Ltd., Nobels, British Dyestuffs Corporation and the United Alkali Company. These units had themselves, over a number of years, become monopolies in their own particular sphere. The formation of I.C.I., Ltd. was the climax to a lengthy development. Undoubtedly the process was accelerated by the War of 1914-18.

Thus, in the alkali industry, the introduction of the ammonia-soda process by Brunner and Mond in 1872 led to forty-five smaller firms, employing the Leblanc process, amalgamating under the title of the United Alkali Company. This was an early example of rationalization in the chemical industry; and the methods employed by the United Alkali Company to meet their difficulties afford an instructive example of the methods of capitalism when a new invention threatens profits. The United Alkali Company closed down some of their works, concentrating manufacture, and "effected economies." The fate of the displaced workers was of minor interest to a group of capitalists fighting to hold on to their profits. The economies were effected at the expense of the employees lucky enough to be retained.

When Brunner Mond & Co., Ltd. were in their turn affected by a rival method of production of one of their products, viz.,

the electrolytic production of caustic soda by Castner Kellner Co. and Electro-Bleach, Ltd., the older firm bought up the new. While getting the stranglehold on the home market, Brunner Mond & Co. were competing keenly on the world market—the sales organizations known as Brunner Mond (China), Ltd., Brunner Mond (Japan), Ltd., sucked in their profits from the East, while bonds of Empire were knit with Brunner Mond (Canada), Ltd., Brunner Mond (India), Ltd., and agents in Australasia.

In the development of another branch of the industry, dyestuffs, there are features of great interest. This industry started in 1856 when Perkin prepared mauve. For a period of about twenty years the industry developed in this country, but British capitalism was not so farseeing as its lately born and lustier rival in Germany. It was the period when British capitalism was still the dominant figure in world economy. Bigger profit was to be gained from imperialist expansion abroad than from the development of technical education at home. Modern warfare, based as it now is on the mobilization of the whole industry of the country, with special emphasis on the chemical industry, was not an immediate issue for Mr. Disraeli. It was not until 1914 that the results of German attention to science shattered the complacency of British imperialism. Then, as we shall show later, an affection for applied chemistry suddenly blossomed in the hearts of our capitalist rulers. It was the possibilities of destruction latent in applied chemistry that attracted them, rather than any vision of the benefits it might bring to man.

In 1845, Hoffmann came from Germany to the chair of chemistry at the new Royal College of Chemistry. His students and assistants became the pioneers in the developments of coal-tar dyestuffs. The more famous of these were the Englishmen Perkin and Nicholson, and the Germans Caro, Griess and Martius. These men were all working in England about 1850–60, making the discoveries in organic chemistry which were the foundations of the dyestuffs industry. But as we have pointed out above, British capitalism at that time showed little interest in nursing the infant industry; for this required the expenditure of a good deal of money without any *immediate* large profit.<sup>1</sup> It involved building research institutes and providing subsidies for training young organic chemists. No such support was forthcoming, and Hoffmann went back to Germany in 1865, Caro in 1867, Martius about 1870,

<sup>1</sup> Thus synthetic indigo made by Baeyer, in Germany, in 1880, was the result of many years' research, and the expenditure of thousands of pounds.

Witt in 1879. Perkin exploited the advantage of his position in being first in the field, made a personal fortune, then retired in 1874. Nicholson had retired in 1868. From 1860 the initiative passed to Germany, whose capitalists showed much keener interest in applied chemistry and where, consequently, the provisions for training chemists were much in advance of those existing here.

The huge British textile industry found, in consequence, that it could obtain better dyes from Germany. It therefore became an opponent of any large capital assistance to British dyestuffs. For once the initiative had passed to Germany, the resuscitation of the industry here would have required high protective duties and subsidies. Indirectly the textile industry would have to pay for these, because of the increased cost of dyes. Before the War the vested interests of textiles were clearly too strong for this to be carried out. The chief British firms which survived in 1914 were Read Holiday & Sons, Ltd. (which became British Dyes, Ltd. in 1915), Levinsteins, Clayton Aniline Co., and the British Alizarine Co. British Dyes, Ltd. and Levinsteins were the two chief units which were fused into the British Dyestuffs Corporation in 1918.

We have given briefly typical examples of the development of units of the industry up to 1914. What was the technical position? We shall first quote from *History of the British Chemical Industry*, by S. Miall (Benn, 1931). Miall, editor of *The Journal of the Society of Chemical Industry*, prepared this book on the occasion of the fiftieth anniversary of the society. The society was founded by prominent manufacturers in the industry, and its presidents are drawn from leaders of the industry. Miall may thus be considered to speak as one with authority.

Of the heavy chemical industry he says: "The outbreak of war, at the beginning of August 1914, found the chemical manufacturers of this country very ill prepared for such a catastrophe. Messrs. Brunner, Mond & Co. were well equipped and up to date, but the works of the other alkali-makers were in the main thoroughly old fashioned. In the manufacture of sulphuric acid, the works of Spencer, Messel & Chapman were up to date, but the majority of the manufacturers were Victorian in their ideas and equipment."

Such is the picture of the heavy chemical industry in 1914, as portrayed by the historian of the manufacturers themselves. It

is hardly possible to blame the Cabinet if these manufacturers were too Victorian to impress that body with the war importance of chemical industry, and thus extract money from the public funds to renovate their rickety plant. But, as we shall see, their successors have managed these things better in 1935.

Of the dyestuffs industry Miall says: "The majority of the other English firms had just about enough vitality to keep them from putrefaction."<sup>1</sup>

Then came the War. It was the first war where the death-dealing importance of applied chemistry became a vital factor in the struggle. Our rulers bitterly lamented that they had been slow in seeing this beforehand. At the conclusion, with the world made safe for democracy, they immediately took steps to be in better shape for the next holocaust. The chemical magnates, with the profits of 1914-18 in mind, were not unwilling to get ready. Let Miall (loc. cit.) speak for them:

"When the War came to an end and the chemical industry had an opportunity of considering its position, it was found that there was a strong determination that never again should we be so dependent upon foreign countries for essential chemical compounds as we had been in the summer of 1914. . . . The heavy chemical industry was already in a good state, but we were lacking in a supply of synthetic ammonia manufactured here, and in dyestuffs and drugs we were behind the best Continental practice."

The Cabinet of the day promptly took measures to make us really fit for war. A commission was sent to examine the German chemical factories in the occupied area, with the object of picking up as much for nothing as they possibly could from German practice.

The next step was concerned with dyestuffs; that industry which, before it had shown its uses in war, was, we have noted, so neglected and despised. Let us continue the story from the pen of Miall. "Immediately after the War the Government intimated to the British Alizarine Co., that it was essential that it should be in a position to supply not only the needs of Great Britain, but also of the Empire, and that its premises at Silvertown did not appear adequate for this purpose. On the promise of some protection, the company launched out into much larger fields in 1919." Read, Holliday & Sons and Levinsteins had already (1918), at the instigation of the Government, united as the British Dyestuffs Corporation.

<sup>1</sup> He excepts Levinsteins, as it was then called.

Protection was given in plenty, although the textile manufacturers howled, by the Dyestuffs (Import Regulation) Act, which came into force on 15 January, 1921, for a ten-year period. When the question of renewal of this protection came up, we were told: "It" [the dye industry] "was essential for national defence purposes" (Parliamentary Secretary to the Board of Trade in the House of Commons, 18 December, 1933) and Sir Herbert Samuel at the same time added that it was "a great new industry . . . of strategic value to the country." Divested of their Parliamentary cloak, these statements mean that capitalists regard applied chemistry worthy of support when they are convinced of its value in warfare. From the early history of the industry we may assure Sir Herbert that the dyestuffs industry could have been "a great new industry" in this country in the 'nineties.

From dyestuffs we may pass to synthetic nitrogen. A German Chemist, Haber, invented a process whereby the nitrogen of the air could be utilized in the preparation of ammonia and nitric acid. Nitric acid is an essential agent in the preparation of high-explosives. Prior to Haber's discovery the main source of nitrate was the Chile mines. The British naval blockade cut off this source from Germany during the War, and Haber's process was developed there on a large scale. It was thus apparent to our capitalists after the War that the chemist may even outwit a naval blockade. Thinking of him in these terms increased his importance in their eyes tremendously. It was also clear that a home supply of synthetic nitrogen products was vital for the future preservation of British Imperialism. "In this country, also, *the War* showed the imperative necessity of home production of fixed nitrogen," says Col. G. P. Pollitt (J.S.C.I., 1922, p. 291), the man who built Billingham, the present home of the British synthetic nitrogen products. The beginnings of this industry in Britain may be briefly noted. In 1920, Brunner Mond & Co. bought from the Government, through a subsidiary, Synthetic Ammonia and Nitrates, Ltd., a war-time plant erected at Billingham-on-Tees. They issued in 1925 a £2 million debenture issue, carrying interest at 5 per cent per annum. The Government of the day under the Premiership of Mr. Baldwin guaranteed the annual interest and repayment of the whole principal.

In more recent years another deal is arranged. This time it is the question of petrol and light oils. W. Fox (*loc. cit.*) has given an account of this in frank straightforward words:

"Even more clearly a preparation for war is the latest union of

Government and I.C.I. enterprise. The transaction is simple—so awfully simple. The I.C.I., through the Fertilizers and Synthetic Products subsidiary, will build a huge plant at Billingham to extract, by the Bergius hydrogenation process, oil from coal. This plant will cost £2,500,000; it will absorb when complete several millions of coal a year and will produce 100,000 tons of light oils and petrol annually. One thousand miners, estimates the Premier, will find employment. The order for the steel plant will, by the way, help to tide the Vickers' organization over the difficult days of peace. On its part, the British Government guarantees to maintain the existing tax of eightpence a gallon on imported petrol for at least four and a half years and a preference of at least fourpence a gallon on home-produced petrol for possibly ten years.

“Such is the bare outline of the scheme which gives to the I.C.I. such a thumping subsidy from the tax-payer. As the three and a half million tons of petrol which Great Britain imports each year cost about threepence a gallon, the ‘preference’ to the I.C.I. will involve a loss to the revenue of a million a year. In other words, the workers are subscribing a million a year to the I.C.I. so that the combine can produce oil at two and a half times the cost of producing natural oil. Financially, it is ‘a risky speculation which bids fair to be exceedingly costly in the long run.’ (*Economist*, 22 July, 1933.)

“A little deeper. The Bergius process which the I.C.I. is exploiting is owned by a body called the International Hydrogenation Patents Co. of Holland. In this concern the shareholders are most refreshingly divested of all national jealousies. Here is first the I.C.I., secondly the I.G. Dye and Chemical Trust of Germany, third the Royal Dutch-Shell combine and fourth the Standard Oil Co. of New York. In face of such a partnership, who can believe the innocent claim that the object of the I.C.I.'s enterprise is to make Britain independent of the oil combines?

“But neither deep nor obscure, but glaring and manifest is the fact that the object of the I.C.I. hydrogenation plant is to produce petrol for war-time purposes, to guarantee to the British navy and air force their fuel when the Americans cut off the American and Venezuelan supplies, when Japan strikes at the fields of the Dutch East Indies and when a new European combination may threaten that Mediterranean route along which pass Rumanian and Anglo-Persian tankers. Oil for the navy and air force and chemicals for explosives and gases—Billingham has become a keystone in the British system of war.”

Should readers still doubt that war-preparation is the basis of much organization and “planning” in the chemical industry, we may finally quote from the recent pronouncements of Dr. E. F.



Armstrong. Dr. Armstrong is a gold medallist of the Society of Chemical Industry, a very prominent figure in the industry, and is regarded in the higher circles of those who control the destinies of the industry as a progressive mind. He says (J.S.C.I., 5 July, 1935) summing up the past, present and future of chemical industry:

“During the former” [i.e. the pre-War period] “we found ourselves lamentably ill-prepared and were forced at first to improvise and later to build manufacturing plants on a scale never previously realised. . . . During the post-War period it has been for us to take to heart the lessons we had learned; in particular to teach the Government and the people the significance and indispensable importance of a national chemical industry.”

Dr. Armstrong continues:

“It is essential in peace-time that we maintain those chemical industries in active being which in war will furnish the plants and the material and the chemists necessary for war production. This proposition is accepted by the Nation, as witness the Dye-stuffs and Safeguarding Acts.”

There it all comes tumbling out—peace is regarded merely as an interlude to be used for getting into better shape for war. Having thus made it quite clear that the peace-time organization of chemical industry should be in relation to its war uses, Dr. Armstrong amplifies his theme:

“It behoves us to be prepared to make in quantity all those substances which are likely to be required at short notice. The modern mass-production plants cannot be improvised, and though it is possible to build them quickly this only holds true when the constructive material is available with quick delivery. The industry’s ability to expand rapidly to supply war needs will be very important. Even more essential will be the availability of the technical personnel capable of handling the intricate manufacturing problems as well as those emergency problems which must be solved in the shortest possible time.”

It is seen that the experiences of 1914–18 had a profound effect on the orientation of development in the heavy chemical industry. The three major developments have been:

- (a) Growth of the dyestuffs industry.
- (b) Synthetic nitrogen production.
- (c) Oil from coal.

In each case the capitalist State has given considerable financial assistance. In each case, development has been with an eye to future war.

Capitalism, especially monopoly capitalism, does not relate production to mass welfare as does Soviet planning. The chemical industry is sometimes thought to be an exception to this—an example of how modernized, rationalized capitalism can be both efficient and long-sighted. The above account hardly bears out this view. Prior to the War, chemical industry showed, in an accentuated form, the usual defects of capitalism—lack of co-ordination and of long-range policy. Not until its necessity for war purposes was realized did anything approaching efficient modernization take place, by means of special encouragement by the State. In the chemical industry the appalling paradox of capitalism becomes manifest: it is only efficient when its production is harnessed, not to social welfare, but to destruction. This efficiency furthermore is necessarily limited by the restricted aim. We find that capitalist leaders envisage the future of the industry in terms of war preparation. As the danger of another imperialist slaughter becomes more apparent, all pretence of science being applied for the welfare of man is dropped, and in horribly naked terms we hear capitalist spokesmen point the only direction their system now offers.

We have indicated how the chemical industry, with its pre-War small and often extremely inefficient units, has been fused into a gigantic monopoly. By the final welding of this trust the fate of applied chemistry in this country, the fate of technicians, the fate of thousands of workers and, to an alarming extent, the fate of world peace, are in the hands of a financial oligarchy.

The three main technical directions of development in the industry, as we have seen, have been those where the capitalist State has identified its interests with those of the monopoly. The monopoly itself spares no effort in impressing the State executive with its importance for "national defence," but at the same time has financial interests in, and agreements about patents, marketing, etc., with similar monopolies in other capitalist States. Thus I.C.I. Ltd. makes profit out of selling to foreign countries high explosives and the materials for making poison gas, while at the same time it actually has at the present time (August 1935) a representative sitting on a Government Committee of experts from the War Office, Admiralty and Home Office, which is considering the purchase of bleaching-powder as a decontaminator for air-raid

gas attacks. This representative has a considerable voice in saying what the specification shall be for bleaching-powder supplied—and I.C.I. Ltd. then make further profit out of selling the commodity. Material for the “enemy,” material for “national defence” against the material supplied to the “enemy”: thus is the pleasant game of profit-making carried to its logical end.

At this point we may digress for a moment to consider the question of State control of the chemical industry—or “socialization” in the sense that that term is understood by certain of the reformist leaders. We must consider this point, because many progressive and sincere people, appalled by the international arms racket, are advocating State control or ownership of the chemical industry.<sup>1</sup> If the industry became State-owned, in the sense that the Post Office is, for example, while the main structure of the State remained capitalist, it would not mean that applied chemistry would be emancipated from its present perverted role as agent in war preparation for capitalist ends. For, as we have pointed out, the capitalist State executive *itself* makes full use of the existing monopoly for war preparation. It is not likely that a different orientation would be given to the industry if Sir Harry McGowan ceased to be chairman of I.C.I. Ltd. and became instead Minister of Chemicals, with the industry turned into a State department. There can be no effective socialization of chemical industry until the capitalist system is overthrown, until the State ceases to be the organized executive of the profit-makers.

Chemical industry is based on applied science. With monopolization there appears the possibility of the very basis of the industry being thwarted. This point of view needs considerable emphasis, for there is a widespread impression that exactly the contrary is true—that rationalization means a fuller and more intensified development of science. This belief is fostered by captains of industry, who talk of increased efficiency and create the impression that increased efficiency means, *ipso facto*, that there is greater cherishing of science and scientific methods. To the layman, seeing the growth of applied science as it is even under capitalism, it may appear nonsensical to suggest that its *development* is being hindered, even though he may agree that capitalism perverts its discoveries. But the layman sees only the very remark-

<sup>1</sup> See for example the case presented by the Union of Democratic Control before the Royal Commission on the Private Trade in Arms. Part of this evidence is given in an excellent pamphlet by the U.D.C. entitled *Poison Gas*.

able actual achievements. He is often unaware of latent possibilities.<sup>1</sup>

Scientific discoveries are frequently revolutionizing. A discovery does not always mean that further improvements to existing methods or processes may be carried out, although of course many advances of this type are made. But from time to time a discovery is made which makes existing methods obsolete. This has happened in the past and from the very nature of scientific method it will happen in the future. As examples of revolutionizing discoveries we may cite the McArthur Forrest cyanide process for the extraction of gold, which changed the whole scope of gold-mining; and Haber's fixation of atmospheric nitrogen. The monopolization of chemical industry is, in effect, an insurance against revolutionary scientific discovery. For if the industry is monopolized, with practically complete control of research, and if it is closely linked to the banks and sources of credit, it can dictate whether scientific discoveries shall be applied on an industrial scale or not. The decision on this point will not depend on whether the discovery will bring welfare to mankind or not, but on purely financial arguments. Thus the monopoly can ignore discoveries inside its own organization, or it may purposely omit to follow up certain lines which might have very disturbing possibilities. If discoveries are made outside the organization, control of credit can prevent their industrial realization.<sup>2</sup> There remains the possibility that a rival nationalistic monopoly or allied combine may discover something unpleasant. The insurance of the monopoly is extended to meet this possibility by arranging patent-agreements with the main international rivals. Such agreements are usually described as measures to prevent cut-throat competition; it would be considerably more to the point to describe them as the throttling of science.

It is not possible for us to state to what extent this direct sabotaging of research actually occurs, because the inner secrets of I.C.I. Ltd. are unknown to us. On the whole it is probable

<sup>1</sup> For a description of the embarrassment of science under capitalism see *The Frustration of Science*, Allen & Unwin, particularly, in connection with chemical industry, the article by J. D. Bernal.

<sup>2</sup> In this connection we have the interesting statement of Dr. Armstrong (loc. cit.) that developments are often hindered because of the extortionate interest charges made by what he calls "financiers" for loans required to bring a laboratory discovery to technical realization. It is a pity that Dr. Armstrong fails to see that the control of the whole of the chemical industry of this country is in the hands of "financiers."

that the development of science is not hindered so much by direct frustration as by the limited aims of research and development under the monopoly. I.C.I. research, in the main, is concerned with improvements in existing I.C.I. processes, in maintaining the quality of existing products.

The relations between the coal industry and the chemical industry in Britain to-day furnish examples of the disunity and inefficiency of production under capitalism. In coal, nature has supplied us with a storehouse of chemical wealth. Capitalism squanders this legacy and fails to provide any sort of planned relations between the coal industry and chemical industry. It has paid little or no attention to the scientific utilization of the chemical wealth of coal. In this respect the capitalists of Britain have shown as criminally wasteful an attitude to Nature's bounty as the capitalists elsewhere who burnt wheat and coffee. There has been no attempt<sup>1</sup> to elucidate the fundamental chemical nature of coal, a fact which is astonishing when one considers the importance of the coal industry in Britain's economic life.

But not only has British capitalism been cruelly neglectful in its waste of *potential* chemical wealth—it has even failed to make the most elementary provisions to ensure that under the present wasteful conditions there is some forethought for the future. Thus, the supply of good coking coal in Great Britain is known to be quite limited; one might reasonably assume, therefore, that it should be carefully conserved for the use of the steel industry's coke ovens, where good coke is very necessary. Yet we find that such elementary planning as that involves is beyond British capitalism. Best coking coal is sold indiscriminately; actually a large percentage of it goes to the great London gas-works.

In the coke-oven industry itself we find British capitalism handicapping the efforts of technicians to improve quality, as the following statement (from the *Annual Report of the Progress of Applied Chemistry*, 1933) shows:

"The research organizations dealing with the coke-oven industries are devoting their whole energies to improving the quality of coke produced. It seems a pity that their efforts cannot, on account of economic conditions, be assisted by the erection of more modern plants. Many of the older batteries can never produce coke of the highest metallurgical qualities, since they can never be uniformly heated, however great the care taken by the operating staff."

<sup>1</sup> On the importance of this question, and its neglect, cf. Sir Frank Smith's Address at the Rly. Society of Arts, 13 December, 1935.

An example of waste, due to the lack of planned relations between chemical industry and the coal industry, is afforded by the conditions of ammonium sulphate production. Coke ovens and gas works produce ammonia liquor as a by-product. From this, ammonium sulphate, the agricultural fertilizer, is easily prepared. Before war preparations led to the subsidizing by the State of the synthetic nitrogen products plant erected by I.C.I. at Billingham, the gas and coke-oven firms did in fact transform their ammonia into sulphate and sell it for fertilizer. The Billingham plant now produces ammonia derivatives on a huge scale, and the coke-oven firms despairingly run off their ammonia liquor to waste. This spectacle provokes a rebuke from the Chief Inspector of Alkali Works (*Report*, 1933): "The manufacture of sulphate is a more economical method of disposing of ammonia liquor than the wasteful methods so much in vogue." With reference to gas works he adds: "The low value of ammonia has tempted some gas works managers to allow a greater slip of ammonia past the washers."

The effect of this delinquency is the accumulation of ammonium salts in the spent oxide. The spent oxide is subsequently sold to sulphuric acid manufacturers, and the presence of ammonium salts is very deleterious for the manufacture of sulphuric acid. Thus waste in one section of the industry leads to inefficiency in another.

The man who brought I.C.I. into being, Sir Alfred Mond (Lord Melchett), was the foremost exponent in this country of class collaboration in industry. It is perhaps significant that this policy was advocated so strongly by a man whose fortune had been made in the chemical industry. From his early association with the industry, the astute Mond was no doubt clearly aware of two factors:

(1) the continuous nature of many chemical processes means that a strike causes severe dislocation and is therefore a powerful weapon;

(2) the importance for war purposes of the industry makes it imperative for the capitalist that the workers should follow his bidding in times of "emergency."

In essence, the policy of class collaboration is an attempt to smooth out antagonisms between capitalist owner and exploited

worker. The two factors we have mentioned indicate that in the chemical industry such antagonisms may have disastrous results for the capitalist. In Germany the policy of class collaboration has been carried to its logical end in the Hitler Labour Front, and it is pertinent to remember that the financial oligarchs controlling the German equivalent of I.C.I.—the I.G. combine—were among the chief backers of Hitler in the days immediately before he was given power.

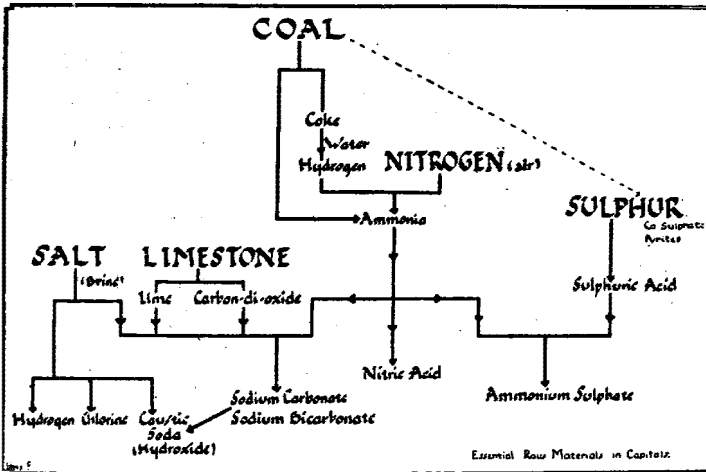
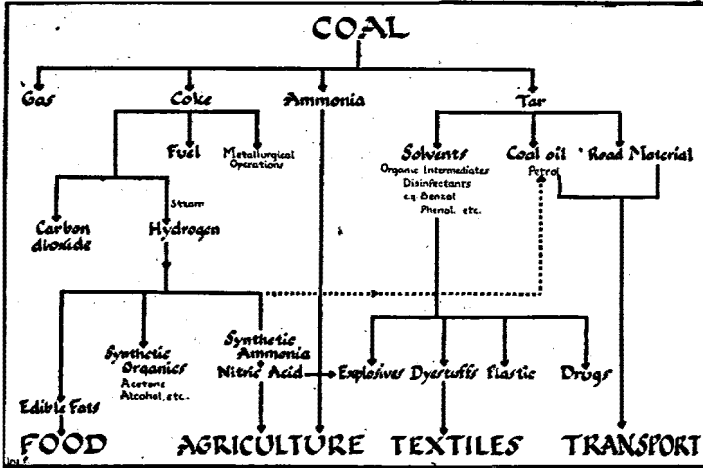
Mond's urgent pleadings for "co-operation" between workers and capitalists were favourably received by many T.U. leaders in 1928. What have been the effects of "Mondism" in industry? On this point we may quote from Arthur Horner, the Welsh miners' leader, speaking at the T.U. delegates' meeting at Bermondsey Town Hall on 28 August, 1935:

"Mondism was based on a fallacy. It contended that it would be possible by an agreement with the employers to arrange the mechanization and the general rationalization of industry in such a way that no detrimental conditions would accrue in wages and conditions. There was an obvious flaw in the theory at that time. What was to become of those who were pushed out of industry, the great mass of unemployed which would be created? The question was never faced."

The question was not faced by the T.U. leaders who accepted the philosophy of Mond; but the answer has been given by the political representatives of Mond's successors—the National Government. The answer to that question is: for those displaced from industry there is the Means Test.

It may be objected that Horner was thinking primarily of the mining industry, a notoriously "bad" and unenlightened industry. I.C.I. proclaim that they pride themselves on the care with which they look after their workers. Indeed, compared with many other sections of industry, and particularly with coal mining, I.C.I. workers certainly enjoy relatively good conditions. But the spectre of unemployment and want is as real for I.C.I. workers as for coal-miners. The most profitable unit of I.C.I. is probably the old firm of Brunner, Mond & Co. at Northwich, Cheshire. This firm in particular has always stated that workers' welfare was dearer to it than dividends; and, in fact, if we take Northwich as an example we are probably taking the best that British Imperialism can offer to workers. Here, perhaps, we may find the justification of Mond in the little town that built his fortune.

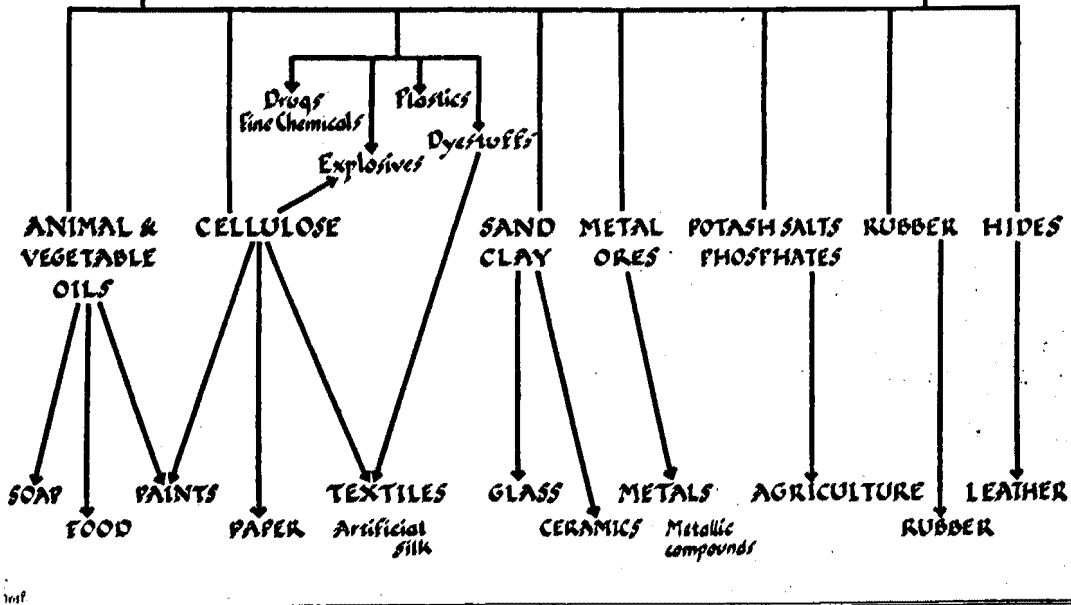
Let us for a moment ignore the sights of the town itself, the



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# HEAVY CHEMICAL INDUSTRY COAL



wretched houses reeling from frequent subsidence of the land, the knots of idle men on street corners, the despairing figures who are to be seen thumbing the "jobs vacant" columns in the papers in the public library—and make our way to the works, where surely we shall find class collaboration at last. In the works there are men operating the plant of the ammonia-soda process. Some of them have done it for years. Are they, as a result of this experience, given charge of the plant? Do they have a decisive voice in the organization of labour in the plant? Do they have any control over dismissals? No; co-operation does not run to such lengths. The plant managers are chosen from men of the public school class. They are not chosen for especially brilliant talent in engineering or chemistry: a rowing blue is frequently a far better recommendation. They are chosen, in fact, to put it in ruling-class jargon, for their "ability to handle men." In practice this means that they will exert themselves to get the maximum amount of labour out of the workmen. Furthermore, should the workmen strike, there will be available this squad of "handlers of men" to act as blacklegs and form a skeleton organization to keep the more important parts of the plant in working order. For in a crisis for the workers, when all the seriousness of strike action is before them, with the possibility of severe hardship for their wives and children, will these public school managers sink their class differences and co-operate? They will—with the board of directors; as in fact they did, during the General Strike of 1926. Many of the managers, to show their complete zeal for co-operation and Mond philosophy, went as strike-breakers in other industries: for example, they drove, or rather damaged, trains at Crewe.

We have mentioned that Mondism has failed to remove the scourge of unemployment in Northwich. In 1922–23, unemployment there was particularly bad, and it is interesting to note how co-operation was used to deal with the distress. It was pointed out to the workmen in employment that, if they taxed themselves so much per week, contributions thus raised would help to relieve the distress. There is the essence of Mondism—the poor help the poor. A firm which had made millions of profit during fifty years from the workers of Northwich turned to them in their distress and gave them, not benefit from its superfluity, but advice to help themselves with their own pennies. That is Mondism—forerunner, maybe, of the winter-relief schemes of Fascism.

It is sometimes suggested, that a newly born Soviet Britain would fail to survive in a hostile capitalist environment because of a lack of essential raw materials. This

**The Question of Raw Materials** argument is based on the assumption that all existing capitalist States would refuse to trade with the new Soviet Britain. Such an assumption is by no means certain to be correct; for it is hardly to be expected that *every* group of capitalists would refuse to bite at the rich English market, and secondly it must be pointed out that social revolution may have abolished capitalism in a number of other countries before that happy event has occurred here. However, we will consider the position on the extreme assumption that the Soviet Union still remains the only socialist State, and that the rest of the world is organized on a capitalist basis. If a Soviet Britain were born into such an international situation, with the whole remaining capitalist section refusing to trade for a period of a year or so, would the chemical industry be able to carry on? This is the question we must examine.

In considering this question it must be borne in mind that a Soviet Britain would mean the complete removal of British imperialist oppression throughout the Empire, and that in India, for example, every encouragement would be given to that country to develop her own political and economic life. It can hardly be doubted that such an act of liberation would make India very willing to trade with a Government of British workers whose revolutionary action had thus smashed the fetters of centuries.

It is not enough to consider this question solely in relation to the chemical industry proper; the survey must include a consideration of the links between the chemical industry and other branches of industry. We shall therefore first deal with the base of chemical operations—the heavy chemical industry—and then with some of the superstructure depending on this base.

All the raw materials required for the processes in the first section are available in Great Britain except sulphur, required in the manufacture of sulphuric acid, a most necessary agent for many processes. The bulk of this raw material is imported. There are, however, two sources of sulphur available in Great Britain:

- (a) the sulphur collected during production of coal gas;
- (b) large deposits of calcium sulphate at Billingham.

Source (a) has been used for many years and source (b) has recently been exploited by I.C.I. Ltd.

The following table gives an analysis of the per cent amount of sulphuric acid made from the alternative sulphur sources in 1933:

Total tons	Pyrites and others Imported	Domestic	Gas works Spent oxide	Sulphur and hydrogen sulphide	Zinc concentrate
788,000	54.54%	0.17%	21.7%	13.86%	9.73%

(*Chemical Trade Journal*, 1934.)

The value of the imports of pyrites and sulphur for the six months January—June, 1935, is as follows:

#### *Sulphur*

	£
From Italy .. .. .	56,229
„ U.S.A. .. .. .	138,616
„ other foreign countries .. .. .	17,031
	<hr/>
	211,876

#### *Iron Pyrites*

From British countries .. .. .	10,095
„ Spain .. .. .	110,515
„ other countries .. .. .	55,200
	<hr/>
	175,810 <sup>1</sup>

It is clear then that for our supplies of sulphur we rely considerably upon imports. Where are we to turn for this material if boycotted by Italy, the U.S.A. and Spain? There is the sulphur in coal, and there is the Soviet Union; and since the latter country has extensive sulphur sources, Soviet Britain need not seriously fear sulphur-sanctions by capitalist countries.

Production figures for some of the products of the basic chemical industry are given in the following table. (Figures taken from *The Census of Production for 1930*):

<sup>1</sup> *Annual Statement of the Trade and Navigation of the United Kingdom*, July, 1935.

A. *Value of Production in 1930.*

	£
Sulphuric Acid .. .. .	1,844,000
Hydrochloric Acid .. .. .	480,000
Sodium compounds (mainly soda carbonate, bicarbonate, hydroxide) .. .. .	8,171,000
Ammonium sulphate .. .. .	2,120,000
Other ammonium compounds .. .. .	562,000
Bleaching materials (mainly chlorine products) ..	971,000

B. *Volume of Production and Percentage Exported for 1930.*

	<i>Production Tons</i>	<i>Proportion of production exported</i>	<i>Share of home market held by British products</i>
Sulphuric Acid ..	791,800	1%	99.9%
Hydrochloric Acid ..	173,000	0.1%	100%
Sodium { carbonate bicarb. ..	1,100,000	27.9%	99%
hydroxide			
Bleaching material ..	121,000	27.5%	97.9%

Coal, it should be noted, is of great importance as a chemical raw material.

The following figures are taken from the *Census of Production for 1930* and indicate the value of certain coal products for that year:

	<i>Value of Production, 1930</i>
	£
Anthracene .. .. .	6,000
Benzol, crude .. .. .	827,000
„ refined .. .. .	2,549,000
Phenol, crude .. .. .	137,000
„ crystalline .. .. .	154,000
Naphtha, crude .. .. .	224,000
Naphthalene .. .. .	120,000
Tar oil, etc. .. .. .	1,213,000
Toluol .. .. .	134,000
Pyridine .. .. .	18,000
Cresylic acid .. .. .	967,000
Other sorts .. .. .	267,000
	6,086,000

We can now go on to consider raw materials in relation to industries dependent for a base on the heavy chemical and coal industries. The raw materials, in addition to those already listed, which must be considered, are: Vegetable oils and fats, cellulose (sand, metal ores, clay), potash, phosphates, rubber, hides.

We have not been able to find data dealing with the distribution of these imports among various industries: **Animal and Vegetable Oils and Fats** how much goes to soap, how much to the manufacture of cattle food and cake, how much to the paint industry; so that just to give the value of the total imports of animal and vegetable oils and fats is not particularly helpful.

The chief oils imported are whale, cotton-seed, linseed, palm, tung, soya bean, olive. Of these linseed and tung go mainly to the paint industry, while the remainder are used in the manufacture of soap, margarine and cattle food.

There should be no difficulty in the long run about whale oil, although there might be a temporary shortage. The vegetable oils are largely products of colonial or semi-colonial dependencies, and since one of the first acts of a Soviet Britain would be to emancipate these peoples, they are not likely to take up a hostile attitude and refuse to trade with her workers' government; but rather the contrary. In addition, the Soviet Union may at that time be in a position to export certain of the oils, such as cotton-seed and soya bean.

The chief sources of cellulose are wood pulp and cotton waste. The import of wood pulp is of considerable value: for the six months January-June 1935 it was £4,176,582.

**Cellulose** A large proportion of this came from the Scandinavian and Baltic states. Should these countries refuse to trade with Britain—which is most unlikely, since timber and wood pulp are among their chief imports—there is no lack of timber in the Soviet Union.

Sand and clay are of course available in Great Britain. Certain "special" types of sand are imported, but **Sand and Clay** in a boycott period they could be lost without serious inconvenience.

Metals and metal ores hardly come directly under the sway of the chemical industry. It may be mentioned however that the most important imports under this head are iron, copper, lead, tin, nickel. Of these, iron, tin and copper are widely distributed. At the moment Canada has the bulk of nickel production, although the Soviet Union is starting to develop sources that have been discovered in the far north.

The value of potassium salts imported during the six months January—June 1935 was as follows:

	£
Potassium hydroxide .. .. .	73,287
„ chloride .. .. .	87,733
Kainite and other pot. fertilizers .. .. .	160,190
Potassium nitrate .. .. .	74,073
All other pot. compounds .. .. .	95,301

The world production figures for 1933-34 are as follows:

	<i>Metric tons</i>
Germany .. .. .	1,050,000
France .. .. .	342,000
U.S.A. .. .. .	135,000
Spain .. .. .	100,000
Poland .. .. .	35,000
U.S.S.R. .. .. .	10,000
Palestine .. .. .	7,500
Others .. .. .	7,000

Of this total the amount available for export was 750,000 tons, the combined German and French export amounting to 472,000 tons.

With potassium salts there might be difficulty if Germany, France, U.S.A., Spain and Poland all boycotted this country. In that case agriculture would be the chief sufferer. For the purposes of the soil, however, we could probably manage by exploiting for an emergency period our own sources of nepheline and mica.

We import phosphate rock. This is quite widely distributed, and there are deposits in the Soviet Union.

From this brief survey we may conclude that although there might be considerable difficulties about raw materials in the early days of Soviet Britain, if a wide boycott by capitalist countries

were established, yet they are certainly not difficulties which could cripple the chemical industry or chemical operations in related industries. Moreover, in reaching this conclusion, we have not taken into consideration the many improvisations that may be devised by the chemist in an emergency period. For example, in the event of a sudden shortage of oils for soap manufacture, other detergents could undoubtedly be provided.

The establishment of a Soviet Britain would bring new activity and new perspectives to the chemical industry. The immediate task for the industry would be to adapt itself to supply the demand of other branches of industry which require chemicals in their operations. With the abolition of unemployment, and a rising standard of life for the vast majority of the people, there would follow considerable expansion in the textiles, food, housing, transport and light industries; and the demands upon the chemical industry from these sources would be correspondingly increased. Similarly, a rehabilitated agriculture would result in increased demands upon chemical industry.

Because of (1) its manifold connections with other branches of industry, and (2) its function of transforming raw materials, of which there are often alternative sources, it is not possible to give an estimate of what order of magnitude the increased production might be in the first years of a Soviet Britain. Both the above-mentioned factors, which prevent a reliable estimate of production-increase, are dependent in part on the international situation at the time. To make these points clearer it is necessary to give some illustration. In the first place, in a planned economy the immediate programme for the chemical industry would to a large extent depend on the planned production for each of the industries which it served. A planned increase of 20 per cent in production for textiles would mean a quite different demand on the chemical industry, both in quantity and type of chemicals, than, for example, a 20 per cent increase in building and furnishing. Reciprocally, of course, one of the factors in determining the possibility of a 20 per cent increase in textiles would be the capacity of the chemical industry to fulfil its part in that increase; although this is unlikely to be the *limiting* factor. Considerations such as this illustrate the particular dependence of the programme for chemical industry on the planned economy as a whole, and also illustrate the particularly great advantages of socialist planning



for the internal organization of the chemical industry, with the many and varied calls on its products.

The following data are interesting in this connection. They show the relative distribution of two chemicals, sulphuric acid and alcohol, among various industries.

<i>Destination of Sulphuric Acid (1932-33).</i>		<i>Tons</i>
Dyes and intermediates .. .. .	.. .. .	29,134
Iron and copper pickling (including tin-plate trade) ..	.. .. .	62,942
Paint and colour .. .. .	.. .. .	8,419
Phosphates and sulphates (exc. superphosphate and ammonium sulphate) .. .. .	.. .. .	15,231
Ammonium sulphate .. .. .	.. .. .	163,318
Superphosphates .. .. .	.. .. .	155,357
Textiles .. .. .	.. .. .	21,573

The total of this list (which was taken from *Chemical Trade News*, 1934) only comes to slightly more than half the production for the year, which was about 790,000 tons. No doubt a considerable portion of the remainder went into the explosives trade; but a discreet silence is maintained on other phases of the industry.

#### *Main Industrial Utilization of Industrial Alcohol for 1934*

	<i>Bulk gallon</i>
Varnishes, polishes, lacquers, stains, paints, enamels for sale .. .. .	2,389,351
Varnishes, etc., etc., for use in manufacturers' own workshops .. .. .	753,585
Oil cloths, leather cloths .. .. .	478,903
Celluloid, xylonite and similar products .. .. .	47,986
Rubber .. .. .	63,994
Dyes .. .. .	150,088
Inks .. .. .	74,727
Soap .. .. .	178,612
Toilet articles .. .. .	484,336
Other organic derivatives .. .. .	87,472
Medicinal extracts .. .. .	108,789
Alkaloids and fine chemicals .. .. .	94,034
Collodion .. .. .	43,442
Photographic plates, etc. .. .. .	108,000

We may illustrate another point which must be borne in mind by the following figures. In the *Census of Production* for 1930 the production of sodium hydroxide and carbonate is given as £1,100,000. Of this 28 per cent was exported. But this 28 per cent

does not give the true figure of the fraction of soda production dependent on the foreign market; because, of the soda that remained at home, some went into making soap, for example, and a proportion of this soap was exported.

Thus in the question of foreign trade the chemical industry is concerned not only with its own direct products but with those of other industries.

The particular international situation existing at the time will have its effect upon Soviet planning in the chemical industry. It might, for example, prove more economical, in the interests of the country as a whole, to get oil from Soviet Russia than to produce it from coal. Questions like this could only be solved by an analysis of the concrete conditions existing at the time.

Because of the uncertainty which faces us at the present time about the precise international relations which would exist when a Soviet Britain came into being, we cannot deal concretely with the question of export trade in chemicals. As has been said, however, in the introductory section, the establishment of a Soviet Britain would mean the complete removal of Imperialist dominion over India and large areas of Asia and Africa, and it is reasonable to expect that in India, for example, this emancipation would lead to a great renaissance of her economic life and to a more rapid industrial development than in the last twenty years (whether on a capitalist or socialist basis). Hand in hand with such development would inevitably go big agricultural development. Without much question this process of rehabilitation of Indian agriculture would, for the first years, be dependent in large part on foreign heavy industry. Her first requirements would be to build her own heavy industry. Until this was accomplished she would be unable herself to meet the demands from an expanding agriculture; and even for some decades the need for some products of heavy industry arising from industrial and agricultural development would probably proceed faster than her ability to supply them. Hence we may expect that she would be willing and eager to take from a Workers' Government of Great Britain, which had emancipated her, fertilizers and other chemicals in return for some of her own minerals and other raw materials. There is little reason, therefore, to expect any shrinkage of the export trade in chemicals: rather, a revival.

Indian agriculture, organized on the basis of village com-

munities, was disrupted by the hand of the British bourgeoisie. It is indeed fitting that its restoration, at a much higher level of organization, should be, in part, the task and privilege of the British working class.

What developments may we expect at home, in Britain? Clearly it is impossible to give the *precise* orientation that the Chemical Industry would take, and the rate and magnitude of its development. To do this would involve a knowledge of the future discoveries of scientific research. But we can, with confidence, draw a number of *general* conclusions about the future of Chemical Industry in Soviet Britain.

Technical progress in Chemical Industry depends upon scientific research. By this we mean that (1) scientific research must be aided and abetted by adequate funds, and full provision made for training young men and women for its prosecution; (2) laboratory discoveries which may have technical possibilities must be taken up and carefully investigated. The most fervent apostle of capitalism could hardly claim that in Britain to-day there is any such careful fostering of scientific research. Under capitalism the very mainspring of technical progress is treated in the most niggardly fashion. The Department of Scientific and Industrial Research, the universities and industrial concerns together spend in one year on research less than the present Government spends on the construction of a single battleship.<sup>1</sup>

Scientific research in Soviet Britain would no longer be, as it is in capitalist Britain, a humble suppliant at the feet of finance capital. It could and would assume, for the first time, that high importance to which it is entitled by reason of its function of extending and consolidating man's dominion over nature. From the new and increasing demands on industry, from the appalling heritage of waste and destitution, which the workers' Government would receive from capitalism, there would arise countless problems whose solution would depend on the fullest development of scientific research. Every effort would need to be made to reduce the time-gap between laboratory discovery and industrial application; and this would be facilitated by the fact that there would be no financiers to hamper this process by demanding extortionate interest on loans for development. On the contrary, the Workers' Government would be in a position to devote large sums of money for extensive and vigorous prosecution of research where to-day

<sup>1</sup> See for example figures given by J. D. Bernal in *The Frustration of Science*, Allen & Unwin, Ltd.; cf. also below Chapter 10. }

it is starved by lack of co-ordination and by the short-sightedness of capitalist interest. Gone would be the cry of "a ten-years' truce in scientific research" that we heard a few years ago from a prominent industrialist. We should need more and better-arranged research work. This could not be had just for the asking. It would take some time and a great deal of constructive work. More research institutes, more teachers, more laboratories would be required. It would be one of the objects of the Workers' Government to arrange such facilities that every young man or woman might have the *possibility* before them of doing scientific work if they so desired, and had talent in that direction. The effects of such whole-hearted encouragement to science are incalculable; but we may safely assume that the *tempo* of technical progress would, as a consequence, be many times quicker in Soviet Britain than it is at present.

With the establishment of Soviet Britain there would be, not only a wholesale quickening of scientific activity, but also, what is of greater importance, the whole perspective of research and factory organization would change.

The emphasis and driving force would cease to be profit and would become, instead, the welfare of the great mass of the population. Because of this we can justifiably expect new orientations in research work and fundamental changes in works organization.

**Science: Friend,  
not Enemy**

We may, perhaps, make this point clearer by further reference to the general question of technical progress under capitalism. Under capitalism one of the major and insurmountable difficulties thwarting the fullest realization of scientific discoveries is the fact that new methods and processes lead to unemployment of operatives. The installation of modern plant, operating on a continuous principle with a great deal of control arranged for by automatic devices, in place of the older plant, may have appalling social consequences when this modernization takes place under capitalism. The chief evils which result are : (1) a proportion of the former workers are thrown out of work, (2) the labours of those remaining tend to be "speeded up" without any consideration of their health and well-being. Because of these disastrous social effects of modernization of technique under capitalism, it follows also that the development of such technique must necessarily be hampered. If capitalism attempted to press forward to the utmost extent with modern technique it would

rapidly run itself into an economic and political crisis of a magnitude hitherto unknown. The net practical effect of what does go on to-day in Britain is a woeful compromise. In certain industries modern technique is introduced; the social consequences are extremely painful; the development of technique is restricted because there is no harmony between the forces of production and the social system.

In Soviet Britain the new organization of society would, from its nature and design, put an end to this state of affairs. Since production and organization would be for the benefit of man, labour-saving devices, clean mechanically operated systems, would not have to be greeted with apprehension. The emphasis would be on the reduction of dangerous, dirty and heavy work. In the Chemical Industry this emphasis would most probably manifest itself in a more widespread application of the methods of catalysis, a more intensive examination of high-pressure technique, an increasing use of electricity for power and for automatic control devices. From development along these lines it may be expected that there will be added incentives to search for new materials for use in plant construction. Mechanization need no longer mean unemployment for the many, more intense exploitation of the lucky ones who remain: on the contrary it could mean shorter hours, more shifts and more goods for the many now so wantonly deprived of them.

Workers in the Chemical Industry stand in need of very carefully arranged safety regulations and a rigid enforcement of these regulations when they are drawn up. In capitalist Britain it cannot be said that either of these necessary conditions exists. Obviously the people most likely to see that the regulations are faithfully put into operation are the workers themselves, and in a Britain controlled by and for the workers this would, for the first time, be the primary aim of industrial policy. Safety regulations would be a matter for the Trade Unions to supervise, the actual framing of the regulations being done by the workers' representatives, acting in conjunction with appropriate technicians and scientists.

We have not given detailed "blue-prints" of development for Chemical Industry in Soviet Britain. That does not mean we are uncertain of its future in that state of society. In Soviet Britain, as in Soviet Russia to-day, science will come into her own, and applied science will profit accordingly. The Chemical Industry may experience many transformations both in its methods and

in its scope; auxiliary industries may be revolutionized and their operation modified beyond recognition; but there can be no doubt of increasing growth and greater potentialities.

With man no longer exploited by man, and science at last really set free to serve the whole community, there seems no limit to the field of its achievement: and with the growth of science the industries which most depend on scientific research will, inevitably, grow too. With this future growth of science the Chemical Industry is linked, perhaps, most closely of all. Science, and with it chemical industry, have nothing to fear from the overthrow of capitalism; they have only their chains to lose.

# VIII

## TEXTILES

"They were so poor, these fellows, that they said they could not attend the dinner even if provided with free tickets because their clothes were not good enough. . . . I did not like to think how bad their clothes, their whole circumstances, were; it is not indeed a pleasant subject.

"They were with us, in that early battalion of Kitchener's New Army, when kings, statesmen, general officers, all reviewed us; and they stood in the mud and water, scrambled through the broken strands of barbed wire, saw the sky darken and the earth open with red-hot steel; and now in 1933 they could not even join us in a tavern because they had not decent coats to their backs. We could only stare at one another, in pitiful embarrassment, over this tragi-comedy of the living, who had fought for a world that did not want them, who had come back to exchange their uniforms for rags. And who shall restore to them the years that the locust hath eaten?" (Extract of an account of a battalion reunion dinner in Bradford. *English Journey*, J. B. Priestley.)

**T**HE chief processes of the textile industry are best described by the account given in the *Survey of Textile Industries*<sup>1</sup> from which we quote (with suitable additions).

The seed-cotton, after being picked from the plant is passed, in the country in which it is grown, through a ginning machine which separates the seed from the cotton or  
**Cotton** lint. The lint, which forms the raw material of the cotton industry, is compressed into bales for convenience of transport. On arrival at the mill where it is to be used, the cotton is taken from the bale and opened up. It is then necessary to shake, blow or beat out the dirt, so as to convert the cotton into a form ready for the next stage, namely carding. These processes are performed by machines from which the cotton emerges, with the principal impurities removed, in the form of a continuous flat band or "lap." The carding-machine

<sup>1</sup> Committee on Industry and Trade (1928).

delivers the lap onto a wire-toothed cylinder with a surface speed of 2,000 ft. per minute. On being doffed from this machine the material has the appearance of a thick loose rope or "sliver," with the remaining impurities removed, short or broken fibres extracted, and with the fibres roughly parallel.

After the carding process, the treatment of the material depends upon the class of yarn to be spun. For counts of 60's and upwards,<sup>1</sup> the cotton is subjected to a combing process. In other cases the carded sliver is passed through a drawing-frame in which a number of slivers are doubled together and drawn out to the same weight per yard as any individual sliver so as to reduce irregularities. In this process the sliver passes through four successive pairs of rollers, driven in such a way that the surface speed of each pair is greater than that of the preceding pair. The material then passes on to other machines which draw it finer and impart a slight twist to it, enabling it to withstand strain during the processes preceding spinning. In the final stage before spinning the carded and drawn sliver is called a "roving."

The machine employed in the spinning may be either a ring spinning frame or a mule. In the former the processes of twisting and winding the yarn upon a bobbin occur simultaneously and continuously. In the mule the action is intermittent; first a certain length of roving is drawn out and twisted, and then the twisting ceases and the winding-on takes place.

Yarn may be converted into thread (for sewing, for example) by a process known as "doubling," in which many strands of yarn are twisted and doubled in order to attain the required strength or the desired count. Yarn may also be dyed before being woven, but most yarn is woven without being dyed.

All these processes are used for wool also; but as it is an animal hair additional processes are necessary. Each clip must be classed and each fleece sorted before washing and scouring can take place. There are

### Wool

two main branches of the industry, the woollen and the worsted. The principal difference between woollen and worsted manufacture is that the fibres are as near as possible parallel in worsted yarns while in woollen yarns the fibres lie in all different directions. The medium and lower grades of wool are used in the woollen branch of the industry, while merino and

<sup>1</sup> The "count" of the yarn is the number of "hanks," or wrappings of 840 yards, which go to the pound. Thus, the higher the count the finer the yarn.



fine cross-bred are used in the worsted branch. If the thread is intended for the worsted process it passes through a special combing machine which separates the long wool or "tops" from the short wool or "noils," which are disposed of to the woollen branch. Spinning is usually effected on the cap frame to the desired counts, which in worsted are the number of hanks of 560 yards which go to the pound. Mungo and shoddy are used exclusively in the woollen branch, and some cloths may contain little else.

Cellulose, the name given to the principal substance forming the walls of the cells making up the structure of all plants and trees, is the raw material used in the production of all "rayon" yarns. Cotton and spruce timber are the two most commonly used. The production of all artificial silk fibres depends on the fact that cellulose is soluble in certain substances and can be removed from solution by other substances. If a solution of cellulose be squirted through a fine nozzle into a bath of some substance which extracts the solvent, a fibre of pure cellulose can be obtained, which has most of the properties of other celluloses, such as cotton, but has the additional advantages of continuous length and superior lustre. The various artificial silk processes differ chiefly in the nature of the solvent and of the coagulating bath. We thus get the acetate, the viscose, and other processes.

"The process of weaving consists in interlacing, at right angles, two or more series of flexible materials, of which the longitudinal are called warp and the transverse weft."<sup>1</sup> In an ordinary loom the warp threads are fixed and the weft thread is caused to pass in and out of the slowly unrolled back beam (a kind of flanged roller) and rolled up on the cloth roller as the weaving proceeds. Each warp thread is attached by means of "healds" to one of two or more pairs of shafts whose alternate rising and lowering enable the shuttle containing the weft to pass under or over the warp threads in order to weave the cloth to the required pattern.

The main types of loom are the tappet, the dobby, the jacquard and the automatic. The principle of each is the same, the difference lying in the capabilities of each machine. The tappet is for purely plain stuff; the dobby can have anything up to twenty-four, or even forty-eight, "shafts," horizontal staves

<sup>1</sup> *Enc. Brit.*, 11th edition, Vol. 28, p. 440a.

responsible for lifting the healds. These looms can therefore weave a far greater variety of design, while the jacquard can weave any design whatsoever up to the classical "Bolton Abbey by Moonlight." The automatic loom is a practically self-operating loom, and only requires the weaver to replenish the drum which forces the bobbins into the shuttles for the loom to go on running continuously. This loom has a warp-stop motion, which "knocks the loom off" when an end comes down, or when a "pick" or weft breaks. The grey piece is then burlled and mended and sent to the dyers to be bleached, finished, dyed, or printed.

For cotton piece-goods the material is first stiffened and then calendered to give it a bright finish if this is required. If white goods are required, they are bleached and then starched or filled, and dried over a cylinder machine.

For wool piece goods, the fabric is first "crabbed" or set, and then steamed. This prevents cockling or distortion. The dyeing operation is then performed. After this the pieces are centered out to the required width, and the finish or "handle" is obtained by steaming or raising and then pressing. The cloth may also be milled, a process which increases the density and consistency and hides the structure of the cloth beneath a "felted" cover.

"On looking at a map of Lancashire one is struck by what a tremendous productive capacity is concentrated here in a comparatively small area of about 35 miles in length and 22 miles in breadth. Nowhere else in the world can such a strong total agglomeration be found. Even the southern part of the New England district in the U.S.A., with its 10 million spindles to an area of about 35 miles by 25 miles, cannot compete in this regard with Lancashire. This intense massing together is, however, more of a secondary than of a primary nature. Generally speaking it is based to a greater degree on a large number of moderate-sized mills, grouped together in one district, rather than on very large single factories."<sup>1</sup>

Spinning is concentrated mainly in South Lancashire. The spinning of coarse and medium counts in the American section is localized predominantly in Oldham and Rochdale, while the fine counts (60's and above) from Egyptian cotton are centred in the Bolton, Manchester and Stockport districts. Doubling is mostly carried out in the Stockport and Bolton districts.

<sup>1</sup> Dr. Wisselink, *Concentration in the English Cotton Industry* (1929), p. 4.

Weaving is carried on mainly in North and North-East Lancashire, the chief centres being Blackburn, Burnley and Preston. Until recently the different areas concentrated on different types of work; for instance, Blackburn and East Lancashire towns largely produced cloth like dhooties for the Indian market; Preston produced shirtings, sheetings, long-cloths, fancy cloths, etc.; Burnley printing cloths; Nelson and Colne manufactured sateens and brocades; Colne and Radcliffe specialized in the weaving of dyed yarns; Oldham produced fustians and velvets; Bolton, quilts; towels were made at Heywood and cotton blankets and sheets in the Rossendale Valley. Dr. Wisselink says, in criticism, that "the specialization practised in the form of 'one locality one process' may even be said to have been driven too far as a rule."<sup>1</sup> But with the coming of the depression and the contraction of business, competition has led to "the uncontrolled encroachment of mills spinning coarser counts and sheds weaving coarser cloths into the fine section,"<sup>2</sup> thus destroying this specialization. For example, between 1922-29, a number of coarse-spinning firms in Oldham came into the fine-spinning field which hitherto was the preserve of Bolton. In this connection it is worth noting that artificial silk is now being largely woven on cotton and even on broad worsted looms in such localities as Skipton, Nelson and Colne.

The wool textile industry is now almost entirely centred in the West Riding of Yorkshire. To a certain extent the woollen and worsted branches are concentrated in separate districts, though the separation is by no means complete. The worsted branch is located mainly in and around Bradford, Halifax and Keighley—to the west and north; while the woollen branch is located mainly round Leeds, Batley, Dewsbury and Morley—to the east and south. In Huddersfield both branches are carried on, high-quality worsteds for men's wear and fine woollens being produced. The Colne Valley above Huddersfield specializes on cheaper kinds of woollen goods, while Dewsbury and Batley specialize on still lower qualities in which shoddy plays a large part. Leeds is the centre of the clothing industry; Bradford is the principal commercial centre of the industry and the centre of wool-combing and of the manufacture (together with Halifax) of worsted dress-goods for women's wear.

<sup>1</sup> *Ibid.* p. 4.

<sup>2</sup> *P.E.P. Report on the Cotton Industry* (1935), p. 10.

Broadly speaking the textile industry is an industry of anarchic competition. The central processes of spinning and weaving are largely in the hands of small firms, the few large

**Organization of the Industry** concerns which exist intensifying rather than mitigating "this chaotic intensive competition"<sup>1</sup> on account of their lower costs. At the entrance and the exit of the industry, however, stand giant monopolies which are able to draw off a large proportion of surplus profit from the rest of the industry, while using the less highly organized sections of the trade as strike-breaking and wage-reducing instruments. Consequently, "the industry is frequently in conflict with the sectional combines in combing and dyeing."<sup>2</sup>

In the cotton section, the Liverpool Cotton Association frequently gives financial support to the spinning-mills on condition that they have a monopoly of the company's business on the cotton market. The Liverpool Cotton Association is a commodity exchange, purchasing cotton from the foreign producer. Not more than ten merchanting firms out of a hundred handle 75 per cent of the imports, while four or five firms of brokers conduct nearly a quarter of the business.

In the wool section, some 95 per cent of the combing is included in the Woolcombing Employers' Federation, an organization which draws up and publishes a Woolcombing Tariff or price-list agreed upon among the commission-members of the Federation. These own roughly 50 per cent of the combing-machines in the trade, and 95 per cent of all the combs normally employed on commission woolcombing. The farming out of this vital function on commission, due to the heavy cost of installing combing-plant in each firm, creates a serious "bottle neck" in the industry. The average increase in 1928 over corresponding charges in 1913 stood at 135 per cent, and only between 35 and 50 per cent of the total costs go in wages. In 1933 the Woolcombers' Mutual Association was formed. "The Association's activities have already strengthened combing rates and this section is well placed to take advantage of increased turnover."<sup>3</sup> Woolcombers, Ltd., which comprises eighteen firms, has regularly paid substantial dividends (210 per cent in ordinary dividends in the last seventeen years) and has made several issues of bonus shares

<sup>1</sup> *P.E.P.*, p. 9.

<sup>2</sup> *The Distribution of Employment in the Wool Textile Industry*, Shimmin.

<sup>3</sup> *Economist*, 12 October, 1935.

amounting to £650,000 during the post-War period, a result in striking contrast to other sections of the industry.

At the other end of the industry, there stand the three great combines—the Bleachers' Association, the Bradford Dyers' Association, and the Calico Printers' Association. The total percentage of profit for each of these companies has on the average been distinctly higher in the post-War than in the pre-War years. The Bleachers made on the average 8.3 per cent post-War (1918–1927), compared with 6.4 pre-War. The Bradford Dyers' Association made 8.5 per cent compared with 5.6 per cent; and the Calico Printers' 5.9 per cent against 5.0 per cent. Moreover the post-War percentages of profit were obtained upon an increased capital and a diminished volume of trade. The Bleachers' Association comprises 62 firms; the Bradford Dyers' Association 27 firms; the British Cotton and Wool-Dyers' Association 30 firms; and the Calico Printers' 74 firms; all operating on a commission basis.

The net profits and the reserves and undivided profits in the dyeing and finishing section in 1935 were as follows:

<i>Company</i>	<i>Net Profit (1935)</i>	<i>Reserves and Undivided Profits</i>
Bradford Dyers' Association ..	—	365,177
British Cotton & Wool Dyers ..	60,723	526,962
Bleachers' Association .. ..	26,531	1,151,723
United Turkey Red .. ..	—	444,736
Yorkshire Dyeware & Chemical ..	26,731	71,856
United Indigo .. .. .	—	15,185

Thus these six finishing concerns together disclosed undivided profits of £2,575,000. This enormous figure shows to what extent this section of the trade has been successful in feeding on the less highly organized sections by virtue of the key position it holds in the industry. This can be seen in actual operation from the following quotation:<sup>1</sup> "If the spinners and finishers are able to resist any attack on their prices, buyers will then be forced to exert pressure on the cloth manufacturers, who by reason of the large amount of surplus machinery will be placed in a relatively weak position."

There has been a certain amount of amalgamation in the spinning section of the cotton industry. "Amalgamation in the

<sup>1</sup> *The Economist*, 20 September, 1935.

American section is still anathema within a twenty-mile radius of Oldham Chamber of Commerce, owing to the fact that certain banks unloaded their obsolete and uneconomic mills on to this combine."<sup>1</sup> The firm here referred to is the Lancashire Cotton Corporation, with a capital of eight and a half million pounds, originally controlling 9.3 million spindles, now reduced to about 6.25 million. There is also a number of groups based on common directorships. These account for approximately 45 per cent of the total spindles in the American section, while the rest of the trade is in the hands of companies operating one or two mills each. In the Egyptian section three concerns control about 50 per cent of the total spindles.

Cotton-weaving is carried on by approximately 900 firms. In addition to these it is estimated there are 250 which combine spinning and weaving. In the aggregate the number of looms "attached" to spindles is relatively small, despite the fact that "on the whole vertically organized concerns have fared better than the general run of spinners and manufacturers, because they have developed their own marketing."<sup>2</sup> Even these concerns are, however, "rarely completely self-contained or 'balanced'.<sup>3</sup>"

The fundamental characteristics of the weaving section are the great variety of its products and the smallness of its mills.

As Mr. Walter Runciman recently admitted "Some of the features of the post-war boom constituted one of the gravest scandals of our time. Attention should be drawn to what was in many cases nothing but a financial ramp. By 1921 the bubble had been burst."<sup>4</sup> In 1919, in fact, 100 typical spinning companies paid an average dividend of 21½ per cent, and in 1920 150 companies paid an average dividend of 40½ per cent.<sup>5</sup>

Profits were made, not on increasing output, but on the enormous margins between the price of raw material and prices. For example in April 1920 margins on medium yarns were more than 43d. per lb. as against 2.5d. per lb. in 1914. Mills were purchased at one price and repurchased almost immediately at a much higher capitalization. The £30 shares of the Fern Co., for example, were sold for £272 per share and the £3 shares of the Orb Co. realized £28 10s. 0d. per share. The money was raised

<sup>1</sup> *P.E.P. Report.*

<sup>2</sup> *P.E.P.*, p. 11.

<sup>3</sup> *P.E.P.*, p. 12.

<sup>4</sup> *Manchester Guardian*, 5 February, 1936.

<sup>5</sup> Cf. *Tattersall's Cloth Trade Review.*

largely by loans, bank overdrafts, and debentures. This left the industry with a colossal burden of fixed interest-bearing capital to be met whether the companies made profits or not. In fact debt charges incurred by some spindles went as high as £4 per spindle. Finally, "it is impossible to take account of the formation of expenses of the new companies, such as registration fees, and the gifts to old directors, which were no doubt a considerable item."<sup>1</sup>

The London Wool Market consists of the London Wool Exchange in Coleman Street. This is controlled by the Associated London Selling Wool Brokers, a governing body on which sit representatives from nine firms of wool brokers. At the London Docks there are forty acres of warehouses for showing the wool and storing it. During the sales 11,000–12,000 bales of wool are sold daily, of which only 1·2 per cent is English grown.

The woollen section is to a large extent vertically organized. About half the dyeing and finishing is done by the manufacturers and many of them also make their own yarn.<sup>2</sup> There are close on 200 "raggers" in Dewsbury and Batley area, employing a few rag-sorters each (between three and six is quite common). It is hard to conceive a more uneconomical method of providing the woollen industry with raw material.

In the worsted section, as explained above, combing developed separately on a commission basis. Spinning also developed separately. The industry is characterized generally by the small size of its units; the majority being privately owned, personally conducted businesses (56 per cent). In fact, over half the total undertakings (64 per cent) employ not more than 100 insured operatives each, the average number of workers for each undertaking in the West Riding being 121, in 1920.<sup>3</sup>

"The existence of small firms is largely the outcome of a system under which room and power can be rented, thus eliminating the necessity for raising sufficient capital to erect buildings, before manufacture is begun. In the Bradford area, as in North-East Lancashire, many mills may be found to house several firms whose machinery is driven off the same engine."<sup>4</sup> The competition between these small concerns is intense. "There are far too many

<sup>1</sup> Daniels and Jewkes, "Post-War Depression in Lancashire Cotton Industry," *Statist*, 1928.

<sup>2</sup> Shimmin, p. 107.

<sup>3</sup> *The Distribution of Employment in the Wool Textile Industry*, A. N. Shimmin.

<sup>4</sup> Shimmin, *op. cit.*, p. 107.

irreconcilable interests for cartelization or rationalization to be successful. Whatever changes may take place in the next few years the organization of the industry is not likely to be much different as regards the proportion of big, average and little houses."<sup>1</sup>

As a consequence, "few of the manufacturing firms have an impressive profits record during recent years, and this section of the market suffers from a certain lack of general investment interest."<sup>2</sup>

Salts of Saltaire is one of the rare examples of vertical organization in the worsted industry. In 1934 the net profits of this firm were £189,917 with reserves and undivided profits held of £114,548. The figures for five other leading firms in the West Riding were: £644,911 in Net Profits and £1,869,791 in Reserves and Undivided Profits.

The Yorkshire wool industry suffered two spasms of amalgamation—in 1920 and 1924. At each period the finance of the amalgamation was boom finance, the merging and absorption of firms being accompanied by gross overpayments for mills and gross over-capitalization of the combines. Although some of that inflated capital has since been cut by drastic reorganization of capital, the industry still suffers acutely from these voluntarily acquired financial diseases of the boom period.

For example, Illingworth Morris & Co., probably one of the most extravagantly reared children of the 1920 boom, runs eight subsidiary firms. Some of these subsidiaries were bought most expensively (the £150,000 capital of one William Morris costing £404,500). Naturally indigestion followed, and even a cut of three-quarters of a million in the capital in 1927 leaves the Illingworth Morris problem still unsolved, as its debenture debt (raised partly to finance these acquisitions) totals £825,000 and has absorbed in the last five years in interest £242,000 out of a total income in that period of £376,000.

The chief organization of the employers in cotton is the Federation of Master Cotton Spinners' Associations, Ltd., which is a federation of fourteen local associations. Through these local associations the federation comprises 650 firms owning forty-four million spindles—about 80 per cent of the total spinning in Great Britain. In normal times

<sup>1</sup> *Statist*, 29 June, 1929.

<sup>2</sup> *Economist*, 12 December, 1935.



approximately 200,000 workpeople are employed in the mills owned by members of the federation. Though the federation is for spinners, 10 per cent of the members are engaged in weaving.<sup>1</sup>

Employers in the weaving section are organized in sixteen local associations representing 560 firms. These associations are federated in the Cotton Spinners' and Manufacturers' Association which represents 80 per cent of the weaving firms in the industry. The federation also includes some spinning firms, amounting to perhaps 10 per cent of the total membership. One of the main objects of the Association is stated in one of their recent circulars as being:

"Clause 5.—Mutual Protection in the payment of equitable rates of wages against resistance on the part of operatives or operatives' Trade Unions." (22 October, 1935.) We shall see what they mean by "equitable" later on.

The employers in the wool textile industry have a series of carefully graded organizations. There are thirty-one district associations or federations. Prior to and in the early years of the War, federations of associations were formed, such as the Woollen and Worsted Trade Federation, and the Worsted Spinners' Federation. Later the Wool Textile Employers' Council was formed consisting of representatives from the main federations. In 1919, the employers, through the Employers' Council, joined the National Confederation of Employers' Organizations, and in 1921 established the Wool Textile Delegation as a central body.

In the finishing trades the employers are also organized in groups. In dyeing there is the Employers' Federation of Dyers and Finishers in the Lancashire area, while the Bradford Dyers' Association, Ltd., is the most important organization in Yorkshire. The bleaching trade is covered by the Employers' Federation of Bleachers, and the calico-printing employers by a similar federation. There is also the Federation of Cotton-Yarn Bleachers, Dyers and Sizers. The federations named have a co-ordinating organization, the Allied Association of Bleachers, Dyers, Printers and Finishers.

In order to start with a general picture, it will be of interest to quote from the results of examinations of young workers from the wool textile industry called up for military service at the end of the War. (Published by the Ministry of National Service, 1918.)

<sup>1</sup> Statement submitted by the Federation to the Committee of Civic Research appointed by the Government to inquire into the Industry, p. 2.

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	Grade I	Grade II	Grade III	Grade IV
	%	%	%	%
Woollen Trade ..	46.1	21.3	25.5	7.1
Lace Workers ..	45.1	26.9	22.7	5.4
Tailors .. ..	33.9	21.4	33.5	11.2

“Grade I.—Full normal standard of health and strength.

“Grade II.—Moderate muscular development and able to undergo considerable degrees of physical exertion of a nature not involving severe strain. They have fair hearing and vision, and do not suffer from progressive organic disease.

“Grade III.—Those who present marked physical disability.

“Grade IV.—Totally and permanently unfit for any form of military service.”

These figures refer to lads of between 18–21 years, at a time when the Government’s standards were exceptionally low owing to conscription. The Committee of Inquiry stated at the time that “the gradual fall in the index of fitness shown in this table is a true criterion of the effects of the various occupations upon the physical welfare of the workers.”

The figures require no other comment.

What produces these results is not hard to find. Employment in textile mills “if carried on in high temperature rarely fosters growth or development among boys. The stunted child elongates slightly in time, but remains very thin, loses colour, the muscles remain small, especially those of the upper limbs, the legs are inclined to become bowed, more particularly if heavy weights have to be habitually carried, the arch of the foot flattens, and the teeth decay rapidly. The girls exhibit the same shortness of stature, the same miserable development, and they possess the same sallow cheeks and carious teeth.”<sup>1</sup>

“The various branches of the industry afford examples of the influence upon health of excessive humidity and of high temperatures, of improper lighting, of toxic substances, poisonous gases, and of bacterial infections, as well as the dangers arising from the tending of rapidly moving machinery.” (*Industrial Hygiene and Medicine*, p. 504. Hope, Hanna & Stallybrass.)

In order to acquire a further insight into how the workers live, let the workers speak for themselves. We quote from *Working*

<sup>1</sup> Evidence of Mr. Wilson before the Committee on Physical Deterioration, Vol. I. *Report and Appendix*, 1904, pp. 26–27. Quoted in *Economics of Fatigue and Unrest*, P. S. Florence, 1924.

*Days: Personal Records of Working Men and Women, 1926*  
(extracts from the contribution of S.B., a Bradford textile worker.)

"I myself commenced work at the age of 12 years (half time), and my mother first entered the spinning-mill in order to contribute to the family income at the age of seven years. My spinning days, which covered a period of seven years, were little less than a nightmare to me, for I loathed every single day of my life while tied to the spinning and twisting frames; not because of the work but because of the conditions under which my schoolmates and myself worked. We were at it full time, 55½ hours per week, for 8s. 6d.

"Generally speaking, the operatives in a spinning-room are much younger than in any other textile department. Children leaving school who intend entering the factory almost invariably enter the spinning first. A young girl is first employed as 'a sweeper out'; the brushes are big, heavy and clumsy. There are places that are far too big for one sweeper and in these cases it becomes overpowering. The task is too great and the satisfaction and remuneration too small. The day's work becomes a drudge, for it is sweep, sweep, sweep, from morning till night, and in spite of this the room is always littered with waste and grease.

"To-day, as in years gone by, the complaints to be made relate to the conditions, rather than to the process of spinning. Spinning operatives are chiefly girls—only a very small percentage are boys, and these (with the exception of jobbers who are engaged to assist the overlookers) are very young. In view of this, it is in my opinion a deplorable fact that dozens of factories exist to-day without a woman supervisor or welfare worker. Every one of these girls, whether sick or well, is subject to the ruling and criticism of a male overlooker and manager. Under such conditions it is very sad when at a time of sickness and worry they have no one in authority to whom they can turn for a little help or advice. Many of the spinners—especially those employed in the centre of the city—come from very sordid homes. So bad are the conditions under which they live that they look forward to the time when they will be old enough to work and thus get away from the squalor. The absence of cloakrooms and dining-rooms is a very great inconvenience. In a great many cases factory workers, and especially spinners, have to partake of their meals inside the mill. You will find them sitting either on the floor or on the bobbin cases eating their bread and butter from their laps amidst dust, grease, oil and waste. This is not only unpleasant, but very injurious to the health.

"Work inside the factory is much harder than it used to be owing to the great speeding of machinery. The toil is almost

ceaseless; the machinery demands constant attention. Thirty years ago this was not the case; the machinery ran very much slower and the operatives had a little leisure during working hours, but all this has been abolished. Whether spinner or weaver, the textile operatives are on their feet from the first turn of the wheel in the morning till the last turn at night.

"Were it not for its effect upon human beings, a textile factory would be a splendid monument to man's skill. The marvellous and complex machinery that seems to work with hands, feet, eyes, that acts almost as if it had a conscious brain, is startling in the almost human, though automatic, perfection it has reached. One looks with wonder at the automatic looms of to-day which stop just at the right moment and dispose of the empty shuttle, pick up a full one and restart as though possessed of magic power. One is inclined to think 'what a boon to the workers;' but this is not the case, because a weaver of ordinary looms tends two, but an automatic weaver tends four with very little difference in wages.

"In spite of the long days some of our workers do quite a lot of reading. It has been stated over and over again that, owing to the monotony of the work, the majority of textile workers cannot bear too long the strain of thought or study. Generally speaking, when their day's work is done, they are too weary to engage in mental pursuits. There are, of course, exceptions, and one feels proud to meet young men and women who take an active part in various clubs, classes, study circles, and trade union organizations.

"There are more married women employed in the textile industry than any other. Babies are put out to nurse at a very early age—very often at six weeks old. So small is the family income that the mother is obliged to work in order to provide even the barest necessities: food and clothing for her children. In the event of sickness of husband or any other wage-earner, the mother naturally turns to her own trade for support. This of course makes it very inconvenient for all concerned, for instead of arriving home to a little rest and comfort, one is faced with a full day's domestic work waiting to be pushed into a few hours. For after all one must have clean clothes, clean beds and a clean house if it is to be home at all. Bread must be baked and food cooked, and the quantity of sewing, darning and patching tends to increase rather than decrease when boys and girls are left unattended to from morn till night. Hence one's leisure disappears, and what entertainment and education one gets is stolen at the expense and inconvenience of other members of the household.

"The insecurity of employment is another thing to be faced. There is so much unemployment in the country that one always runs the risk of being turned off, and no factory worker, entirely

dependent on her income, can ever be in a position to stand a long period of unemployment. When a worker feels ill she is almost afraid of staying off her work long enough to enable her to recover."

Dr. Dearden examined details of 10,548 cases of sickness which caused absence from work during a period of two years extending from July 1922 to June 1924, compiled from the records of the Card and Blowing Room Operatives' Approved Society.<sup>1</sup> The **Cardroom Workers:** men and some of the women were found to be **Strippers and Grinders** subject to excessive dust and the majority of the women and girls worked in an atmosphere which was often too hot, and frequently contained too much moisture. Both sexes suffered excessively from bronchitis, influenza and colds, rheumatic affections, and digestive troubles.

Where bale-breaking is still a hand process the worker has to put up with a considerable quantity of dust. In mills spinning low counts, where much mixing takes place, it is still a common practice to place moderately sized slabs on to a feeding-lattice attached to the breaker, and in such cases a lot of particles get into the atmosphere. In the carding process, a considerable amount of dust arises from the brushing of the flats, but the most intense clouds are produced by the stripping of dirt and waste from the carding and doffer cylinders. Stripping is carried out from twice to four times a day, according to the class of cotton being carded. Another very dusty process is the clearing away of the waste and dirt from the receptacles beneath the cards, openers, and scutchers, the jobber having to work in the midst of a thick cloud.

Dr. Dearden said "there is no doubt that the symptoms one noticed in strippers at work are those of asthma; clearing out a dirty box will invariably bring on an acute attack." "When fully established it was very distressing and like all other violent coughs might be accompanied by vomiting. In 18 cases (out of 100) the patient stated that streaks of blood had been observed on one or more occasions." Dr. Edgar Collis also found ("Millroy Lectures" 1915) that for men on coarse grades of cotton 91 per cent were more or less affected, while for men on medium and fine grades the figures were 72 per cent and 62 per cent respectively. Dr. Dearden comments that these extreme cases are rarely seen to-day,

<sup>1</sup> *Journal of Industrial Hygiene*, 1927.

and yet the mortality figures from bronchitis among strippers and grinders in 1921-23 was 120 compared with 1910-12 taken as 100.<sup>1</sup>

The fact is that the lower quality of the cotton used by the employer in order to cut costs causes extra stripping in the card-room, and makes matters far worse for the workers. There has been a steady increase of incapacity in recent years. During 1935 the average number of days of benefit paid per head of the membership of the Insurance Section of the Cardroom Workers' Amalgamation was 16.3 for men, as compared with 11.6 in 1930; 20.5 for single women, as compared with 14.1 in 1930; and 26.7 for married women as against 22.5 in 1930. Commenting on the fact that, only a few weeks before the issue of the Union's Report, the employers had refused to continue negotiations for a scheme to compensate grinders who had been injured by the dust, the Amalgamation says: "Never in the whole history of the trade have the employers been known to display an interest in the people. In their view the operatives are mere units, machine tenders, to be cast on one side when utility ceases, regardless of the fact that inability to work is caused by the filth which the men have inhaled whilst working in the mills."<sup>2</sup>

"[A spinner] has never a minute of rest except when he is mending broken ends and then it is not cessation of work but change. His nervous system is in a state of tension from the time he commences work until

#### Spinning

he finishes, the influence of the monotony of employment. Strain is known to be more exhausting than work. To strain must be added the influence of noise and of work carried on in overheated rooms and a humid atmosphere. In all textile factories the main object is to get out of machinery the greatest production possible, to secure which machinery has to be sped up to a degree almost impossible for human strength to cope with it for any great length of time."<sup>3</sup> That this description is equally true to-day can be seen from the following facts.

During the outward movement of the carriage on the mule spinning-frame, the spinner leans over the faller shaft to piece

<sup>1</sup> Figures in the Report of the Registrar General quoted in the *Report of the Departmental Committee on Dust in Card Rooms*, 1932.

<sup>2</sup> *Manchester Guardian*, 15 April, 1936.

<sup>3</sup> *Occupations from the Social, Hygienic and Medical Point of View*, p. 23, Sir Thomas Oliver.

together the ends of the threads which have broken in the twisting. In piecing a thread the spinner takes the broken end nearer him between the finger and thumb of his left hand, joins it to the other end on the delivery roller with a quick twist. The intensity of the work is shown by the fact that he may perform this movement 240 times an hour. But besides piecing there is also "doffing," or removing the completed cops, and "creeling," or replenishing the supply of roving with full bobbins, to occupy the spinners' attention. In this he is assisted by the big and little piecers, who also help in oiling and cleaning the machinery. The intensity of the work is greatly affected by the count of the yarn. Obviously when the yarn is coarse, the cops are more quickly completed and the mules run at a higher speed. Not only is there more creeling but it is estimated that doffing has to be carried out perhaps six times as frequently on 20's as on 80's counts. The operative not only suffers on account of the longer mules, but he also has to follow the carriage in and out, which may mean more than a third of a mile to be covered every hour. It is estimated that Oldham operatives walk about thirteen miles every day in the sweltering atmosphere of the spinning-room.

"A fact which strikes one on entering the spinning-room in a mill is that the floor is wet with oil; in fact in old mills oil actually drips through to the floor below."<sup>1</sup> Owing to faults in the machinery the spinner often has to kneel on the floor to carry out repairs. His overalls thus absorb oil from the floor, at the knees, and from his hands. This oil coupled with friction from the hard cheap overalls containing up to 40 per cent size, which on account of the heat are worn next the skin, is the cause of scrotal cancer. The seriousness of this disease is shown by the fact that between the years 1920-34 there were 719 cases of scrotal cancer of which 228 proved fatal, a percentage of 31·7.<sup>2</sup>

"In addition to the speeding-up of machinery in textile mills there is also the warm and humid atmosphere, which causes not only a quickening of the pulse, but also a rise in the temperature of the mouth to that of the internal temperature which is also slightly raised. Weavers when at work are on their feet all day long watching for broken threads. They travel several miles every day over the

<sup>1</sup> "Scrotal Cancer," by James Robertson, *Journal of Industrial Hygiene*, 1927.

<sup>2</sup> *Report of the Chief Inspector of Factories*, 1934, p. 60.

floor-space allotted to them. The warm atmosphere imposes a tax upon the powers of accommodation as indicated by the low blood pressure. More blood sent to the skin to be cooled means more work thrown upon the heart and greater demands made upon the central nervous system to regulate the distribution of blood. When in consequence of long-continued physical exertion the skin has become warmed, there occur a lowering of the muscular tone, a lessening of the exchanges of the materials of the body and a depression of the appetite. It is circumstances such as these which explain the pallor of cotton-weavers, their slim build and shortness of stature, their complaint of indigestion and loss of appetite with an accompanying sense of fatigue."<sup>1</sup> These are the conditions that drive the worker to death: ". . . Mortality at later adult ages in this country is discreditable to us. . . . This discreditable high mortality affects particularly the centres of our most productive industries, such as Lancashire and the West Riding of Yorkshire."<sup>2</sup>

*Cotton.* As a comment on the profits that are made in the industry we quote the following conversation which is typical of the state of the class relationships in the industry, and which illustrates the role of the spinning and weaving firms in connection with wages.

"A. Naesmith (weavers): For the last four or five years your firm has never honoured any agreements?

"W. Birtwhistle (Birtwhistle & Fielding, Ltd.): It's a matter of what you call honouring agreements.

"James Bell (weavers): What is the actual amount your weavers earn per week?

"Birtwhistle: Eight shillings a loom.

"Bell: And the majority of your weavers are running four looms?

"Birtwhistle: Yes.

"Bell: Do you regard that as fair remuneration?

"Birtwhistle: It's not a question of what I regard as fair, but of what the industry can afford."<sup>3</sup>

In a table showing the position of the workers in the cotton industry, the T.U.C. in their pamphlet on cotton state that wages,

<sup>1</sup> Evidence from Dr. Pembrey of Guy's Hospital, and Dr. Edgar of the Home Office, from the *Second Report of the Departmental Committee on Humidity and Ventilation in Weaving Sheds*, 1911.

<sup>2</sup> Sir George Newman, *Report on the State of Public Health*, 1921.

<sup>3</sup> *Daily Herald*, 18 May, 1935.



taking the 1920 rates as 100 per cent, were down in the spinning section to 53.5 per cent in 1932, and in the weaving section to 53 per cent. In the weaving section the reductions have been as follows:<sup>1</sup>

70% in 1921.  
 40% in 1922.  
 12½% in 1929.  
 15½% in 1929 (Midland Agreement).  
 5¾% further reduction for four-loom weavers as from  
 July 15th, 1935.

After the watering of capital five or six times by the issue of bonus shares after the War, we should expect to find the severest attacks on the standards of the workers.

What these reductions mean in wages the following table shows. It compares the wage census of March 1920—the peak period for wages was May 1920—with the wages paid in September 1932. The rates are for the spinning section, and show both the wretchedly low wages during the boom period and also the very big reductions since.<sup>2</sup>

Worker	March 1920			September 1932			
	£	s.	d.	£	s.	d.	
Ring Overlooker .. Glossop & Hyde	3	14	6	Chorley ..	2	16	9
Ring Jobber .. Farnworth	2	7	4	Rawtenstall	1	13	8
Oiler & Bander .. Wigan	1	3	8	Manchester	1	4	0
Ring Frame Tenter .. " ..	1	14	4	Wigan ..	1	3	6
" Doffer .. " ..	14	7		" ..	13	4	
Gaiter-up .. " ..	17	7		" ..	12	1	
Bobbin Carrier .. " ..	1	1	9	" ..	15	9	
Mule Overlooker .. Farnworth	3	18	8	Rawtenstall	3	3	6
Spinner (Twist) .. Darwen	3	12	2	Yorkshire	3	1	1
Big Piecer .. Chorley	1	13	0	Bury ..	1	6	0
Little .. " ..	18	10		Bolton ..	16	2	
Spinner (Weft) .. Darwen	3	13	5	Rawtenstall	2	16	6
Big Piecer .. Chorley	1	13	11	Wigan ..	1	3	1
Little Piecer .. " ..	19	6		" ..	15	2	
Extra Piecer .. Farnworth	11	3		" ..	11	0	
Bobbin Carrier .. " ..	1	14	2	" ..	14	1	
Weft .. Wigan	1	4	10	Manchester	12	11	

But wages in cotton are disgracefully low throughout the whole industry. Even in 1906, out of 106 industries providing hourly figures, only 25 were below cotton, and in 1924 out of 84 industries there were only 6 below (hourly earnings for all males: 1924

<sup>1</sup> *Cotton Factory Times*, 27 December, 1935.

<sup>2</sup> Jewkes and Gray, pp. 201-202.

Wage Census). The actual average weekly earnings for a typical week in September 1924 were:

						<i>Shillings</i>
Preparing	..	..	..	..	..	33·12
Spinning	..	..	..	..	..	34·58
Weaving	..	..	..	..	..	34·98
Total including "others"					..	35·92 <sup>1</sup>

and since then the average has greatly shrunk. Another significant fact is that earnings have fallen more rapidly than wage-rates.

	<i>Rates</i>		<i>Earnings</i>		
	<i>Mule</i>	<i>Ring</i>	<i>Mule Spinning Twist</i>	<i>Mule Spinning Weft</i>	<i>Ring Spinning</i>
March 1920 ..	134·2	135·2	138·5	138·9	135·9
Sept. 1932 ..	100	100	100	100	100

This has been due to firms working short time for very long periods. Between 1921–26 for instance short time totalled 71·4 weeks of 48 hours, during which all spindles in the American section were at a standstill. The effect of constant stopping and starting is not only bad technically for the machine; it is also bad for the skill and wages of the worker. But the chief reason is "bad spinning" or the substitution of a poorer quality material by the employer with the object of cutting costs at the expense of the worker from whom he demands the same level of output and efficiency. It is this steady deterioration of quality coupled with short time that has had the effect of reducing earnings faster than wage-rates, and the workers are having to contend with this kind of thing throughout the entire industry to-day.

We will take the case of the big piecer as an example of the appallingly low rates paid for male workers. "His earnings are among the lowest of the whole range of earnings for adult male workers in the country despite the fact that his work involves much training and not a little specialized industrial skill."<sup>2</sup>

The table below gives full-time earnings of big piecers in a

<sup>1</sup> Ministry of Labour figures.

<sup>2</sup> Jewkes and Gray, p. 176.

number of Lancashire districts in 1934 compared with the maximum Unemployment Assistance Scales and standard rates of Unemployment Benefit.

District	Earnings for full-time week		Unemployment Assistance Scales (Basic Rent 7s. 6d.)	Standard Unemployment Benefit
	lowest	average		
	s. d.	s. d.		
Ashton (Twist) ..	26 11	27 4	28 0	28 0
„ (Weft) ..	29 7	30 4		
Bolton (Twist) ..	26 4	26 11		
„ (Weft) ..	27 4	27 7		
Oldham (Twist) ..	28 6	28 9		
„ (Weft) ..	32 4	32 6		
Rochdale (Twist) ..	30 6	30 6		
„ (Weft) ..	34 9	35 6		

From this table it is clearly seen that their earnings do not compare favourably even with the dole. The big piecer of twenty years earns 4d. an hour. That is the level to which this section of British workers has sunk under capitalism.

“The reductions resulting from the new weaver’s list of prices on ordinary cloths, vary from 10% to upwards of 20%: and this on cloth for which the wage per loom would not be more than 9/6 to 11/- before reduction. Where poplins, venetians and art silk goods are involved the reductions vary from 15% to 25% and upwards. Thousands of weavers, where under-employment is the general rule, are going home with a wage of 15/- to 25/- week after week, and have to swallow their pride and go to the P.A.C. for a food ticket.”—Carey Hargreaves (Secretary of the Nelson and District Weavers’ Association).<sup>1</sup>

“It might be thought that by working six looms instead of four, a weaver would considerably augment his production, and therefore his wages. But the increase in the number of looms has brought a slowing down of between 7½% and 10% on their running speed. Thus by the new price list for six looms, an operative who was earning 40/- a week of forty-eight hours, working four looms, will earn 41/- a week, working six looms. That is to say he will earn 1/- more a week provided all his looms are running. But if he finishes a warp and there are no more orders coming in, he will come down to five looms and then perhaps to four or three. He will still have to be at the mill for forty-eight hours, and he can only earn five-sixths or four-sixths of 41/-, according to the number of looms he has running.”<sup>2</sup>

<sup>1</sup> *Cotton Factory Times*, 4 October, 1935.

<sup>2</sup> *Are Trade Unions Obstructive?* Ed. Prof. J. Hilton, p. 80.

"There are great numbers of weavers in Lancashire who are earning less under the six-loom system than they earned under the four-loom system, owing to the vast amount of under-employment, which is now more prevalent than it has been in any time of our history."<sup>1</sup>

*Wool.* Of this industry, Mr. W. L. Heywood says "Not only are the weekly earnings of textile workers exceptionally low, but they vary from place to place, and from district to district in the most absurd manner. There must be hundreds of cases in the West Riding of members of the same family working at the same jobs in different factories for different time-rates, let alone for different piece-rates".

"An analysis of the evidence advanced by the employers in 1925 and again in 1930 shows that their whole effort has been directed towards securing a reduction in wages. They do not complain of the restrictive practices by the Unions, and they do not, with one very minor exception, advance any arguments to show how output might be improved."<sup>2</sup>

In the *Annual Report* to the National Union of Textile Workers, Arthur Shaw quotes statistics from the *Ministry of Labour Gazette* to show how miserably low are the wages rates in operation throughout the industry. In the twelve months ended December, 1934, the average number of operatives employed in the industry for whom returns were made was 137,296. Excluding holidays, or in effect, over the period of 50 weeks, the earnings per operative averaged 36s. per week. The average in the Worsted Section was 35s. 2d., and during the worst month in the year was 30s. The earnings of the women operatives in this month averaged only 22s. 6d. per week. (25 May, 1935.)

Finally, Mr. W. L. Heywood concludes:

"There are thousands of adult male textile workers, employed by firms who pride themselves on paying the established rate to all their operatives, who receive from 42/- to 44/- for 48 hours. In the worsted spinning mills adult females are paid 21/- (spinners) 23/9 (drawers and reellers), and 26/- (warpers). Such figures might well lead a stranger to suppose the West Riding to be a distressed area."<sup>3</sup>

<sup>1</sup> *Ibid.*, p. 80.

<sup>2</sup> *Are Trade Unions Obstructive?*, p. 300.

<sup>3</sup> *Bradford Pioneer*, 13 December, 1935.

The decline in insured cotton-workers of 105,000 since 1924 shows how many men and women have abandoned the industry for good. Of the remainder who have hung on hoping for better days no less than 102,000 are unemployed, while there are 256,000 less employed workers than in 1912.

			<i>Lancashire</i>		
			<i>Registered</i>	<i>Employed</i>	<i>Unemployed</i>
1912	..	..	—	621,516	—
1924	..	..	572,420	487,702	84,718
1929	..	..	554,790	488,215	66,375
1934	..	..	467,440	365,071	102,369

To take one area. "In a badly depressed textile town 32 per cent of the men under 30 years, 45 per cent between 30—39, 47 per cent between 40—49, and 54 per cent between 50—64 years have been unemployed for more than a year."<sup>1</sup> And in one district "With the closing of Rhodes Top Mill, Hadfield, three-fourths of the cotton-operatives are on the Means Test from Hadfield to Broadbottom, and out of twelve mills only one in this area is finding employment."<sup>2</sup>

The situation is worse even than these figures show because the real gravity of unemployment is concealed by short-time working. The frequency of this is shown by the estimated figures from four principal cotton areas in which the rate of unemployment was about 45 per cent that as many as 70 per cent of the insured men and 88—90 per cent of the insured women made claims for benefit at some time during the year ended December 1930.<sup>3</sup> But distress in Lancashire cannot be measured in cold statistics. The appalling rise in the number of persons in receipt of Poor Relief (100,000 between 1931 and 1934) gives some indication of the misery suffered; but in order to bring it home more keenly we will make a personal visit to the back streets of industry and hear the workers speak for themselves.

"I had worked at an artificial silk factory for eight years when I was locked out. I was in charge of the 'pirn-winders' stores, which are part of the weaving department, and when the company lowered the weavers' piece-rates last December the weavers threatened to strike rather than accept the reduction. The

<sup>1</sup> *Manchester Guardian*, 8 February, 1936.

<sup>2</sup> *Cotton Factory Times*, 4 October, 1935.

<sup>3</sup> *Manchester University Survey of Lancashire*, p. 10.

company refused to let them work until the new rates were accepted, and my stores were closed along with the rest.

"I had nothing to do with the dispute. My wages were not in question because I was not a weaver, and the foreman had no fault to find with my work. Not all the weavers returned when the 'lock-out' was over. The old hands did not get taken on again, as young girls of sixteen to nineteen are as good at the job and a great deal cheaper. I suppose that is why I have not been able to get my job again as I am forty-three.

"I have six children. The eldest is a boy of twenty-two in the Navy. My eldest daughter is seventeen and works at an elastic webbing factory. She will bring home anything from 11/- to 18/- a week, but to get 18/- she has to work from eight o'clock in the morning to seven at night. My next boy is sixteen and he works at the silk factory for 15/-. My girl aged fifteen is in the making-up department at the same factory and earns 14/- a week. My youngest girl to be working is also at the webbing factory and she gets 9/10 a week. I have two girls still at school. My husband left me ten years ago.

"When I was working I got 30/- a week; since Christmas I have had to keep the six of us on the children's earnings and my unemployment pay. I have now come to the end of my benefit and I am told that I must go to the Public Assistance this week. They will apply the Means Test to me, but they will see that I have nothing but the children's wages, which come to £2 17s., when they are working overtime in the summer. In the winter they work short time and I only get half that amount. I have no more furniture to sell. I have already parted with everything that I could spare to the neighbours for whatever I could get, and now I have a table, three chairs, a couch and the beds left.

"I don't suppose I shall ever have more, for I do not know on Fridays who to pay first. It's the children's clothes that worry me most. I cannot let them go without shoes in the bad weather, but that means they must go without food. I don't know how I am going to get new bedclothes or top-coats for the winter. I have tried to get work, but there is no regular work for a woman of my age. I hate this nothing-to-do. I am a strong woman, and I liked having my work at the factory, although it meant eleven hours away from home every day and five on Saturday, and doing the cooking, washing and sewing for the week on Saturday afternoon and Sunday. Now that there is nothing for me to do to earn the money we need for clothes and food I must try 'charing.' I have a small garden, but this is not my work and however much I do I cannot earn the money for the children's clothes."<sup>1</sup>

This case which is representative of thousands brings out with

<sup>1</sup> *Memoirs of the Unemployed*, Beales and Lambert, 1934.

force that main contradiction of capitalism in decay: the suffering of textile workers who cannot even clothe their own children.

In the mule spinning section it is customary for each set of machines to be minded by three operatives. The spinner or minder, who is solely responsible for the output of the mules, himself employs two other workers, the big piecer and the little piecer, at wages agreed between them. This situation creates serious difficulties for which a remedy must be found. "The post-War depression has both worsened the lot of the piecer and made it even more difficult to devise effective and acceptable remedies."<sup>1</sup>

The main difficulty is that piecing was "always in essence, and is increasingly in practice, a blind-alley occupation."<sup>2</sup> The spinner works from the age of 25 years to 55 years: a period of 30 years. But the big piecer's job only lasts from the age of 18 to 25 years: a period of 7 years; and the little piecer's from 14 to 18/19 years: a period of 4 years. From these figures it can easily be seen that whereas the spinner will require between four and five big piecers and between five and six little piecers during his life in an industry of constant size, only one of these can become a spinner. During the expanding phase of capitalism the industry was increasing in size (between 1900-13 the number of spindles increased in Oldham by 49 per cent and in Bolton by 35 per cent); more spinners were required and thus room was made for some of the superseded big piecers. Others found employment in allied industries (e.g. textile engineering), which were increasing their output along with the main industry. The expansion of the industry concealed the essential viciousness of the system. But the fact that cotton has been a contracting industry in the post-War years (between 1920 and 1933 the number of spindles has decreased by 10 per cent) and the decline in textile engineering, has forced the big piecers down to the level of a "submerged class with an extraordinary low standard of living."<sup>3</sup> Moreover promotion from big piecer to spinner has been slowed down by a decline in the number of spinners following a reduction in the number of mules without a compensating increase in the number of rings. It has also been slowed down by the increased normal working life of spinners because unemployment has reduced their

<sup>1</sup> Jewkes and Gray, *op. cit.*, p. 172.

<sup>2</sup> *Ibid.*, p. 172.

<sup>3</sup> *Ibid.*, p. 174.

savings and made it harder for them to retire. The ravages of unemployment have had the further effect of driving fully qualified spinners back to work as big piecers. "The result has been that not only do those in closest touch with the industry consider that, without any doubt, the average age of the big piecer is rising, but also the big piecers are actually growing up, marrying, and attempting to bring up a family on quite insufficient wages."<sup>1</sup>

An Inquiry conducted in 1934 among 2,780 big piecers registered as temporarily stopped in eight Lancashire towns gives the following results regarding the rise in age of piecers. Of the total 54 per cent were above 24 years of age, 25 per cent were above 28 years and 10 per cent above 31. In one mill one pair of mules had three operatives working on it the youngest of whom was 70 years of age!<sup>2</sup> Again of the total 30 per cent were married, 12 per cent had children and 3 per cent had two or more children. In Oldham the figures were far worse. Eighty-three per cent were over 24 years, 40 per cent over 28, and 25 per cent over 31; furthermore 41 per cent were married, 17 per cent had children and 4 per cent had 2 or more children.

These facts mean that big piecers are (1) frequently supporting a family, often of more than one child, (2) attempting to bring up their families on a standard of living which compares in many cases unfavourably with U.A.B. scales. It requires only a very short stay in any Lancashire spinning-centre to provide ample testimony of the shocking effects upon their families of the poverty of the big piecers.

Overtime and undertime are inextricably tangled in the wool textile industry, and the same sections show **Hours of Labour** at the same time drastic short-time and heavy overtime working. This is especially true of the woollen section. The position in a week in May 1935 was as follows:

	<i>Short-time</i>		<i>Overtime</i>	
	<i>% of workers</i>	<i>No. of hours lost (average)</i>	<i>% of workers</i>	<i>No. of hours overtime (average)</i>
Woolsorters and combers	15	12	18½	9
Worsted spinning	14	13½	16	5
Worsted weaving	11	9	10	6
Woollen spinning	24	9½	10	6
Woollen weaving	32	9½	11	6

<sup>1</sup> Ibid., p. 175.

<sup>2</sup> Ibid., p. 177.



Commenting on the frequency with which firms resort to the longest permitted working hours, Mr. Heywood says: "In many trades—the woollen and worsted among them—where the normal hours of employment are supposed to be 47 or 48 it has become the practice of some firms to work up to the full legal limit when trade is good. This is the great weakness of present-day factory law. It is almost incredible that so-called protected persons can, within the law, be worked for longer hours than even their employers regard as normal."<sup>1</sup>

Arthur Shaw says: "Any early riser can see the women and children going to work at 6.15 a.m. to start at 6.30, and on many occasions I, myself, have seen children half awake setting off to work their full ten hours' stretch, just as they were expected to do twenty or thirty years ago. It is not at all unusual to see young girls leaving factories at 6.45 or 7 p.m.—a state of affairs entirely unknown twenty years ago."<sup>2</sup>

"The employers seemed to assume that the forty-eight hour week was simply for the purpose of regulating wages, and that they could work overtime regularly, and that is why we got the Joint Industrial Council to have overtime limited."<sup>3</sup> That the unions were perfectly right in taking this step in 1922 is shown by the fact that many of the employers have since taken advantage of the breakdown in the conciliation machinery, not only to work regular overtime, but also to abandon the forty-eight hour week as a basis for regulating wage-payments. A union official stated: "It would be true to say that one-half of the firms adopt the working hours of 6 a.m. to 6 p.m. under the Factory Acts, and the other half from 7 a.m. to 7 p.m."<sup>4</sup> The dyers work from 6 a.m. to 6 p.m., taking their meals over the jigs in the foul steaming atmosphere of the dye-house, without a break except when they fetch colours.

A number of firms have gone back to the continuous two-shift system, with the result that men come on when the women finish, to work right through the night. "There are a great number of woolcombers who work from 5 p.m. until 7 a.m. next morning, without a break, night after night. That is, they work over seventy hours a week. The men strongly object to this, but they have no alternative if they want to keep their jobs. In one case the men

<sup>1</sup> *Bradford Pioneer*, 26 July, 1935.

<sup>2</sup> *Textile Workers' Record*, p. 6, September, 1934.

<sup>3</sup> *Are Trade Unions Obstructive?*

<sup>4</sup> *Ibid.*

actually worked from 5 p.m. on Friday till 7 a.m. on Saturday morning, and then went back again at noon on Saturday and worked until 9 or 10 p.m. that night."<sup>1</sup> Such hours as these make the presence of unemployment and under-employment in the industry all the more illogical and outrageous.

One of the most serious forms of undertime is that found in the cotton weaving section. Mr. J. W. Sunderland, secretary of the Great Harewood Weavers' Association, said that "he knew of no other industry where workers were liable as in Lancashire to be called upon to work for 48 hours a week on half-pay because their employers might not be able to keep all their machinery running." That is to say, the weaver is working full time but only earning half wages. "The weaver is very often not 'payed off' at all, but has to work the usual number of hours with one or two looms—sometimes even three—stopped out of four. As a consequence he cannot sign on, no matter how low his wage is. He cannot obtain relief from the relief committee because they are forbidden to grant relief to people who are working. Neither can the Unemployment Assistance Board grant anything unless the claimant is unemployed. The under-employed weaver who cannot live on his meagre wage ('there are workers in the industry who through under-employment are going home with something less than 20s.' George Tomlinson, C.C. Secretary of Rishton Weavers' Association), has only one source of help from public funds, and that is the relief ticket issued by the relieving officer. When his wages are below the relief scale he is actually worse off than if totally unemployed."<sup>2</sup>

The organization of the workers in the cotton industry shows the disease of sectionalism in an acute form. Not only are there three separate unions for the spinning, weaving and finishing sections, but within each division there are a number of associations catering for the same class of workers. In December 1932 there were 171 unions in the cotton industry with a total membership of 318,884 or 63·8 per cent of the workers. In almost every town and village separate

<sup>1</sup> *Ibid.*, p. 307.

<sup>2</sup> Carey Hargreaves, Secretary of the Nelson and District Weavers' Association, in *Cotton Factory Times*, 4 October, 1935.

local textile organizations exist. They are autonomous units, linked together in amalgamations, and subsequently on the manufacturing side in the Northern Counties Textile Trades Federation; while for the whole industry there is the United Textile Factory Workers' Association, which deals mainly with legislation and political matters. By far the largest organizations are the Amalgamated Association of Operative Cotton Spinners and Twiners, the Amalgamated Association of Card Room Operatives and the Amalgamated Weavers' Association.

Besides divisions due to locality or to the nature of the work in which their members are engaged, the unions in the industry differ in structure. There are open and closed unions. Of the former the Amalgamated Weavers' Association is a good example. It is open to men and women without distinction, and will accept all workers who have any connection with the weaving side of the trade. Other unions on the manufacturing side cater specially for the cloth-workers, overlookers or twisters and drawers. In contrast, entry to such organizations as the Card and Blowing-Room Operatives' Association and the Central Union of Associations of Loom-Overlookers is subject to strict supervision, chiefly designed to regulate the labour supply. In the former the unions insist that for every three journeymen one apprentice be trained for two years after reaching the age of eighteen. The maintenance of this craft organization often enables a small section of the workers to benefit at the expense of the rest of the working class, and sometimes even amounts to a virtual contracting out of the class struggle. It is not possible for the workers as a whole to escape in this way from the clutches of capitalism.

For many years the cotton-operatives have been strongly organized, though in this, as in other industries, the prolonged trade depression has weakened the position of the unions. In 1920 the Amalgamated Weavers' Association had a membership of 223,000; to-day the figure is approximately 122,000. The decline in membership is almost exactly parallel with the rise in unemployment, since the Association calculates that there are between 110,000 and 120,000 surplus employees in the manufacturing section of the industry. The same process is apparent, though not to the same degree, in the rest of the industry. The Operative Cotton Spinners and Twiners have dropped to 40,000 from a maximum of 55,000 and the Card and Blowing-Room Operatives from a normal strength of about 75,000 to 66,000.

In the wool textile industry the National Union of Textile Workers is the major union. This body has taken a leading part in promoting the National Association of Unions in the Textile Trades with the object of bringing the workers of all branches in the industry into closer co-operation. In the past the unions have not always combined to pursue a common policy, but recently the National Association has revised its constitution and it now includes all the more important organizations in each branch of the industry with the single exception of the National Society of Woolcombers.

The operatives are not so strongly organized as they were before the dispute over the Macmillan award. In the more prosperous days fully 60 per cent of the workers were members of one or another of the unions, but the proportion has dropped to about 40 per cent. Organization is best among the craftsmen, and their unions claim to control most of the key positions. On the other hand, in the worsted section, where a large number of juveniles are employed, there is little real organization of labour.

The finishing section is served by unions of three kinds. There are those which are confined to the finishing trades. Of this class are the Amalgamated Society of Dyers, Bleachers, Finishers and Kindred Trades, which covers Yorkshire and Scotland; and the Operative Bleachers', Dyers and Finishers' Association, which operates in Lancashire only. Secondly, some operatives belong to the National Union of Textile Workers, an organization which has members from all sections of the industry. And finally, the National Union of General Workers has extended its activities to include a considerable number of workers in this section of the cotton trade. In December 1932 there were twenty-eight trade unions in the finishing section, with a total membership of 58,318.

In view of the struggles that lie ahead of the unions, the great need of the hour is clearly unity. One of the big difficulties here is the existence of contributions and benefits round which vested interests tend to grow. This is admitted by Mr. Heywood when he says, "It would be idle to deny that vested interests exist or that they can be very stubborn." "Powerful groups of members combine to vote down any amalgamation proposals which appear to imperil the particular benefit they are concerned about; for

**Trade Union  
Unity**

example, probably more fusion schemes have been wrecked by the opposition of members qualifying for superannuation than by any other means."

It can be shown that this sectionalism impairs the strength of the unions not only as fighting organizations but also as benefit societies. For instance in the Lancashire Cotton Spinning section, the local associations fix their own rate of benefit payments, administer their own funds and affairs, and undertake the preliminary negotiations concerning disputes relating to wages and conditions. This is remarkable since in 1933 only 3 out of 17 districts had more than 250 members. These small administrative units must mean an increase in expenses. Whereas the four largest districts or provinces cost on an average 3·4*d* per member, the four smallest cost on the average 5·9*d* in 1932. The conclusion is not quite established from the figures, but they point to unification meaning economy.<sup>1</sup> It is this insistence on district financial autonomy which prevents the risks being as widely or the insurance schemes being organized as scientifically as possible. If during the comparatively prosperous years before 1929 there had been in existence a national textile organization, with the gift of foresight and the power to use funds derived from one section to strengthen other sections, national support would have been forthcoming for Bolton, for example, when during 1929-31 the union was faced with the payment of £200,000 in temporary stoppage. In this case Bolton would not have had first to reduce benefit and then to discontinue it altogether for one year, after the funds of the union had been seriously depleted.

As an illustration of the state of depression into which the industry as a whole has fallen, we quote the following figures.

<b>Depression and Decay</b>	Comparing the 1924 and the 1930 Censuses of Production, we find that the total net value of production decreased by 36 per cent in textiles against a decline of 6·2 per cent generally. The distribution of the total decrease of £76 million was in cotton spinning and weaving represented by the figure of £42 million and in woollen and worsted by £17 million. <sup>2</sup>
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We give below a Summary of Production in the Woollen and

<sup>1</sup> Jewkes and Grey, p. 162.

<sup>2</sup> *Economist*, 11 March, 1933.

Worsted Textile Trade as shown in the Census of Production of 1907, 1924 and 1930.<sup>1</sup>

	U.K. 1907	Total made Gt. Britain only, 1924	Gt. Britain 1930
Tops ..	243.5 mill. lbs.	285.8 mill. lbs.	244.5 mill. lbs.
Noils ..	30.0 " "	35.0 " "	28.0 " "
<i>Yarns:</i>			
Woollen ..	260.0 " "	314.3 " "	190.7 " "
Worsted ..	186.0 " "	210.6 " "	158.3 " "
<i>Tissues:</i>			
Woollen ..	188.1 mill. yds.	77.1 mill. sq. yds.	
Worsted ..			182.1 mill. sq. yds.
Mixed ..	—	178.7 " "	
Total ..	188.1 " "	255.8 " "	182.1 " "

"The issue of the Census of Production 1930 Final Report (Wool Section) brought home the fact that between 1924 and 1930 the proportion of the total product exported had fallen from 50 per cent to 36 per cent. As this latter figure related to an output of fabrics that was 25 per cent less than the 1924 production the seriousness of the contraction of overseas trade is apparent."<sup>2</sup> Exports indeed declined from 221.6 million sq. yds. in 1924 to 102.2 million sq. yds. in 1934, or by more than half. And in 1932 the figure was only 81.2 million sq. yds. In 1929 there was 40 per cent of the looms of Bradford standing, although there was a boom in the first half of the year.

"The tap-root of the troubles in this industry is the falling off in the consumption of its products, a decline due to causes unconnected with the competition of imported goods. This decline of demand has been common to the whole Western World."<sup>3</sup> Whereas the average amount of wool consumed per head in Britain between the years 1890 to 1919 was 17.8 lbs., actually rising to 22.16 lbs. during the War, in post-War years the figure has sunk to 14.7 lbs. or barely above the level of the latter half of the last century (1860-90 : 14.3 lbs.). These figures prove in no uncertain way that the main increase in the use of wool under capitalism has been an increase for war purposes; and that when the slaughter is done the workers come back to "exchange their uniforms for rags."

<sup>1</sup> *Statistics Annual Report Bradford Chamber of Commerce, 1934, p. 11.*

<sup>2</sup> Shimmin, *Britain in Depression*, p. 365.

<sup>3</sup> Board of Trade Safeguarding of Industries. *Report of the Woollen and Worsted Committee*, p. 16.

The conflict between the productive forces and the class relationships which determine the extent to which the products of society are consumed has now reached world proportions. Baron D'Andoy estimates that the average output per operating spindle in 1928 was 20 per cent greater than in 1913. The number of spindles in 1927 was approximately 172.6 million, equivalent to 207 million on the 1913 basis: an increase of effective spinning capacity by about 42 per cent. And yet the world consumption of raw cotton was only 14 per cent greater in 1927 than in 1914.

Inside this world picture, the crisis of British capitalism is most deeply expressed in Lancashire, that "classic soil (as Engels wrote in 1844) on which English manufacture has achieved its master-work" in its flourishing period, and to-day the most powerful demonstration of its permanent and basic decay. The decline in cotton is far heavier in proportion than for any other industry. While the general index of production in Britain for 1934 stood at 84 per cent of 1913, while the volume of coal output stood at 78 per cent of 1913 and coal exports at 54 per cent of 1913, while even shipbuilding in 1934 stood at 40 per cent of 1913, cotton exports in 1934 (and three-fourths of the output of the industry is for export) were only 28 per cent of 1913. The export of cotton piece goods, which had fallen from 7,057 million yds. in 1910 to 2,198 million yds. in 1932, fell further to 2,031 millions in 1933 to 1,993 millions in 1934, and to 1,949 in 1935.

At the post-War peak, production was roughly one-third below the pre-War level; and in 1931 the crisis brought the industry to a state of virtual paralysis, with one-half of its labour force of nearly 570,000 insured workers unemployed.

This decline has been due only in part to the weakening of the grip of British imperialism on the Indian market. It is true that British cotton exports to India totalled only 586 million yds. in 1933 or less than one-fifth pre-War. It is true that Japanese cotton exports, on account of the greater efficiency of her industry, advanced to exceed the declining British for the first time in 1934. And it is true that on account of the growing hatred of British rule the Indian boycott has increased the demand for Indian mill production: between 1928-34 Indian mill production increased from 1,893 million yds. to 2,945 million yds. (out of a total available quantity of 3,830 million yds.), an increase of 55 per cent in five years.

But of greater significance is the fact that the consumption of

cotton piece-goods in India, both imported and made in the country, was in 1913-14 13.29 yds. per head, while in 1927-28 it was 12.11 yds. and in 1929-30 12.04 yds. This was before the effect of the world economic crisis. Since then, the nature of the goods consumed by the Indian worker shows a further fall in the standard of living. "Consumption declined in quantity and quality, with the most damaging results for those countries which supplied India with manufactures."<sup>1</sup> Before 1914 out of every 100 yds. of cotton piece-goods worn in India, 50 yds. was of good quality British manufacture. But the purchasing power of the Indians has fallen so low that in 1933-34 they could afford to buy only 7.6 yds. from Lancashire, 56 yds. coming from Indian mills, and 28 yds. from the hand loom. This mass impoverishment of the Indian people has been brought about by the widening gap between the price at which the peasant can sell his raw materials and the price at which he can buy finished goods. Between September 1929 and March 1934 the price of raw cotton slumped by 51 per cent, while in the same period cotton manufactures only fell by 29 per cent. This "opening of the scissors" against the peasant is making his lot unbearable. As Prof. J. P. Thomas, from whose article some of these figures are taken, says, "The Indian peasant even in the best of times, lives on the verge of poverty, and most of the economic surplus from agriculture normally goes into the pockets of the landlord, moneylenders or Government. The depression has increased the inequalities of distribution between these partners (!) in the agricultural business. The risks have fallen on the peasant who is least capable of bearing them." And the writer is forced to the only possible conclusion: "the persistently low standard of living of the Indian masses is to-day the greatest obstacle to the increasing consumption in India of Great Britain's better-grade goods."<sup>2</sup> Unemployment and low wages among industrial workers has contributed further to the impoverishment of the Indian masses.

But we can go further. In the post-War period, over the thirteen years 1920-32, the average world cotton consumption annually was 22.89 million bales. In 1931 the figure was 22.48 million; in 1932, 22.32 million.<sup>3</sup> So that in the last two decades, when world population increased by something like 200 million

<sup>1</sup> *Economist*, 14 December, 1935.

<sup>2</sup> *Economic Journal*, No. 179, 1935, p. 482. Prof. P. J. Thomas, "India in the Depression."

<sup>3</sup> Report (June, 1933) to the International Cotton Congress at Prague.



persons, the world consumption of cotton actually sank below the 1913 level of 23 million bales. These figures give the lie to all those reactionary forces who chant in chorus "Japan has stolen our Cotton Trade," in their attempt to conceal the real cause of the crisis which is rooted in capitalism itself: the low level and even fall of the world consumption of cotton.

Nor can it be said that the decline in cotton is due to increased consumption of artificial silk. Whatever its future, the production of rayon was only 8.21 per cent that of cotton in 1934. The average annual world production of these two commodities taken together was 14,396,708 lbs. between the years 1924 and 1931. This sank to 13,116,501 lbs., in 1932; in 1933 it was 13,470,905 lbs.; and in 1934 it sank again to 12,022,197 lbs.

It is this growing decay which leads the reactionary elements in the industry to seek, not for any fundamental solution to the crisis which faces them, but for some means of maintaining their power by more violent competition, and by the organization of decay itself. In the last ten years in the Lancashire industry the number of cotton spindles has diminished by almost 20 per cent, or by about 14 million spindles. "It is estimated that since 1928 approximately 9 million spindles and 150,000 looms have been destroyed."<sup>1</sup> This was in 1930. "In June 1931, out of 52 million spindles in the industry 11.6 million were in mills completely idle, and it was proposed that 10 million of these spindles should be scrapped and a corresponding reduction made in the capacity of the other sections of the industry. The proposal was perhaps too rational (!) for common acceptance."<sup>2</sup> But "reason" it seems will always conquer in the end, and now an Act of Parliament will authorize the destruction of these 10 million spindles, a figure approximately equal to the total spindleage of Germany at the present time. For this the employers will be compensated to the tune of £2,500,000 in ten years. The Board of Trade's statement showed that in 1934, 99 cotton factories were closed.<sup>3</sup> And out of a total of 140 mills acquired by the Lancashire Cotton Corporation, 80 were in the process of being scrapped by January 1936<sup>4</sup> One shareholder declared that 8,000 operatives

<sup>1</sup> *P.E.P.*, p. 97.

<sup>2</sup> Shimmin, *Britain in Depression*, p. 343.

<sup>3</sup> *Cotton Factory Times*, 23 August, 1935.

<sup>4</sup> *Economist*, 11 January, 1936.

had already been flung "on the stones" by January 1933 after closing 31 mills. According to Mr. Henry Boothman, general secretary of the Operative Spinners Amalgamation, "something like 24,000 workers may be thrown out of work, possibly permanently," by the new scheme.<sup>1</sup> There will be no compensation for them.

But this destruction of spindles in the spinning section will force the pace in every other branch of the industry. Next will come weaving. "It is estimated that of the 500,000 looms in existence to-day in Lancashire, fully 150,000 can be considered as redundant. The prospective capacity of the industry might be as low as 300,000 looms which compare with the 800,000 looms in existence in 1914."<sup>2</sup> "On the basis that 14 million spindles and 150,000 looms are redundant, it is estimated that the labour surplus, without taking into account the effect of any technical changes in the industry, amounts approximately to 90,000 workers."<sup>3</sup>

In the wool section the Woolcombers' Mutual Association (1933) was formed and operates not only as a price-fixing organization, but also in order "to assist the woolcombing industry by the purchase and dismantling of redundant and obsolete mills, plant and machinery for re-sale under restrictive covenants against their further use for woolcombing." In the dyeing industry the same tale is to be told. According to the *B.D.A. Report* (28 February, 1935) "there is more plant seeking employment than is required to deal with the trade available, or of which there is any immediate prospects." And the Chairman of the Association asks for an Industrial Reorganization Enabling Act for the limitation of production by firms withdrawing—"to sell out and plants to be closed down under a co-operative arrangement whereby the remaining members bear the cost involved."

Hand in hand with these measures go the restriction of the supply and the organized destruction of cotton crops. It has been reported that the bollweevil has been artificially introduced into the American cotton crop in order to create famine prices. The United States Department of Agriculture in the summer of 1933 announced bounties to farmers if they would assist the work of destruction: "The Government hoped to take ten million acres out of production by paying growers \$7 to \$20 per acre

<sup>1</sup> *Manchester Guardian*, 31 January, 1936.

<sup>2</sup> *Economist*, 28 September, 1935.

<sup>3</sup> *P.E.P.*, p. 83.

(according to the yield of their land) for ploughing under or mowing down cotton already growing. The scheme was immediately successful in restricting acreage, over 11 million acres being ploughed in or mown down, reducing the estimated acreage from 40.8 to 29.7 million acres."<sup>1</sup>

As an epitaph upon the capitalist epoch in the cotton industry we will quote Sir Thomas Barlow speaking in support of the Cotton Industry (Redundancy) Bill. "So long as the present lamentable chaos and disorder existed in the industry it was hopeless to consider putting up new plants and new schemes on the technical side, because it would be all undone by the frightful degree of overproductive-capacity that now existed. Many of them might think that the whole cotton industry needed reconstruction. He would agree. But who could be certain that the future structure of the industry was going to be?"<sup>2</sup>

Confronted with such bankruptcy as this, no wonder that Mr. Maynard Keynes said in 1928: "There was probably no hall in Manchester large enough to hold all the directors of cotton companies; they ran into thousands. One of the first things should be to dismiss the vast majority of these people."<sup>3</sup> No wonder that even the *P.E.P. Report* on the British Cotton Industry admitted in 1934: "there must be an ideal objective but it is doubtful if anything but a revolution would bring it about."<sup>4</sup> No wonder that Lancashire, as Rhys Davies said in a broadcast speech, in 1935, is "far more derelict than some derelict areas." Rhys Davies proceeded to compare the thirty-one townships in the county of Durham, which is a special area with 34.8 per cent unemployed, with the township of Hindley with 26,000 inhabitants of which over half are out of work. The time is rapidly approaching when all the forces which have hitherto held the workers in check will be played out. The issue of social revolution hangs over Lancashire more clearly than over any other industry. It is merely a question of time until the textile industry, which is "in an advanced state of decay,"<sup>5</sup> which is "apparently dying and nearly bankrupt,"<sup>6</sup> the financial structure of which is "obviously chaotic,"<sup>7</sup> is taken over and run for the needs of the workers and not for the profit of a few.

<sup>1</sup> *World Economic Survey, 1932-3*, pp. 313-4

<sup>2</sup> *Manchester Guardian*, 30 January, 1936.

<sup>3</sup> *Starist*, vol. 91, p. 198 (1928).

<sup>4</sup> *Ibid.*, p. 6.

<sup>5</sup> *P.E.P.*, p. 5.

<sup>6</sup> *P.E.P.*, p. 6.

<sup>7</sup> *P.E.P.*, p. 18.

“A socialist state can come into existence only as a net of productive and consuming communes, which keep conscientious accounts of their production and consumption and economise labour, steadily increasing its productivity, and thus making it possible to lower the working day to seven, six, or even less hours. . . . To learn how to work . . .

**The Industry under Socialism** this is the problem the Soviet authority should present to the people in all its comprehensiveness. The last word of capitalism in this respect, the Taylor System—as well as the progressive measures of capitalism—combines the refined cruelty of bourgeois exploitation and a number of most valuable scientific attainments in the analysis of mechanical motions during work, in eliminating superfluous and useless motions, in determining the most correct methods of work, the best systems of accounting and control, etc. The possibility of socialism will be determined by our success in combining the Soviet rule and the Soviet organization of management with the latest progressive measures of capitalism.”<sup>1</sup>

“When the one and only purpose of every enterprise is a continually increasing output, to meet an automatically expanding effective demand for the commodities, there is no objection felt by the management to the workers’ increased earnings under piecework intensity. It is all to the good of all concerned that the workers should increase their speed of working, their economy of material and accessories, and their proportion of product free from faults and, be it added, their maximum utilisation of labour-saving machinery, provided always that neither the quality deteriorates nor the workman’s health suffers.”<sup>2</sup>

When the workers have taken power, their task will be to organize the industry in order to produce the most wealth with a minimum of toil. This work of reorganization falls into two stages. In the first stage comes the reconditioning of existing factories and equipment: a task which might well last some time. The second stage consists in the complete technical reconstruction of the entire industry. We will describe the main steps of both these stages, and show what improvements in the standards of life of the workers would be possible under each.

<sup>1</sup> Lenin in *Pravda*, 26 April, 1918.

<sup>2</sup> *Soviet Communism*, Sidney and Beatrice Webb.

The conditions of the capitalist market have greatly increased the variety of articles produced by the different branches of industry. Dr. Wisselink in his *Concentration Standardization in the British Cotton Industry*, has estimated the figures for the total number of fabrics of different makes or construction in three towns in Lancashire. The number and variety is quite extraordinary. In Burnley they are 1,622, Blackburn 2,027 and Colne, 1,310.<sup>1</sup> This variety of kinds is certainly equalled and probably greatly exceeded in the wool industry. "In this country mass production scarcely exists, and the products of large firms generally differ from those of average-sized firms in number of styles and qualities rather than in quantity of pieces to style."<sup>2</sup> "The big firms are often several small firms in one from the point of view of production." (Shimmin.) An analysis of Worrall's directory (1934-35) shows that there are 1,979 entries of firms in the West Riding employed in the manufacture of 75 different varieties of cloth of the broadest category such as coatings, costume cloths, fancies. Anyone with any experience of the present organization of the industry knows that each one of these categories may contain between 20 and 50 different makes of cloth and that many firms will probably produce between ten and twenty of these categories year after year. This is the result of the intensely individualistic structure of the industry, with its numberless firms each producing secretly and competitively their numberless variety of similar cloths. Far from catering efficiently for the market, this multiplicity is not only a heavy charge, in the form of redundant designing staffs and commercial travellers, it is also an embarrassment of choice to the ultimate consumer. Moreover, there is reason to believe that it involves an uneconomic use of machinery through absence of specialization and standardization.

It has always been the dream of capitalism to simplify the anarchy of its production in the interests of economy. "If production in Lancashire could be standardized there would be an immediate economy in costs of production. This is probably not possible to any great extent in the case of figured cloths, which depend largely on the skill of the designing end of the trade. In the case of cloths of plain or single weave, however, standardization is possible, and *the tens of thousands of types* [our italics] which exist at present could be enormously reduced to the benefit

<sup>1</sup> Wisselink, p. 16.

<sup>2</sup> *Survey of Textile Industries*, p. 184.

of the industry as a whole. For example, the many different types of cloth sold in the Indian market could be covered by a single standard cloth. Generally speaking, a cloth which is of standard quality in the unbleached state will be of standard quality when dyed or bleached, as it can only be dyed or bleached in a limited number of ways. Even in printing Japan has shown that there is some possibility of securing standard fabrics. Uniformity can however only be introduced if there is some central organization in the section, and is probably best approached from the marketing end in the initial stages by placing bulk orders for standardized lines."<sup>1</sup>

But it is as fundamentally difficult for capitalism to centralize control as it is for it to abolish the vagaries of the market. "The possibility of standardization in the wool textile industry is limited at the one end by the diversity of types and qualities of raw wool and at the other by continued changes of fashion among the consuming public. The changing tastes and requirements of the consuming public exclude the possibility of standardization as a general rule. Even such limited standardization as is implied by the reduction of the number of sizes in which blankets are made—a development which has taken place in the United States—is considered by the trade to be impracticable here owing to the different tastes of the export markets."<sup>2</sup> When the workers take power in Britain, they will be little concerned with "changes in the fashion and size of blankets." They will reduce the "tens of thousands of types" with barely perceptible differences down to a reasonable variety of about 200 cloths of great beauty and good quality. This was attempted to a very limited extent but with some success during the War. "The severe restrictions placed on production for civilian consumption caused a sharp rise in the price of ordinary woollen and worsted goods, and very large profits were made by manufacturers and merchants who had stocks to sell."<sup>3</sup> Under pressure from the Trade Unions, the Board of Control of business men introduced the Standard Clothing Scheme in September 1917 for civilian clothing. Standard specifications were adopted for hosiery, including socks, blankets, flannels, suits, women's skirts, etc. The scheme was naturally most unpopular with manufacturers on account of the controlled prices it enforced, and it

<sup>1</sup> *P.E.P. Report*, pp. 64-65.

<sup>2</sup> *Survey of Textile Industries*, p. 184.

<sup>3</sup> Lloyd, *op. cit.*, p. 153.

was soon dropped after the War. But "to the limited extent to which it was carried out, the scheme was successful. Flannel, hosiery, and blankets were placed on the market in considerable quantities, and met with a ready demand since no other goods could compete with them in price."<sup>1</sup> This limited standardization holds up the mirror to the usual wastefulness of capitalist production and gives some indication of the possibilities of improvement under socialism. By providing a sufficient range of colours and designs, sufficient regard could be paid to diversity of choice and taste, without attempting to stimulate frequent and unnatural changes: only then, indeed, will the real tastes of the people become apparent.

This is naturally linked with the question of specialization; and the principle of specialization under workers' control will be, so far as possible, "one product one plant."

**Specialization in Production** In the cotton-spinning section "experience has shown that the most efficient spinning-mills concentrate on a limited range of counts, and this standardization on which the industry was built up was only destroyed by the post-War depression compelling mills to produce a wider range of counts in order to keep going. The further widening of the range which has proceeded ever since has undoubtedly been a factor which has militated against reduction in costs."<sup>2</sup> "In the ideal, a mill of 100,000 or 150,000 spindles, say, would never spin more than about half a dozen counts."<sup>3</sup>

"Owing to the competition of the large numbers of spinning-mills, much yarn is produced by mills of qualities and counts other than those for which their machinery is adapted. This practice is uneconomic, but is the natural result of the present conditions by which small independent mills compete with one another for a reduced volume of business."<sup>4</sup>

In the weaving section, Wisselink estimated that in Burnley the average number of looms per mill is 860, and the average number of looms per product is 65; in Blackburn the figures are 1,009 and 54 respectively, and in Colne 450 and 18. This means that in Burnley each mill produces over thirteen different types of cloth; in Blackburn the average is just short of twenty and in

<sup>1</sup> Ibid.

<sup>2</sup> *P.E.P.*, p. 10.

<sup>3</sup> *P.E.P.*, p. 11.

<sup>4</sup> Committee on Cotton, p. 7.

Colne the number is exactly twenty-five. But the position is more chaotic than this. "The fact that one finds in Burnley 65 looms for one kind of cloth only is no guarantee that of each kind three or more types may not be made. Considering the sorts of fabrics quoted by the weaving-mills they might each include six or ten varieties even."<sup>1</sup> No wonder Wisselink acidly remarks: "We cannot refrain from making one observation here and that is that the descriptive appellation 'highly specialized,' which the Englishman is so fond of applying to his Lancashire industry (one finds it again and again in scientific works on the subject and in reports) could well be dispensed with!"

The backwardness of England is thrown into even sharper relief by a comparison with other countries. "In the large Dutch grey goods mills a couple of hundred looms to one type of cloth is quite common." "The large grey goods mills of America, with some 3,000 looms apiece, make only a few different kinds of fabrics, and as a rule five hundred to a thousand looms are producing only one type of cloth. There are some examples of 4,000 looms all doing one type of cloth and one of 11,000 even." (Recall the Lancashire figures for similar goods: Burnley 65 looms per product.) "Specialization is insufficient if compared with that of America and Japan. In America similar mills (of about 2,600 looms) make only one or two kinds of cloth as a rule (the writer saw one mill there running 3,000 looms to one type.)" Yet Mosley demagogically affirms:<sup>2</sup> "Lancashire trade is up against certain conditions to-day which no efficiency and no reorganization can overcome, and therefore, I say it is an impertinence for politicians to tell Lancashire that there is nothing the matter with the industry excepting your own alleged inefficiency."

On the contrary. "In Blackburn and Colne a serious trouble is encountered in the form of too small orders and too small quantities to a specification, especially as regards designs. The fundamental difficulty lies, of course, in the organization of the English trade. The manufacturers set the minimum quantities too low for colonial production in order to get orders when trade is slack. This is made all the worse by the absence of larger orders which used to keep the average at a reasonable level, and by the fact that many buyers nowadays never order more than the minimum quantity. In addition to which orders are all too often given at the last moment, so that they have to be given precedence. All

<sup>1</sup> Wisselink, p. 16.

<sup>2</sup> *Blackshirt*, 30 November, 1934.



this causes the setting up of much too short warps in looms with all the detriment entailed to efficiency of production, not to mention the half-pay money that has to be expended on hands kept waiting."<sup>1</sup>

In the dyeing and finishing sections Wisselink draws a similar picture. "The same trouble is very prevalent in the printing and dyeworks, and is the result of a forced acceptance of too small orders. The consequences to working efficiency are no less disastrous than those entailed by insufficient specialization. In printing-works, for example, much preparation has to be done before actual work commences, and whether large or small quantities are to be printed, these preparations cost (roughly speaking) the same time and money; samples have to be printed, a standstill occurs while machinery is cleaned and reset, whatever the size of the order may be. If this happens very frequently it is fatal to plant efficiency. The same thing holds good for dyeworks."

"One of the directors of the Association is reported to have stated (with reference to the Bradford dress and costume trade in coloured cloths) that before the War the number of pieces ordered to a shade was about  $4\frac{3}{4}$  on the average, whereas at the end of 1927 it had fallen to less than  $2\frac{1}{2}$ ."<sup>2</sup> Not only could specialization under workers' control greatly reduce the time at present taken in mixing colours and the labour of cleaning and preparing the machinery for continuously changing combinations of colours, but it would also cut down the actual cost of dyestuffs at present so wastefully squandered under capitalism.

One authority recently summed up the organization of the cotton industry in these words: "Three thousand unco-ordinated small units . . . all without cohesion, without **Co-ordination of Production** nucleus, loose, higgledy-piggledy, rushing hither and thither, jostling, chasing, fighting, the whole curious phenomenon involving an enormous wastage of money, energy, time and power"<sup>3</sup>; while a committee of the Economic Advisory Council recently referred to "the separation of each part of the trade from the others and of the markets from production, and the lack of general control," which, though it might work satisfactorily enough in more stable times,

<sup>1</sup> Wisselink, p. 19.

<sup>2</sup> *Survey of Textile Industries*, p. 215.

<sup>3</sup> B. H. Ellinger, "Japanese Competition in the Cotton Trade," in *Journal of the Royal Statistical Society*, Pt. II, 193, p. 211.

to-day "threatens ruin in times of radical change."<sup>1</sup> The traditional individualism of Lancashire in the past has kept her an industry of small firms, too little specialized for modern requirements, and unco-ordinated both "horizontally" and "vertically," and hence lacking standardization and "balance" between its successive processes. Burdened by debt and capital-charges, and fettered by output-restrictions to-day, plant is growing as obsolete as much of it is redundant, and technical innovation and re-equipment are throttled. "Outside the fine cotton spinning section, the cotton industry is divided into a multiplicity of small units, each still obstinately independent. Even an amalgamation of small units cannot rapidly produce the full advantages of large-scale organization, as the history of the Lancashire Cotton Corporation has shown. Moreover the lack of vertical organization means that the units are incapable of ensuring large savings, so that the incentive to efficiency is reduced. Finally the balance sheets of many cotton textile public companies suggest that a considerable proportion of liquid resources has been invested in stock and debtors, in the scramble for business. Some of these resources might, given rationalization, be liberated for physical re-equipment, but the industry is not in a position to raise fresh capital at the moment."<sup>2</sup>

Similar conditions, if in less accentuated form, characterize the woollen and worsted trades, of which Prof. Allen has said: "In structure and organization the worsted branch bears a close resemblance to the cotton industry; for it is highly sectionalized, and each producer confines himself as a rule to a particular process. . . . In the modern world where the elimination of inefficient firms by bankruptcy is a slow process, the existence of a large number of independent, highly competitive producing units accentuates an industry's difficulties during a period of falling demand; for each firm tries to preserve itself by broadening the basis of its production and this policy raises average costs."<sup>3</sup> By contrast we see the Japanese textile industry highly integrated into a few large combines, which not only control importing and exporting houses, but also cotton plantations, textile machinery firms, and silk and artificial silk mills as well. "There are four firms in Japan which have a capital between them representing £13 million and a reserve fund of £13 million; they own their

<sup>1</sup> *Report of Comm. on the Cotton Industry*, Econ. Adv. Council, July, 1930.

<sup>2</sup> *Economist*, 13 July, 1933.

G. C. Allen, *British Industries*, pp. 257 and 269.

own ginning plants in America and in India and import the raw cotton; they have spinning-mills and weaving-sheds, and in one or two cases, bleaching-, dyeing- and printing-plants, and are themselves very largely the exporting merchants to the world.”<sup>1</sup>

Control in textiles under socialism would be centred in a Central Textile Administration. We will later describe the buying agency, taking wool as our example, which would comprise one section of the administration. Other sections would presumably include specialized committees working on design, research, machine design and other matters such as marketing, affecting the whole industry. As partly autonomous sub-sections of it there would need to be regional textile administrations, probably situated in Manchester for cotton, and in Bradford for wool; each of these Regional Administrations should co-ordinate a number of trusts in various localities, organized as production-units on as rational a basis as the legacy of capitalism allowed. It seems probable that each trust would consist of a grouping of the mills in any suitable district working together as an efficient and fairly specialized unit; each mill wherever possible producing only one type of cloth, and a trust-aggregate consisting of anything up to ten large-sized mills. Under the co-ordination of the Regional Administration these trusts would be linked “vertically” with the preparatory and finishing firms, and their production adjusted “horizontally” to what other trusts engaged on different types of yarn or cloth were producing. Whether each trust itself should be constituted so as to embrace “vertically” a number of successive processes, or so as to specialize on one process as a “horizontal” grouping of mills, seems to be a matter which would probably have to vary with different cases, and be partly a matter of experiment. Probably some diversity of structure would deliberately be allowed, to provide for flexibility and rapid change. There would also be a certain number of spinning and weaving plants specialized to the production of “fancy lines.” Perhaps each trust-aggregate would have one of them.

To afford a rough sketch of how such geographical trusts might be organized in practice, we add this suggested example from a particular locality. Let us take the West Riding wool industry, basing our suggestions on Shimmin’s figures derived from the 1921 Census (*Distribution of Employment in the Wool Industries*, 1926) for statistical convenience in the absence of a more recent analysis. Let us suppose the workers take over all firms with more

<sup>1</sup> B. Ellinger, in *The Statist*, 1928.

than 100 operatives. This would reduce the number of mills by 882, from 1,384 to 502. Most of the 882 mills are no longer in economical running order on account of their small size, poor equipment and remote locality. They would be scrapped and what machinery there was that was still in working order removed to the larger factories. This operation would only affect 30,000 operatives out of a total of 167,000. At the same time a concentration could be made round the larger factories. There are 14 factories in the West Riding employing more than 1,000 workers apiece. These account for 19,600 workers. Around these basic units would be grouped sufficient plant to form geographical trusts.

"It is almost impossible to give an adequate idea of the endless variety of conditions from mill to mill. Conditions differ not only from mill to mill but from mule to mule. **Reconditioning** Mules are of different lengths and different types; **Factories** they run at different speeds; they produce yarn of innumerable kinds. Indeed, it is no exaggeration to say that there are no two mills, and very probably no two pairs of mules, producing exactly the same yarn under the same conditions in the whole of the cotton industry."<sup>1</sup>

Dr. Wisselink says: "Of the 215,840 looms in Burnley and Blackburn, there are only about 34,000 in the former, and about 48,000 in the latter, which can be called suitable for rationalized production without delay. The character of many of the products listed in Worrall's Directory involves a most undesirable number of various and different types of looms in one mill, even in many of the mills which have been approved. The classification obtained on a rough estimate such as this certainly offers too favourable a prospect as concerns rationalization, because the looms of Burnley and Blackburn are above the average for the rest of Lancashire. In the whole American section (and as far as these kinds of good are concerned, in all Lancashire) there are no more than about 200,000 looms suited for acceptance, if one wants mills which can be used immediately for production on a rational basis." Looms of different width and size, of varying make and construction are in fact jostled together with complete disregard to space or specialization. These conditions set serious problems to the workers and put certain limitations on rate of progress at this stage.

Where possible machinery would need to be shifted from one mill to another and to a certain extent replaced by new machines. For example the setting up of looms all of the same width in the

<sup>1</sup> Jewkes and Gray, p. 136.

same shed would reduce the number of reeds, healds and beams in use at that shed. Wisselink estimated that the saving on the cost of cloth due to this cause alone would be from 1 to  $1\frac{1}{2}$  per cent and might rise as high as 2 to 3 per cent for the bigger mills making coloured goods and even to 4 or 5 per cent for the mills of 700 looms at present suffering under small-quantity production.<sup>1</sup> This would enable yarns of uniform count and twist always to be supplied to this mill. This uniformity of yarn would not only simplify the task of the spinning section but would also guarantee standardization of dyeing in the sense that the different pieces of cloth woven from the same yarn would, for all practical purposes, take the dye in the same way. Wisselink estimated a possible economy of  $1\frac{1}{4}$  per cent in the price of yarns between 20–24 counts. But as he underestimated the number of different counts and yarns spun in the same mill, the saving would probably be considerably greater than this. "Taking the saving on the costs of production to be effected by concentration altogether, in regard to well-organized industries, such as those of America, Japan, Italy and partly that of the Netherlands, the amounts in round figures are: grey, unfinished cotton goods,  $1\frac{3}{4}$  per cent; bleached cloth, 2 per cent; piece-dye cloth,  $2\frac{1}{4}$  per cent; cloth woven of dyed yarns,  $2\frac{1}{2}$ – $3\frac{1}{4}$  per cent; printed goods, 4–5 per cent."<sup>2</sup>

This process would be assisted by the intense concentration of factories in the same locality in Lancashire and Yorkshire; but it would be limited at this stage by the small size of those factories and by their low level of equipment and technique. As Dr. Wisselink says, "It is not necessary to say much more about the average production capacity in Burnley (860 looms per mill). It is far behind what is considered nowadays to be the most economical type for mass-production in big series, namely some 2,500–3,000 looms per mill."

One of the first things the worker would require to do at this stage would be to make the industry perfectly safe by every type of safeguarding and protective device. In many of the processes constant cleaning is necessary while the machinery is in motion on account of the "fly" from the machines which would otherwise spoil the yarn. It is natural that the absence of complete covers to the machinery (and the use

<sup>1</sup> *Op cit.*, p. 31.

<sup>2</sup> Wisselink, pp. 26 and 33.

of partial covers or "nips") increases the tendency to accident owing to the danger of the worker's hands being trapped between the guard and the cog teeth, while removing the fluff.

The fencing of all toothed wheels should completely enclose the wheels. On all machines the driving-pulley and belt should be provided with a fender-guard. Figures do not exist to show to what extent these essential precautions are lacking, but the number of accidents in textiles reported in 1934 was 37 fatal and 11,821 non-fatal cases (the second highest incidence of accidents in all industry). Further, fines were imposed to the aggregate sum of £1,517 15s. 3d. in punishment for neglect causing death or injury by unfenced machinery.<sup>1</sup> And the fencing of combing-machines, cylinders, frame-ends of gearing on ring-spinning and ring-doubling frames, and of driving-belts and pulleys on direct electrically driven frames was still under consideration in 1934.<sup>2</sup>

As an example of the kind of injury the workers suffer, we quote the case of Frederick Brierley—a fly-gatherer who met with an accident, his left arm being taken off practically to the shoulder, as the result of an insecurely fenced licker-in on the roller and draw card.<sup>3</sup> A glance at the *Cotton Factory Times* shows hundreds of such cases.

It is possible to make a dangerous industry like textiles absolutely safe. The spiked rollers on bale breakers can be covered over by grid guards. Locking motions can be fixed to lap and scutching-machines. On account of the dust and fluff given off during the process of carding, wiping down with a brush or waste is constantly being done. It is necessary on this machine more than on any other to guard the cog-wheels. Again, in order to grind the card cylinder, the rotation must be reversed and the general practice is to cross the driving-belt. The removal and replacing of the belt is generally done by hand and has been the cause of many serious accidents. The belt too has to be lengthened and shortened, as it must be longer when crossed than when open. To facilitate this, belt buckles have been used and these have proved a source of danger by catching the clothes of those who have to attend the machine. New machines could have slide gearing which eliminates this dangerous operation. In weaving, one example of what could be done is the installation of shuttle guards which would prevent the shuttle flying.

<sup>1</sup> *Report of Chief Inspector of Factories, 1934*, pp. 104-106.

<sup>2</sup> *Report of Chief Inspector of Factories, 1934*, p. 46.

<sup>3</sup> *Cotton Factory Times*, 23 August, 1935.

To-day every doctor with a working-class practice knows that the root of his patients' trouble is the bad conditions in which the workers live: the back-to-back houses; the unpaved streets covered with filth, which are the children's only playground; the rooms where vermin swarm and water leaks. The textile workers can better the health of the population by clearing the air of the smoke and dirt which foul the atmosphere of all working-class quarters to-day. For instance, the total number of tons per square mile of deposit over the centre of the city of Bradford in 1934 was 381.00. For the same year over a northern residential district, two miles from the centre it was only 152.00.<sup>1</sup> There is no reason why Bradford, to-day one of the ugliest and dirtiest cities in the world, should not become as clean and fresh as anywhere else. With the use of smoke-saving devices and the extension of electricity, it should be possible once more for the workers to see the sky and breathe fresh air in these industrial areas.

In the same way the tremendously increased application of science to industrial health could cause a sharp fall in disease. Not only would all factories have a recognized number of medical staff to so many workers, but the results of the laboratory would meet a better fate than the pigeon-hole when the workers themselves were in command.

Professor Julian Huxley (in a contribution to *Scientific Research and Social Needs*) suggests that it might be possible to cure scrotal cancer by mixing lanoline (derived from sheep fat) with the machine oil. So far, it seems, the scientist is solely concerned that this mixture reduces the chance of giving cancer to mice; and, in the meantime, the industry is solely concerned with the problem of the disposal of the surplus fat. And so we have a situation where: "In the cotton industry, with one or two notable exceptions, medical examinations have never been instituted, as the trade appears to be relying upon the result of research work such as is being performed by the Manchester Committee on Cancer, with a view to eliminating the risk by substitution of a suitable non-carcinogenic (or a less carcinogenic) oil, for those which are highly carcinogenic. I fear that it is not realized that, however valuable this may be in preventing the disease in future workers, many cases will continue to arise for years to come as a result of past conditions, and it is for these persons for whom early diagnosis and treatment is so desirable in reducing the death rate."

<sup>1</sup> *Report of the City Analyst, M.O.H., 1934.*

As an indication of how a workers' government could meet the suddenly and rapidly increasing demand for clothing under socialism, it is of value to see how the British capitalist government during the War dealt with this problem under war conditions.

**Unification of Buying** It will be remembered that the requirements of raw wool for the army, normally 1 per cent, increased to 20 per cent of the total consumption for the country within three months after the outbreak of war. By 1917 it had reached a level which closely approximated to the total pre-War consumption of the United Kingdom. In the first three years of the War the War Office placed contracts for the English Armies for about 100 million yds. of wool cloth (the total orders for khaki during the War amounted to 313 million yds.); 115 million yds. of flannel (total war orders 276 million); 25 million pairs of woollen drawers; 60 million socks (against total war orders of 164 million) and 10 million woollen vests. The Government also largely supplied the Allies.

Although the workers' government would be faced with demands expanding as rapidly and more rapidly than these, it would be better able to face its task than was the capitalist government. For whereas "manufacturers who had bought some time before 1916 realized very large profits beside which the reduction effected by paying on the conversion cost system would be almost insignificant . . . spinners of worsted yarn actually making 5d. per lb. net profit compared with a normal maximum in pre-War years of 1½d. per lb,"<sup>1</sup> the workers' government would have expropriated the former owners. This should leave between 600 and 700 million lbs. of wool for the consumption of the workers during the first year of the revolution. In 1915 the Government had 900 million lbs. to play about with for war purposes. The organization of production for peace and plenty should be far easier than it was for profit and war.

The new government would presumably abolish the Port of London wool sales and ship the raw material in numbered bales direct to Bradford warehouses whence it could be delivered to the textile trusts. This would provide a source of important economies in the handling and transport of wool. If the War Office "in accordance with its general principle of not paying commission for services which were unnecessary"<sup>2</sup> was compelled to destroy

<sup>1</sup> E. M. H. Lloyd, *Experiments in State Control*, 115. Lloyd, *op. cit.*, p. 123.



the middleman's right to collect profit in the interests of waging a capitalist war, the workers' government may reasonably undertake the same step in the interests of peace and of providing clothes for the people. By steps such as these the British Government in the last war was able to reduce the total administrative expenses for the distribution of colonial wool to  $\frac{1}{8}$  of 1 per cent of the total sales up to 31 March, 1919, and to less than 1 per cent on home-grown wool sold in three years to the value of £33,686,169. "A dozen or so experts and about a hundred ledger clerks were sufficient to look after the distribution of over £100 million worth of imported wool."<sup>1</sup> At the same time the Government was able to accumulate by 1 March, 1919 profits amounting to £6,833,196 on home wool purchase alone (p. 147)<sup>2</sup> and profits to the sum of £60 million on 10 million bales of wool valued at £300 million handled by the London Wool Exchange.<sup>3</sup>

Similarly, the shipping of cotton up the Manchester Ship Canal direct to the Salford Docks would effect a big saving in transport. "In the past the Liverpool Cotton Association has put obstacles in the way of spinners of East Lancashire having the cotton shipped direct to Manchester."<sup>4</sup> It has been estimated that a saving amounting to 5s. a ton in the case of the Oldham district could thus be realized.

One of the reasons most frequently given for the decline of the textile industry has been the bad organization of marketing. There is in the first place the ignorance of the industry regarding foreign conditions. "Nothing could be more anomalous than the present position. The manufacturer himself often possesses little knowledge of the overseas market and depends for orders on the merchant, whose interests, if a short view is taken, are different from his."<sup>5</sup> Secondly, there is the reaction of the marketing system on manufacturing itself. "As matters now stand, it is the small size of the numerous commercial houses which hampers the expansion of the factories, and on the other hand, it is the big number of small commercial houses which make it possible for all the small mills to have their own special export house and

<sup>1</sup> *Ibid.*, p. 123.

<sup>2</sup> *Ibid.*, p. 123.

<sup>3</sup> W. J. Passingham, *London's Markets*, p. 230.

<sup>4</sup> *P.E.P.*, p. 13.

<sup>5</sup> Committee on the Cotton Industry, 1930, p. 14.

thus maintain their existence. The vicious circle is here complete, and as to the rationality of production and distribution, the less said about it the better."<sup>1</sup>

There are at present between 100—150 merchant firms doing about 70 per cent of the total business, while the remainder is divided between about 1,000 smaller firms.<sup>2</sup> The cost of these middlemen to the industry has been estimated<sup>3</sup> at £4,450,000; and the Shippers' chargers as a further £5,177,000. "The methods of collection and distribution can scarcely be more expensive than they are now from a general industrial standpoint."<sup>4</sup> "We were informed in evidence that, in some cases the number of merchants' representatives visiting a market so far exceed requirements that the orders obtained are insufficient even to cover the cost of the salaries of the representatives employed. The trade must, in the end, pay for this extravagance."<sup>5</sup> According to the statistics of the Occupational Census, there were 383 cotton salesmen and travellers in Great Britain in 1921; in 1931 the number had risen to 725. In wool the figures were 385 and 668; in silk 46 and 254 respectively. Abroad the position must be even more ludicrous. Ellinger in his booklet *A Case for a Guild of Shippers*<sup>6</sup> relates the fact that in one evening in one hotel in Shanghai there were no less than 42 salesmen from different Manchester houses.

Under socialism, when cloth is produced to satisfy need and not for profit, the problem of marketing becomes a question of supply and distribution rather than of competitive salesmanship. In so far as the present merchanting houses have useful knowledge of qualities and book-keeping, their personnel could be usefully absorbed into the distributive departments of the administration. By co-ordinated marketing organization, by the development of standardization, and in turn of specialization of manufacturing and spinning processes through careful planning and placing of forward-contracts, there is little doubt that very substantial economies could be achieved.

<sup>1</sup> Wisselink, *op. cit.*, p. 21.

<sup>2</sup> *P.E.P.*, p. 112.

<sup>3</sup> *Memorandum on the Cotton Industry* (1928, p. 28) prepared by the L.R.D.

<sup>4</sup> Wisselink, p. 33.

<sup>5</sup> Committee on Cotton Industry, p. 14.

<sup>6</sup> Lecture before the Manchester Statistical Society, quoted in Wisselink, p. 46.

The foregoing reorganization creates a basis for and makes imperatively necessary the complete technical reconstruction of the industry. Under the conditions which **Complete socialism** will create the backwardness in **Technical** technical equipment which was the heritage of **Reconstruction** capitalism will be a serious fetter to any further expansion of the industry; it will then be urgently necessary to accomplish the replacement of obsolete machinery and plant and the relocation of the plants themselves in the most effective productive units. How desperately necessary this change will be at that future date is shown by the condition into which the equipment of Lancashire has already been allowed to sink.

In an article in *The Economic Journal*,<sup>1</sup> Mr. J. Ryan gives some interesting figures regarding the state of the Lancashire cotton industry. He investigated the exact records of 20 million spindles, or one-third of the spinning-mills, and fifty thousand looms, or a quarter of the weaving-sheds (200 companies). The details cover two-thirds of the American section and may therefore be considered authoritative for that section. According to expert opinion the average length of life of the ordinary textile machine is reckoned to be thirty years. It appears from the figures which Ryan collected that the average date of building plant and machinery is 1895-98; the buildings average a little earlier and the machinery a little later. Only three or four new mills have been built since 1920 in the whole of Lancashire; and the net result of the investigation is that about 38 per cent of the machinery in Lancashire to-day is out of date and that practically nothing is being done to remedy a situation which for capitalism is already desperate. It shows that all the chatter about redundant spindles under capitalism conceals the more serious aspect of the industry: the far greater obsolescence (54·7 per cent) of the machinery in the weaving section.

As Wisselink says: "Regarded from the standpoint of the industry as a whole, the state of the organization of production in the weaving branch is in a far worse condition than the spinning branch, not to mention even the splitting up of the trade among so many small dealers and the badly maintained contact between sale and production."<sup>2</sup>

No wonder Mr. W. A. Brook of Messrs. Adcock & Co., speak-

<sup>1</sup> December, 1930, p. 571.  
P. 23.

ing before the Bradford Textile Society, says:<sup>1</sup> "It is not unknown that a fire would be useful to some concerns, where spinning frames have to run until they break down for want of levelling up, where spindles protrude hopelessly through the caps, and the bobbins are so badly worn that they jig and wobble on the tubes;—with such irregular conditions you reap a harvest of bad-spun yarns, excessive waste and reduced output."

In order to remedy these conditions, the workers will need to introduce four great changes that will revolutionize the industry:

- (1) The substitution of ring spindles for mules.
- (2) High Draft Spinning.
- (3) High-Speed winding and warping and beaming.
- (4) Automatic looms.

These changes, needless to say, will have the opposite effect to what they would have under capitalism. Under socialism, any device which increasingly transfers the burden of production from the backs of the workers on to the machines must have the effect of releasing labour for other expanding branches of industry, of shortening hours, and raising wages, and improving conditions generally.

The ring frame has many advantages over the mule. In a recent experiment conducted by Platt Bros., 900 mule spindles produced 2,800 lbs. of woollen yarn in a 48-hour week; 1,060 ring spindles produced 9,500 lbs. of woollen yarn in a 48-hour week (or 9 lbs. per spindle in 48 hours). This was for the same floor space. This means that there was 2½ times greater production on ring frames than on mules (or 3·4 times as great over square feet of surface area covered).<sup>2</sup> The ring frame occupies smaller floor space and requires less motive power.

Since in 1932 Platts produced a new ring frame that would spin far finer counts than previous machines, the argument that the ring frame is limited in this respect seems to be groundless. Moreover it is stated that in the U.S.A., which has 29,728,000 rings against 1,166,000 mules, counts as fine as 120's are being spun; and it is possible that far finer counts are already being spun on rings in England than is generally admitted. The introduction of moving lappets, which minimize breakages in the yarn by equalizing the tension exerted on it, should enable ring frames to spin the finer counts.

<sup>1</sup> *Bradford Textile Society Journal*, 22 October, 1934.

<sup>2</sup> *Huddersfield Textile Journal*, 1934-35.

Despite all these advantages of the ring frame, the average reduction in mule spindles has been at the rate of 200,000 per annum, while ring spindles have only increased at the rate of 100,000 per annum. Even this increase has been spasmodic, for the 1929 figures actually show no increase over 1924, and "to-day less than a quarter of the total capacity consists of ring spindles."<sup>1</sup> It is obvious that no important increase is taking place in ring spindles, "nor are rings replacing mules to any appreciable extent."<sup>2</sup> The conclusion which J. Ryan draws is that progress in this respect is almost negligible.

The adoption of ring spinning will do away with the blind-alley occupation of the big piecer.

High-draft spinning can follow on the introduction of ring spinning. Low drafting is the system almost universally used at present in this country, although it involves triplicating the charges in the card room, and the charges for depreciation, interest, and floor space are considerably higher. In England the number of mills which have adopted this system is negligible. The reduction in labour required in a mill which changed over from mule spinning to high-draft spinning is as follows:

	<i>Old System</i>		<i>New System</i>	
	<i>Males</i>	<i>Females</i>	<i>Males</i>	<i>Females</i>
Card Room .. ..	20	115	20	83
Spinning Room ..	150	—	4	122
Subsidiary .. ..	10	5	10	1
<b>Total</b> .. ..	<b>180</b>	<b>120</b>	<b>34</b>	<b>206</b>

This shows that while the number of males required is greatly reduced, the number of women workers is increased. This is a step in the right direction, as it will release a number of men for heavier jobs, more suitable to their strength.<sup>3</sup>

<sup>1</sup> *British Industries*, by G. C. Allen, p. 246.

<sup>2</sup> J. Ryan, loc. cit., p. 578.

<sup>3</sup> With the fitting of certain labour-saving devices such as:

- (1) "nipple oiling" which oils each pair of spindles from a "wick" at their base;
- (2) reversible spindles for putting in different twists;
- (3) knock-off motions on doubling frames;
- (4) jockey pulleys for spindles to prevent the bands slipping off; it should be possible to reduce appreciably the number of subsidiary workers.

From Ryan's survey it appears that less than 0.1 per cent of the winding spindles in Lancashire are high speed. The Lancashire Cotton Corporation had just 3,000 or rather more than 25 per cent of the high-speed spindles in Lancashire in 1930. There was then definite information of only 17,000 high-speed spindles in England, of which one-third were outside Lancashire.

The following figures taken from the University of Manchester's *Survey of The Lancashire Area* show the amount of labour that would be required in a typical mill with a standard weekly output for five different systems of preparation, varying from the less to the most modern:

	<i>Winders</i>	<i>Beamers</i>	<i>Creelers</i>	<i>Mechanics</i>	<i>Total</i>
(1) Slow-speed system, winders averaging 40 spindles each, beamers doing their own creeling ..	45	11	—	—	56
(2) Machines same as in System 1; winders average 40 spindles each but beamers each attending more than one frame and receiving help for creeling .. ..	45	4	3	—	52
(3) High-speed warping from bottle bobbins; winders average 50 spindles, beamers 2 frames per operative with help for creeling	36	4	1	—	41
(4) High-speed Cone system; winders averaging 25 creads; beamers 2 frames per operative with help for creeling ..	28	2	2	—	32
(5) Barber Colman system .. ..	8	3	2	1	14

The possibility of a greater number of looms than four to one weaver only becomes practicable without speed-up and sweating with the introduction of automatic looms.

**Automatic Looms** At present in Lancashire only about sixty sheds have automatic looms and about thirty have automatic attachments.<sup>1</sup> According to Ryan there were

<sup>1</sup> *P.E.P.*, p. 83.

less than 20,000 automatic looms and attachments, or under 3 per cent of the trade to be found altogether; and he reported there was no indication that the rate of introduction was increasing.

We quote the table below (from the *P.E.P. Report on the Cotton Industry*) in order to sharpen the contrast between the effect of rationalization under capitalism and under socialism.

	(For standard "Bleacher" 34½ in. wide).		
	Four Looms		Automatic Looms (Bobbin Changers)
Weaving Shed Labour			
Male Weavers .. ..	107		25
Female Weavers .. ..	200		—
Seamers .. ..	11		10
Smash piecing (females) ..	—		16
Sweeping and Oiling (females)	—		25
Battery Filling (males) ..	—		31
Cut and Weft Carrying (males)	—		7
	318		114
Totals .. ..			

The essence of socialist labour is team work. When the Soviet weaver Vinogradova found that she could increase the number of looms per weaver, she did so, not by capitalist speed-up methods, but by reorganizing the old labour process on collective lines. She had nine helpers who saw to it that the looms were in perfect running order when work commenced, and who divided the different weaving operations between them according to preference and ability. The result was that she was able to run 216 looms instead of the normal 36. "It was a rationalization of method, and the results improved the earnings of the workers so much that a 13 per cent average increase in wages had to be budgeted for in 1935. It meant a leap from low productivity to high, not over a long and painful period of years, but in two or three months. It was the result of the rational application of socialist enthusiasm to modern industrial technique, and the enthusiasm grew out of the fact that the results did not put profits into private pockets."<sup>1</sup>

The strain of weaving could be still further reduced by the fitting upon the looms of every up-to-date device, such as pick-finders, warp-stop motions, and weft catchers, as well as automatic bobbin-changers and positive let-off motions. The introduction of longer warps and longer runs of the same quality; the improve-

<sup>1</sup> *Manchester Guardian*, 17 February, 1936.

ment in the quality of the yarn; and the fact that ring-spun yarns weave better on automatics will overcome all the known objections to these types of looms.

Ryan found that of the 256 buildings examined, 209 were built before the close of the last century, and the latest building he came across was put up in 1916. These buildings rarely depart from the archaic pattern of the last century. The spinning is carried on in many-storied buildings, which limit the amount of natural light and render ventilation more difficult. The weaving-sheds are usually single-storied buildings with saw-toothed roofs with glass in the steeper northern bay. In most sheds little regard has been paid to the width of the alleys, in the crowding of wider machinery into the same space.

The new factory will be a spacious building on an entirely different scale. Space is the essence of a well-planned factory; it can only be obtained to a big extent under workers' power when chaotic localization, overcrowding of urban areas and consequent exorbitant ground-rents do not bar the way. With space, it will be possible to instal overhead pulleys and running-ways for the carrying of warps and heavy skeps. It will be possible to wheel the warps onto the backs of the looms, instead of the lifting and straining past pillars and girders which makes the life of the weaving overlooker such hell to-day.

The "chain" method of production would enable the workers to organize industrial processes in a continuous flow without the interruptions of different floor levels and unco-ordinated departments. The machinery could be so installed as to allow the introduction of double nozzle vacuum strippers in the cardrooms and revolving fans in the weaving sheds; the "pull" of these instruments being balanced by proper ventilation, and a mean temperature secured by double roofs and double windows. The building of cafetaria, gymnasia, swimming-pools and rest homes round the factory would make the centre of production the centre of working-class life also. The organization of inter-factory delegations to discuss the best methods of production and the encouragement of competitions to raise the productive level would be first steps towards strengthening initiative from below.

Of all the problems that confront the socialist State the problem of unemployment may well seem to be the thorniest. We hear so



often of the inevitability of unemployment in Lancashire that some of us may even forget that unemployment, like war, has causes that lie in capitalism, and that will last the duration of capitalism.

Let us remind ourselves that the essence of socialism is production for use. This means that the only limit to what society can consume under socialism is what society can produce. The establishment of this principle creates an absolutely new situation. Instead of increasing competition for a diminishing market, leading to mass impoverishment and war, the tremendously increased demand which socialism will create will probably cause a shortage of labour and certainly a shortage of technical workers in most industries.

But even if the reader admits this principle as sound for some industries, he will perhaps contest its truth for Lancashire. The Lancashire cotton industry, he will say, was based upon world monopoly. Now that that world monopoly has gone for ever, Lancashire must have a certain proportion of "human scrap" which no society can ever remove. We dispute this statement.

In the first place, as we saw in a preceding section, Lancashire is closely linked with India. In the opinion of Prof. P. J. Thomas one of the basic reasons for the inability of Lancashire to put its house in order was the "persistently low standard of living of the Indian masses." This is not an isolated academic point of view. It is also the opinion of Mr. Harold Butler, director of the International Labour Office. "There was room in the world for unlimited expansion of consumption both of agricultural and industrial products. There were still millions underfed, under-clothed and underhoused. If their needs were met, the so-called over-production in agriculture would disappear, and the textile industries would be flourishing instead of complaining of dumping and cut-throat competition. The solution of our present troubles must be looked for in the expansion of the consumption of the masses throughout the world."<sup>1</sup>

This view is also held, curiously enough, by no other than the President of the Federation of Master Cotton Spinners Association, Mr. W. M. Higgins himself: "Though the population of India has increased since 1913-14 by at least 1 per cent per annum the total consumption of piece-goods has actually declined by

<sup>1</sup> *Cotton Factory Times*, 20 September, 1935.

200 million yds. per annum. If the average peasant of India were only as prosperous as in the year 1913-14, the yardage consumed in the year 1933-34 would have been 1,250 million more than it was. This is the first significant point in estimating potentialities. On the basis of 1 per cent increase in the population plus only 1 per cent increase in productivity per head, the Indian market should now be in a position to absorb 2,800 million yds. more than it actually does. In ten years there should be effective demand for 4,500 million yds. more than the present demand. This is the second significant point.

"Private sources, as well as Government documents, also inform us that large sections of India's population, once dressed in cotton frocks, are now almost without clothing. The bulk of the population also is comparatively impoverished and compelled to wear much lower qualities than were formerly worn."<sup>1</sup>

Every year India pays a sum of £100 million in tribute to Britain in the form of interest, dividends, royalties, pensions and other payments for which no equivalent goods are received by Indians. That is to say, the Indian masses send out of their own country goods to this value which are sold to satisfy the claims of the absentee exploiters. The establishment of socialism would put an end to this tribute—to the loss, not of the British masses, but of individual British bond-holders, shareholders and pensionaries. The Indian people would have a corresponding amount of wealth-producing power set free at their own disposal. Part of it they would doubtless make use of in satisfying their own needs in India. But another part of it they would certainly use to obtain goods from abroad. That is to say, they would export some of the same goods as they export now in payment of a tribute to foreign capitalists, only they would export them in return for foreign manufactured goods that would be an addition to their standard of life. In this additional stream of imports into India the British cotton industry would naturally expect to take a considerable share. Soviet Britain would on no account try to prevent India expanding her own industries, especially textiles. But for many years to come India will not be able to satisfy her own needs fully, particularly if these needs expand rapidly. And with a rising standard of living a larger proportion of the Indian demand will take the forms of higher quality goods which Britain will continue to supply long after India has taken over the manufacture of coarser qualities. The future of the workers of India and of

<sup>1</sup> *Manchester Guardian*, 1 December, 1934.

Britain lies along the same road. This means that both the poverty of the Indian masses and the unemployment of the British textile workers can be cured by a revolution, and only by a revolution, in both countries.

Nor is India the only country of which these things are true. There is also the case of China, where the average daily wage for cotton-workers in the mills of Shanghai is 49 cents for a 12-hour shift; where workers are given but two rest days a month; where in some mills one-fifth of the workers are between the ages of eleven and fifteen years, and where women and children work through the night. And where finally, "contractors obtain young children from the country districts, and by employing such children in the mills and factories are able to make a profit of about \$4 a month out of each child. The children being frequently most miserably housed and fed, receiving no money, the conditions of their lives being practically those of slavery."<sup>1</sup> Dr. Wisselink says: "Potential consumption in China, with its 420 million inhabitants, cannot be denied, and if the use of cotton goods (now only 2½ lbs. per head) were to increase to 6 lbs. a head, it would absorb the production of 10 million spindles working 52 hours a week. A consumption of 6 lbs. of cotton *per capita* in such a land as China is, moreover, extremely moderate. It is much less than that of the Balkan countries (where much woollen fabrics are used in addition) and is still less than 19 per cent of that of the U.S.A. In China where lies hidden such luxurious potential buying power, which at any moment might quickly come into action, there is always the possibility of an increase in the demand which the industries of Japan and China would be powerless to meet."<sup>2</sup>

It is not hard to see that a time must come when the textile industry ceases to be an expanding industry under socialism. It is hardly necessary to point out that this has nothing in common with the so-called over-production of capitalism, which is the result of this system, depriving the textile worker of sufficient purchasing power to buy the clothes he makes. But obviously society will reach a stage when the rate of production of cloth is sufficient for its needs and when a part of the labour

<sup>1</sup> *Cotton Industry in China*, H. D. Fong, reviewed by J. Jewkes in *The Economic Journal*, December, 1933.

<sup>2</sup> Wisselink, p. 40.

hitherto employed in textiles will be better employed in other industries. Moreover the introduction of labour-saving textile machinery will have the effect of releasing workers for other industries where their labour is more urgently required. When this time comes, Lancashire will not become a derelict area. As the community's need for labour in the textile industry declines, the economic planning organs will provide for an expansion of other industries, primarily to provide for new needs, but also to make full use of the potential labour-power of the workers. Industries which would be particularly suitable for Lancashire are various branches of engineering, the electrical industry, and the chemical industry. All of these are already established in Lancashire in one form or other: the production of textile machinery is already carried on: the same skill and organization could produce motor-cars or mechanical tabulators. One thing that the planning organs of a Soviet Britain would *not* do would be to attempt to perpetuate a moribund industry with obsolete equipment and half-employed personnel.

Under capitalism, facilities under the Industrial Transference Scheme for the transfer of workers from the depressed areas were not extended to Lancashire until June 1930. And the scheme has been relatively ineffective since.<sup>1</sup> "It amounts almost to a national disaster that whilst the 'migration' of population from 1921 to 1931 was 12 per cent for the South Wales coal area, and 9 per cent for the North-East heavy metal region, the figure for Lancashire was only 3 per cent."<sup>2</sup>

Transference of labour will be made necessary by the expansion of other and newer industries under socialism: it will become possible with a planned economy and the far wider technical education of the workers. And it will not be undertaken in the anarchic fashion of unplanned capitalism. For example: "In Lancashire and Yorkshire there is a tendency to convert some of the redundant cotton mills and weaving-sheds to other purposes. Industries now carried on in such places include the making of domestic wash-boilers, printing, ham-boiling and baking, making of electric fittings, artificial-silk carding and spinning, manufacture of sports clothes and shirts. One cotton-mill has been divided into seven separate factories housing the following industries: the manufacture of slippers, ties, auto-trailers, incubators, neon signs, beer bottling and mechanical engineering. In another

<sup>1</sup> University of Manchester, *Survey of the Lancashire Area*, p. 14.

<sup>2</sup> Jewkes and Winterbottom, *Economic Journal*, December, 1931.

factory, soap, candles and polishes are manufactured as well as electrical switches and apparatus. At Chorley a new industry, the manufacture of slippers, has been established, and a recently vacated weaving-shed in a village has become a bacon-curing and canning works."<sup>1</sup>

In no field will the new socialist life bring about a greater change than in technical education. Jewkes and Gray say: "The drive seems to have gone out of the search for technical knowledge and efficiency." In **Technical Education** Lancashire to-day many important spinning centres no longer have classes in spinning, and even the mutual associations which existed in pre-war times have disappeared. (These were institutions where spinning operatives would meet to discuss technical points and to practise on machinery bought by their joint contributions or loaned by firms of textile machinists.) The number of textile students attending the College of Technology of The University of Manchester has declined and the following table shows what is happening in detail:

			<i>Union of Lancashire and Cheshire Institutes. No. of examination scripts worked in Cotton Spinning</i>		<i>City and Guilds of London Institute. Total No. of examination candidates in Cotton Spinning</i>
1926	..	..	3,460	..	430
1927	..	..	3,136	..	473
1928	..	..	2,798	..	434
1929	..	..	2,604	..	370
1930	..	..	2,568	..	349
1931	..	..	2,045	..	292
1932	..	..	1,430	..	271
1933	..	..	1,067	..	187
1934	..	..	792	..	184

And the number promises to fall still further. In 1934-35 the enrolment for the session again declined. Moreover, the number of first-year students entered for spinning courses in Oldham Technical College was so low that permission had to be obtained from the Board of Education to run a class smaller than the prescribed minimum!<sup>2</sup> This decline has been due to the con-

<sup>1</sup> *Report of the Chief Inspector of Factories, 1934, p. 17.*

<sup>2</sup> Jewkes and Gray, p. 182.

traction of the industry; to the fact that technical knowledge is no longer wanted and is in fact at a discount in textile mills to-day; and to the nepotism of capitalism whereby all the responsible posts are filled by relatives or "friends" of the directors. Ten years' bitter experience has taught the young workers that they are extremely unlikely to gain a position where technical skill will be of any advantage and they are not wasting their time.

In the West Riding technical skill is actually being officially discouraged. In a recently issued County Council syllabus of the Education Department referring to Technical and Evening Institutes (January 1936), it is stated that technical exhibitions will in future only cover one-half of tuition fees instead of the whole fee as hitherto. This will hit the student of poorer parents and make technical education increasingly the monopoly of the well-to-do. Capitalism will no longer pay for a commodity that is useless to it.

Under socialism technical education will be carried on both inside and outside the factory. The Institute for which capitalism has no further use will be expanded to equip the industry more efficiently and to enable every worker to take part in practical research on the problems that confront him in the factory. Moreover every worker will be taught all sides of the trade and will have, among other things, a general knowledge of industry as a whole. It is very difficult for the worker under capitalism to have a field of vision wider than the number of machines he tends. In fact the writer has met many workers who have never visited every department nor even the main departments of the factory where they work. Under socialism the worker will be encouraged to test his theoretical knowledge out in different factories and continuously to make himself familiar with new processes and inventions. The essence of technical education under socialism will therefore be that the worker will never stop learning during the whole of his life.

It is possible that the textile industry may be handed over entirely to the control of women. They have always been better than men at many of the intricate processes such as piecing and weaving. The 1931 Census of Production showed that there were already 574,000 women against only 301,000 men in the industry. Of these women 204,000 were married, and 136,000 of them were over 30 years old. These figures prove conclusively

that women are perfectly able to become skilled industrial workers, to remain skilled all their lives, and to work while married. Spinning in fact is not a spinster's industry. And it becomes decreasingly so when the ample use of trolleys and overhead lifting and drawing mechanisms has removed the strain which breaks the backs of men to-day. The provision of amenities will also effect great changes here. "It must be pointed out that some of the obstacles to the increased use of women in spinning is due to the almost complete negligence of employers, even in modern mills, in providing amenities, in the form of dressing-rooms, for these operators. In this respect even before the War the cotton industry lagged far behind others in which working conditions were certainly no more strenuous than in the cotton industry."<sup>1</sup> Proper provision for changing clothes ("inadequate or absolutely non-existent")<sup>2</sup> and the control of temperature, which often reaches 90° F. in mule spinning-rooms, would make this branch of the industry, as much as any other, a woman's domain.

And so in the end we come back to the words of Cobbett, (protesting against the long hours sanctioned by the Act of 1833). "We have this night discovered that the Shipping, the Land, the Bank and its credit, are all worth nothing compared with the labour of these hundred thousand little girls in Lancashire."

<sup>1</sup> Jewkes and Gray, p. 191.

<sup>2</sup> Ibid., p. 190.

# IX

## IRON AND STEEL

**T**HE British iron and steel industry has suffered and suffers still from the heritage of its past. It came into existence in the eighteenth century and had its first burst of vigorous development in the early nineteenth century, at a time when it was essentially an *iron* industry: cast iron and wrought iron were its most important products, manufactured in bulk in large-scale, highly capitalized plants, while steel was an expensive product with a limited field of use manufactured in small-scale plants, usually attached to the steel-using process (e.g., cutlery).

Later technical developments made *steel* the main product of the industry. On the continent of Europe and in the U.S.A. the industry developed essentially on the basis of *steel* production: in England, in spite of considerable reorganization, it never wholly outgrew the characters impressed upon it in its old *iron* days.

In the early nineteenth century the iron industry was organized as two distinct sub-industries, the one producing cast-iron goods in the foundry, the other producing wrought-iron goods in the forge. Pig-iron produced in the blast furnace was used unaltered in the first case; in the second case it was turned into wrought-iron in the puddling furnace before being forged. The unit of production, although it represented a large concentration of capital for the time, was small compared with the industry as a whole and intense competition was well-nigh universal. Technically the industry was based upon the two great inventions of the eighteenth century. One was the smelting of iron-ore with coke



to form pig-iron (Abraham Darby, I, 1713—Abraham Darby, II, ca. 1750). This was applied first to the production of foundry iron and only later and more slowly to the production of wrought-iron. The efficiency of the blast furnace was greatly increased by Neilson's invention of the hot-blast (1828). The other was the production of wrought-iron from pig-iron by the puddling process followed by rolling (Cort, 1783-4). The puddling process was improved by Homfray of Tredegar (1790) who introduced the refinery—a furnace in which certain impurities, such as silicon, were burned out of the iron before puddling. Steel was produced in small quantities from the finest wrought-iron, usually charcoal-iron from Sweden, by the cementation process. From the blister steel so produced, cast steel was made, by melting in crucibles, also in small quantities (Huntsman, 1740). Steel was an expensive material, used for high-grade articles like knives, tools, watch-springs, shoe-buckles and other "toys"; its production was carried out on a small scale, usually in connection with the manufacture of the finished article.

In the middle of the nineteenth century the industry underwent a fundamental economic revolution due to technical inventions, followed by a second transformation, only a little less fundamental than the first-mentioned, in the last quarter of the nineteenth century. The first revolution was due to the invention in 1856 of the Bessemer process of making steel direct from pig-iron, so avoiding entirely the time- and labour-consuming puddling process and rendering possible the production of steel cheaply and in bulk. This was followed in 1865 by the Siemens-Martin open-hearth process which gave a similar product, rather dearer than but of better and more exactly controlled quality than Bessemer steel.

The second transformation was started by the discovery by Thomas and Gilchrist in 1879 of the basic process, making possible the use of phosphoric ores previously considered useless for steel-making and, incidentally, yielding as a by-product basic slag, a valuable artificial fertilizer for agriculture. This process, which was applicable to both the Bessemer and the open-hearth methods, broke the monopoly of the high-grade non-phosphoric ore deposits, on which the prosperity of the steel industries of Great Britain and the United States mainly rested, and made possible a tremendous extension of steel-making to regions previously at a serious handicap. Belgium, France, and Western Germany benefited particularly from the basic process since in the miqette

ore deposits of Lorraine was an enormous supply of cheap phosphoric ore, useless hitherto for steel making, but now of great value.

These two transformations together made possible the substitution of mild steel for wrought-iron and the opening up of a thousand new uses for steel. The cheapness of steel rails gave a new impetus to railway construction, and structural steelwork revolutionized engineering. The new demand for steel entailed a revolution in the organization of the industry. Steel was now made in bulk, and since the production of steel was now most economically carried on in close association with the smelting of iron, the tendency was to integrate steel-making with iron works instead of with the steel-using industries: in other words, what had been essentially an *iron* industry with steel as a semi-detached subsidiary became an *iron and steel* industry, with an emphasis on steel that increased as the years went by.

All over the world the steel industry expanded rapidly and the concentration of capital went forward even more rapidly. Vertical integration became the order of the day: iron and steel firms reached backward to control coal-mines and coking-plant and reached forward to acquire rolling-mills, plate-mills, wire-drawing, galvanized iron and tin-plate establishments, rod mills, wire-drawing and wire-manufacturing plant. In the newly industrialized countries, like the U.S.A. and Germany, this development has taken place almost from the beginning. In Britain, however, a few large integrated concerns co-existed with a large number of small undertakings, badly located and often technically inefficient, which have survived from earlier times when the factors governing location and the technical optimum of capacity were very different from what they are now.

The most modern developments in the technique and organization of iron and steel production have been: (1) increase in the size of the plant; (2) fuel economy; (3) integration; (4) specialization; (5) increased use of scrap; (6) improvement in the quality of Bessemer steel; (7) increase in the importance of special steels and alloys.

With these we may associate tendencies that are still embryonic, but may be of immense importance for the future: (8) the production of steel direct from the ore; (9) the supersession of steel by non-ferrous metals.

(1) Increase in the size of the plant (blast furnace, open-hearth furnace or converter, rolling-mill) results in an increase in efficiency. Thus a large blast furnace uses less fuel per ton of iron produced than a small blast furnace. This efficiency is only obtained if the different parts of the plant dovetail into each other so that each is of the most efficient size and each is running to full capacity. This entails a very large output as the minimum efficient output of a modern steel plant. This process is much less developed in Britain than in other countries, especially in the case of coke-ovens and blast-furnaces. Thus the average capacity of coking-plant in Great Britain was only 100,000 tons per annum (1929) as against 500,000 tons in Germany and U.S.A. Thus the annual average capacity of a blast-furnace in Great Britain is 48,000 tons (1929), compared with 97,000 tons in Germany, and 138,000 tons in the U.S.A. The comparison is very striking between a blast-furnace of the type which is most common in England with a daily capacity of perhaps 150 tons, worked by a shift of at least six men, and the most up-to-date 1000-ton automatic blast-furnace worked by a one-man shift. The modern method uses only one-fortieth of the direct labour per ton of pig-iron.

(2) Ever since 1845, when Budd of Ystalyfera used the hot gases from the blast-furnace to heat air for the blast, iron-masters have been studying fuel economy. Nowadays, this takes two main forms. One is the use of coke-oven or blast-furnace gas for heating the blast, heating soaking-pits and open-hearth furnaces, and generating power for the works. The other is the avoidance of heat-losses in the transference of material from one stage of production to another. Thus pig-iron is taken in the molten state direct from the blast-furnace to the converter or the open-hearth furnace, and steel ingots are passed while still hot to the rolling-mill or forging-press. Other forms of fuel economy are represented by the cleaning of blast-furnace gas, and by the use of closer brickwork in the stoves wherein the blast is heated. Under this head may also be mentioned the special treatment of ore before it goes into the blast-furnace—roasting and sintering—which enables less fuel to be used in the actual smelting.

(3) Integration—that is to say the combining of a number of successive processes in one plant—has been dictated largely by the

needs of fuel economy, as described above. Thus the placing of the coke ovens in close connection with the other

**Integration** processes is necessary if the gas generated in the process of coking is to be used in the rest of the plant. Blast-furnaces, steel-furnaces and rolling-mills must be closely linked up physically if heat-losses are to be avoided. But other advantages result from integration. A whole series of processes can be carried out in their proper order without interruption, the quantities produced at different stages can be adjusted to each other so as to produce a regular stream of material through the works, delays between stages can be avoided, and every part of the plant kept working steadily at full capacity. Nowadays, therefore, the manufacture of steel is integrated backward to the coking-plant, the coal-mine and the iron-ore mine, and forward to the steel-using processes, such as the production of rolled sections, rails, constructional work in general, plates, tinplate, tubes and wire.

Although much has doubtless been done in Britain in this direction, much still remains to do. In particular a great many miscellaneous products and semi-products are manufactured by re-rollers. These firms, who buy steel in the form of billets and bar and then re-roll them to the required shape, are frequently too small in scale for economic working and lack the full advantages of fuel economy to be obtained through integration with steel production. Their competition with each other and with the big integrated steel plants results in much uneconomic transport.

The British steel industry has been less able than that of other countries to practise fuel economy, owing to the small size and scattered distribution of its units and to its uneconomic geographical location. Some districts have blast-furnace capacity in excess of their consumption for steel-making, while others, such as Scotland, do not make all the pig that they use. These latter cannot therefore make all their steel from molten pig-iron. 25 per cent. of the basic pig-iron and 60 per cent. of the hæmatite iron produced is despatched to other works.

(4) **Specialization.** Integration has been accompanied by specialization. There is a tendency for one steel works to concentrate on one finished product, on one semi-finished product or on a limited range of finished products all derived from one standardized semi-product. This has been carried so far in some cases that a concern controlling a number of rolling-mills will set one or more

mills apart for one particular section: if short runs of little-used sections are required or if special orders have to be filled, this miscellaneous work is concentrated in a specialized mill designed so as to permit of frequent changing of rolls. Thus the great part of the output can be produced without changing the rolls at all<sup>1</sup>—which effects a great saving of cost.

As in the case of integration, the economics of specialization have not been taken anything like far enough in Britain. For instance, the mutual competition of the re-rollers results in a number of different firms all doing small quantities of the same product with frequent changing of rolls.

(5) Increased use of scrap steel. With the introduction of the basic open-hearth process in the 'eighties, there began an era of rapid and intensive construction in steel: rail-ways, bridges, buildings, ships, machinery, etc. For twenty or thirty years the world was adding to its stock of steel embodied in durable instruments of production. But gradually the instruments made in the earlier part of the steel era became worn out or obsolete, and, after a shorter or longer period of life, the metal contained in them came to the scrap heap, whence it passed through the steel furnace to arise in a new incarnation.<sup>2</sup> Comparatively little steel need nowadays be wasted: it can be used over and over again in indefinitely repeated cycles. New steel manufactured from the ore will always be required to make up for wastage and to provide for any needed increase in the world's stock of steel goods; but the old steel will circulate in an endless round, returning again and again to the furnace in the form of scrap. In other words the steel industry is engaged to an increasing extent, not in *making* steel, but in *re-shaping* steel already made. For this reason the world's production of pig-iron, once greater than the production of steel, has, since about 1910 or thereabouts, sunk below that of steel, in spite of the fact that some pig-iron is used in the foundry<sup>3</sup> or for

<sup>1</sup> Except for the necessary periodic re-turning of the rolls.

<sup>2</sup> "It is only now that the first wave of scrap metal has begun to surge back to the iron works from the world's consumption markets." G. de Geer, *Index*, Vol. VIII, p. 80 (April, 1933).

<sup>3</sup> Scrap cast-iron is nowadays used in the foundry. The following table (from *The Socialization of Iron and Steel*, by "Ingot," p. 161) shows the use of scrap and of other materials in 1934 (in cwt. per ton of steel):

		Scrap	Pig-iron	Other materials (incl. ore)
Open-hearth, acid	.. ..	14.9	7.2	1.3
Open-hearth, basic	.. ..	11.8	9.2	3.6
Bessemer, acid	.. ..	2.7	19.2	1.0

the production of wrought-iron. Thus the use of scrap is no transient phenomenon of depression or of the post-War period, but a permanent feature of the industry.

(6) Improvement in the quality of Bessemer Steel. Steel produced by the Bessemer process has not, in the past, been of the highest quality. Owing, however, to the cutting Bessemer Steel out of intermediate processes and to the short time occupied in the converter itself, Bessemer steel was cheap. Because of its cheapness it has rather won its way into new uses, not previously served by steel, than displaced crucible steel in its old uses. Only with the introduction of the open-hearth process has it become possible to produce direct from pig-iron steel of a quality to compete with that produced by the old processes. The open-hearth process is slower and therefore more costly than the Bessemer process (though much less costly than the old crucible process) but it is much more exactly under control and the quality of the product is not only higher but more uniform than that of Bessemer steel. Also, the yield of steel from a ton of pig is slightly greater in the open-hearth than in the Bessemer process, since in the former process a certain quantity of ore is usually charged into the furnace with the pig and the scrap. The ore helps to eliminate the carbon in the pig-iron and at the same time adds to the total quantity of metal produced.<sup>1</sup> Open-hearth steel rapidly replaced crucible steel in all the old uses of steel with a few exceptions. A definite division of function developed in the steel industry. Two distinct products, Bessemer steel and open-hearth steel, emerged, of two different prices and qualities, each with its own sphere of use. Great Britain gradually abandoned the production of low-grade Bessemer steel and concentrated on the open-hearth process, importing from Germany or Belgium the Bessemer steel she required, either in billets or in semi-manufactured forms. The production of Bessemer steel remained important in Germany, Belgium and the United States.

Of recent years, however, great improvements in Bessemer technique have been made, in the direction of obtaining greater control over the quality of the product. Thus, nowadays, Bessemer steel can be produced of a higher and more uniform quality; it approaches, but has not yet attained, the level of

<sup>1</sup> A method occasionally practised of combining the advantages of both processes is to begin the making of steel in a Bessemer converter and finish it off in an open-hearth furnace.

open-hearth steel. It cannot as yet be used for structural purposes; nor is it, at any rate in Britain, used for rails. But it has a wide range of application for such purposes as tinplate, tubes, and wire. Recently a plant for producing 300,000 tons per annum of basic steel by the Bessemer process has been set up at Corby, in the Northamptonshire ore-field. The output is destined for the manufacture of tubes. This marks an important change in the British steel industry, seeing that the output of acid Bessemer steel had fallen to about 100,000 tons in 1931 and 1932, while the production of basic Bessemer steel had ceased entirely since 1925. (The production of open-hearth steel touches 9 million tons in a good year.)

(7) Increase in the importance of special steels and alloys. Side by side with the development of a concentrated and integrated mass-production industry, engaged in producing enormous outputs of Bessemer and open-hearth steel, has gone the development of a large number of special steels, produced in relatively small quantities for highly specialized uses.

Chief among these uses is the making of the tools used in the engineering, shipbuilding and constructional industries—the very industries which also absorb the bulk of the output of the mass-production branches of steel production. There is a demand for tool steels that retain their hardness at high temperatures and thus enable work to be done and jobs to be machined at a high speed, economizing time and saving overhead costs. Other kinds of special steels are required to resist corrosion, as in acid containers for chemical works. “Stainless steel” for cutlery is a familiar example of this type of special steel. Frequently resistance both to chemical action and to high temperatures is required, as in the valves and pistons of the internal combustion engine and in the steam tubes and cylinder parts of high-pressure steam engines. (For engines are more efficient the greater the range of temperature of the working fluid. Since very low temperatures are impracticable, this involves the use of very high temperatures. But the higher the temperature the greater the rapidity of all chemical actions—even steam at high temperatures and pressures being as corrosive as sulphuric acid.) These special steels often contain admixtures—sometimes in a very high proportion—of other metals, such as nickel, cobalt, chromium, vanadium, tungsten and manganese, or even of non-metals, such as silicon. The scale of production is much smaller than in the case of steel

produced for general purposes. Various methods are in use—the old crucible process still holds its own for certain purposes, much special steel is made in open-hearth furnaces of a smaller type than those used in mass-production, but the electric furnace is most widely used for the manufacture of special steels of all kinds.

(8) The production of steel direct from the ore. Just as the Bessemer process introduced great economies into steel manufacture by enabling steel to be made direct from pig-iron, by-passing the lengthy and costly process of making wrought-iron, so it is thought by many that a still greater economy could be effected by by-passing the pig-iron stage and producing steel directly from the ore. This is by no means impossible—in fact the oldest known method of making iron, the bloomery process, occasionally produced a lump of mild steel instead of wrought-iron—but the difficulty is to discover a method which is perfectly under control and can be carried on cheaply and on a large scale. Research is still proceeding along these lines, and it is possible that within a short time new processes will be discovered that will make desirable the scrapping of most of the existing steel-making equipment and the installation of entirely new plant. Until this takes place, however, it will be necessary to reorganize the industry on the assumption that existing methods will continue to be used. Neither in industry nor in agriculture may one count one's chickens before they are hatched. Nevertheless, it behoves those entrusted with the conduct of socialized industry to be on the look-out for new and labour-saving processes and to be flexible-minded enough to develop and apply them when they are discovered.

(9) The supersession of steel by non-ferrous metals. For many years after the taking of power by the workers, we may confidently expect an increase in Soviet Britain's consumption of steel: railway and electrical development, reconstruction of existing inefficient or obsolete plant, the building of new factories for making goods that are needed by the masses and that could be made by the labour of those now workless under capitalism. But if we cast our eyes still further ahead we shall see the possibility that the once-mighty steel industry will decline before the advance of technical developments now scarcely thought of, except by a few pure scientists. The light metals, aluminium, calcium and magnesium, lie about us in every clod and stone. At present the



cost of extracting them greatly outweighs the abundance and accessibility of their ores, but there is little doubt that this difficulty will be overcome in time (in less than thirty years aluminium has come from being a curiosity of the chemical laboratory to being a commonplace of the kitchen and the garage). Because of their lightness, strength, malleability and ductility, and the valuable properties of their alloys, they will almost certainly replace steel for a great number of structural and industrial purposes. The transformation so effected in the daily life of mankind will be even more extensive than that effected during the last fifty years by the use of steel. However, all this belongs to the distant future, not to the period immediately after the Revolution. The same remarks as apply to the prospect of making steel directly from the ore apply, but with even greater strength, to these remoter possibilities.

The consequences of the early evolution of the British iron and steel industry as an *iron* industry and of its piece-meal development in an age of small industrial units are to be seen in its present-day organization and technical condition. In addition to these historical factors certain other factors make for inefficiency. These are rooted in the historical process of capitalism as such, independently of the development of any particular industry. Chief among them are the disequilibrating effects of the trade cycle, the anarchy of capitalist competition, and the still greater anarchy of capitalist monopoly (so-called rationalization).

One of the most harmful of the forces making for technical and organizational inefficiency is the so-called trade cycle. Under capitalism production, instead of proceeding steadily at a rate which will satisfy the needs of society and keep productive resources fully utilized, proceeds by leaps and starts with long intervals during which urgent social needs are left unsatisfied and productive resources are far from fully utilized. For a reason which will be explained in the next paragraph, fluctuations in the industries producing consumption goods are transmitted in a greatly exaggerated degree to the industries which produce the equipment used in the consumption goods industries—i.e., to the production goods industries. Thus the latter industries, including iron and steel, engineering, shipbuilding, building and the produc-

tion of builders' goods, suffer cumulatively from the evil effects of the trade cycle.

The reason for this is simple. Suppose the average life of a ship is twenty years; then the annual demand for new ships will amount, on the average, to 5 per cent of the existing stock. If now, at a time when all existing shipping is fully utilized, world trade increases by 5 per cent, the resulting demand for new ships will be equal to the demand for replacement purposes. In other words, a fluctuation of 5 per cent in the demand for shipping services will result in a fluctuation of 100 per cent in the demand for new ships. Thus the swings of the trade cycle are amplified in the case of the production goods industries. If now such an industry is organized so that it can deliver the goods demanded at the peak of the cycle, it obviously has to be burdened with productive capacity much in excess of what would be required to produce the same output distributed uniformly over the period of the trade cycle.

This is abundantly apparent in the case of the steel industry. Since steel is the principal ingredient of all machinery, of all large-scale constructional work (railways, bridges, etc.), of ships and of steel plant itself, it is only to be expected that the fluctuations of the trade cycle should have the widest amplitude in this industry. World steel production fell from 118.4 million tons in 1929 to 49.9 million tons in 1931, rising to 79.7 million tons in 1934. The following table<sup>1</sup> gives figures for Great Britain from 1920 to 1933:

## BRITISH PRODUCTION OF IRON AND STEEL

				<i>Pig-Iron</i>		<i>Steel</i>
1920	..	..	..	8.03	..	9.07
21	..	..	..	2.62	..	3.70
22	..	..	..	4.90	..	5.88
23	..	..	..	7.44	..	8.48
24	..	..	..	7.31	..	8.20
25	..	..	..	6.26	..	7.39
26	..	..	..	2.46	..	3.60
27	..	..	..	7.29	..	9.10
28	..	..	..	6.61	..	8.52
29	..	..	..	7.59	..	9.64
30	..	..	..	6.19	..	7.33
31	..	..	..	3.77	..	5.20
32	..	..	..	3.57	..	5.26
33	..	..	..	4.12	..	7.00

<sup>1</sup> G. C. Allen, *op. cit.*, pp. 132J-133.

The result of this is that, except for a very short boom time (twelve or eighteen months, perhaps, in a period of six or eight years), it is impossible to keep plant fully utilized. This involves heavy costs of idleness, with the consequence that the large plant which is technically most efficient (on the assumption of continuous full employment) has the highest costs of idleness. In other words, given violent fluctuations of trade activity, the financial optimum is much smaller than the technical optimum. Only under a general plan, which was adjusted so as to keep construction work *regular* as well as known in advance, would this wastage of excess capacity be eliminated; and only on the basis of a socially planned investment and construction programme covering a period of years would it become practicable to utilize the technical possibilities of large-scale iron and steel plants to the full.

The factor of the trade cycle is intimately involved with those of competition and monopoly. The existence of extremely costly plant with unused capacity at all but a small fraction of the time of a complete trade cycle makes competition peculiarly acute and anarchic. Prices fluctuate wildly and all basis for a rational relation between the parts of the industry disappears. A state of affairs results in which ability to survive in the competitive struggle may depend on anything but economic or technical fitness. Old firms with obsolete plant but with big reserves based on past profits may survive where newer and intrinsically more efficient firms fail. Vertical integrations, formed in order to safeguard supplies of raw materials and to guarantee outlets for semi-finished goods, are based frequently on the accident of business connections rather than on economic suitability. When, finally, competition gives way to monopoly, in accordance with the innate tendency of capitalist development, monopoly takes two forms: the horizontal combination and the price-regulating association. Whichever form is assumed, the anarchy of capitalism continues. Horizontal combines large enough to exercise monopoly power need not cover the whole industry (75 per cent of the output of a particular product is usually sufficient) and such a merger seeks market control rather than technical efficiency. Horizontal amalgamations depend upon the accident of ownership: one firm buys up another (itself the product of previous haphazard amalgamations) lock, stock and barrel. The two properties are then fitted together somehow or other, but since they were not

selected on the basis of technical suitability, the result does little to establish a genuine co-ordination, either geographically or as regards specialization of products. Many recent amalgamations have been forced through by the Bank of England (or its ancillaries) simply because certain concerns happened to be deeply in debt to the joint-stock banks. The combination of concerns selected merely on a basis of a common lack of financial success can scarcely produce a satisfactorily integrated whole, either from the business or from the technical point of view. Nevertheless some rationalization is usually achieved, some obsolete or otherwise uneconomic plant is scrapped or replaced by better, some uneconomic processes are eliminated, some technical co-ordination results.

The trade association, regulating prices and output, is even less effective than the downright combine in promoting technical rationalization. It goes on the principle of restricting output to the point which produces a "remunerative" level of prices; i.e., one which covers the cost of the most obsolete and badly situated plant in the association at the average level of imperfect utilization, and which preserves all the bad practices, the uneconomic cross-hauls, the use of cold pig, etc., that have grown up under competitive individualism. In particular, since obtaining the protection of a tariff in 1932, the industry has tightened up its monopolistic organization and raised prices, without increasing efficiency. The steel-using industries have complained bitterly. Plates for motor-car manufacture, for example, are twice as dear as they are in the U.S.A. This has produced the diverting spectacle of Lord Nuffield, who is a convinced believer in the beneficial effect of tariffs on the motor-car industry, denouncing the evil effects of the tariff on steel products. Meanwhile other motor-car manufacturers go into the steel business themselves, thus adding to the chaos and confusion of competition.

When the industry was really competitive, prices were governed by supply and demand; they fluctuated violently, reflecting the anarchy of competitive capitalist production.

**Prices**                      Nowadays, under monopoly capitalism, prices are controlled by price-fixing associations in the chief branches of production. Minor fluctuations are now smoothed out; but the anarchy of world-competition and of the trade cycle, which national monopoly is powerless to eliminate, still produces big variations. The price-fixing associations main-

tain, by means of a system of rebates on exports, what is in effect two sets of prices, one for home sales and one for exports. The object of the controlled prices is, of course, not to smooth out fluctuations in the *tempo* of economic activity, but to make as much monopoly profit as possible for the firms in the association.

Under socialism the iron and steel industry would be one of the most important in the social economy, and the prices of its products would be one of the most important regulative elements in socialistic book-keeping. Iron and steel prices for internal purposes would be stabilized by the central planning authorities. This does not mean that they would never change. They would not be altered in response to small changes in supply and demand; but they would be changed in accordance with changes in the real scarcity of iron and steel—i.e., if improvements in technique and organization made, say, pig-iron or basic steel really easier to produce, its price would be lowered. In other words, the stabilized price would be based, not on the possibilities of exacting monopoly profit, but on the real long-period cost of production of the goods. With the abolition of monopoly power and the necessity for earning interest on inflated capital and extravagant bank loans, with technical improvements, rational organization and reduced transport costs, it should be possible considerably to reduce the price of iron and steel, thus improving the position of all the industries using these products (ultimately the whole national economy).

External prices would be under the control of the People's Commissariat of Foreign Trade. This would endeavour to stabilize foreign trade as much as possible by long-period agreements with other countries, especially other socialist countries; but it would probably be forced by world conditions to sell part of the export production at prices governed by day-to-day competitive forces outside its control. Here it would have to make the best bargains that it could.

Wages at present are settled by collective bargaining, based in the case of skilled workers on the price of pig-iron or steel according to sliding scales. Most direct process workers, skilled or unskilled, are paid at piece rates. Wages vary enormously according to the grade of the worker: charge hands receiving as much as £20 a week (owing to fluctuations in employment this is *not* equivalent to £1000 a year), and labourers often getting fairly low wages even

for unskilled labour.<sup>1</sup> The wages of the iron-ore miners in some regions are among the lowest for adult male workers in Britain.

Under socialism the system of wage payment would have to be altered in many points. Piece-rates should be retained, since the industry is accustomed to them and they promote efficiency. Once prices are stabilized the *raison d'être* of sliding scales disappears and they should be abolished. Wage-rates should be stabilized independently of the price of the product. Piece-rates for process workers and bonuses on output for other workers should ensure that as productivity goes up and prices come down, wages should go up. The most important change to be made in the existing system is to raise the wages of the unskilled workers as rapidly as possible to a decent level. Since wages only amount to 30 per cent of the total costs of the whole industry, this should not offer extreme difficulty.

The worst blot in the industry at the present time is hours and working conditions. Owing to the fact that most branches of the industry work on a continuous shift system, piecemeal reduction of hours is impossible: either an 8-hour shift or a 6-hour shift must be worked. Moreover coke-ovens and blast-furnaces work 7 days a week. Thus many workers have a 56-hour week (when they are working). Since employers (except in a few regions) will not accept the four-shift system, hours in this industry have remained as long as they were twenty or more years ago (they have even increased in the case of some kinds of work). After the improvement in the wages of the lowest-paid workers, the most urgent reform in the conditions of labour in this industry is the general introduction of the four 6-hour shift system. This might absorb some of the economies effected by increased production and rationalization. But the shortening of hours, like the greater regularity of employment, would probably increase the human welfare of workers in the industry as much as any rise in money wages could. A badly needed (and quite practicable) reform is the re-arrangement of shifts for coke-oven men and blast-furnace men so as to allow for a weekly day of rest and to eliminate the "long turn"—the 16-hour shift when the shift changes over.

Other improvements in working conditions should also be effected, especially in the domain of safety. The shortening of hours would undoubtedly prevent many accidents, and the

<sup>1</sup> Not more than 15 per cent of workers earn more than £6 a week. The average for the rest is about £3 6s. 0d. a week ("Ingot," *op cit.*, p. 55).

modernization of equipment would obviate many others; but a much higher standard in the matter of safety provisions is needed in many iron and steel establishments to-day. Other amenities too are badly needed. The industry has not participated very conspicuously in the welfare movement of the comparatively good years of capitalism in the 'twenties. There is much to be done in the way of canteens, baths, recreation-rooms and other works amenities.

The fluctuations of the trade cycle make profits in the iron and steel industry a very variable quantity. A complicated financial structure, involving many tiers of holding companies, numerous "reconstructions," and elaborate safeguards for debenture-holders, makes it very hard to arrive at the exact facts regarding profits. Many concerns have paid no dividend on ordinary shares (some none on preference shares) since the end of the post-war boom: this does not necessarily mean that the industry is not prosperous, but simply that the cream is being skimmed off for the benefit of the big financial interests who have "rationalized" the industry. The genuine investor has come off badly in many cases, but the banks and the big financial magnates, who alone know the real inside positions and who exercise real control, have feathered their nests well. The high rate of technical depreciation present in iron and steel manufacture makes high depreciation allowances plausible, but it is impossible to check their validity. This, combined with the complexity of holding-company finance, makes it very easy to conceal profits in hidden reserves. The following table<sup>1</sup> shows the amount taken out of the industry in profits by 14 big combines alone during the last six years (gross profit less depreciation).

	<i>£ thousand</i>				
1929	..	..	..	..	3815
30	..	..	..	..	2702
31	..	..	..	..	1625
32	..	..	..	..	1341
33	..	..	..	..	2467
34	..	..	..	..	4072

We must not forget also that directors' fees and salaries to "executive officers" are provided on a very generous scale in this industry. They are not included in the above figures.

<sup>1</sup> *The Socialization of Iron and Steel*, by "Ingot," p. 170.

The big jump upwards since 1933 is attributable to the 33½ per cent tariff imposed in 1932 which enabled "remunerative" prices to be maintained in the home market and gave a powerful fillip to monopolistic practices. Two of these are worth recalling here. With a view to establishing the home production of the semi-finished products formerly imported from the Continent, the British Iron and Steel Federation entered into a cartel agreement with the foreign producers limiting the total quantity of imports. During 1935 modified boom conditions prevailed, and the demand for semi-products rose above the capacity of British producers to supply. The British Iron and Steel Federation thereupon imported the requisite quantities (at tariff-enhanced prices) on its own account, cutting out the ordinary merchants and obtaining for its members the merchants' commission. Another striking example of monopoly power in action was revealed in the Press recently, when it was made public that firms manufacturing certain finished steel products which were willing to supply public authorities at reasonable prices were being forced to join a trade association and raise their prices under threat of having their supplies of semi-products cut off by the firms which supplied them. These latter firms were already in an association. Behind the whole system of linked price-fixing associations stands the British Iron and Steel Federation, which is forcing all iron and steel firms into "voluntary" association by means of interlocking agreements, rebates granted only to associated firms, and agreements between firms in one association to supply only members of associations federated into the British Iron and Steel Federation.

Other sources of increased profit have been the substantial help given, at the expense of the taxpayer, to various steel-using trades. We need only mention the £2 million subsidy to the Cunard-White Star merger to enable that white elephant *Queen Mary* to be built, and the £10 million loan made by the banks under Government influence to the shipping industry. The present Government's re-armament programme will doubtless produce a large further increase in the profits of the iron and steel industry.

All the evidence goes to show that, when the workers take over the industry and extinguish the dole paid to the parasites, there will be an ample surplus out of which to finance the technical reconstruction of the industry and to improve wages and working conditions.



Because of these factors (and perhaps of others) the British iron and steel industry shows a picture of general chaos. Even when particular sections of it have been pretty effectively rationalized, such as the new plants of the North-East Coast, in Lincolnshire, in Northamptonshire, and in South Lancashire, this only perpetuates a wasteful unbalance in other parts of the industry. There is still much uneconomic overlapping in production, the same product being made in several different places when its production might be centralized in one, with a reduction in the process costs. This situation is aggravated by the existence of a large number of re-rollers, competing for the same kind of job and multiplying small runs of the same product. There is still much wasteful inter-regional transport, such as the carriage of pig-iron from Staffordshire to Cheshire and of the resultant sheets from Cheshire back into the Midlands, or the carriage of tin-bar from Northants to South Wales for tinning and of the tinplate back into England. The geographical distribution of the industry is haphazard, resulting not only in such transport anomalies as are referred to above, but also in a wasteful lack of balance between regions. Some regions, such as the North-East Coast, Lincolnshire, Northants and the West Riding of Yorkshire, produce an excess of pig and export it to the regions which, like Scotland and South Wales, do not produce all the pig they use, and consequently have to charge their steel furnaces with cold pig, contrary to the best principles of fuel economy. In other words, although there has been a certain amount of partial rationalization (distorted by the accidents of ownership and by the desire for monopoly-power), the industry has never yet been planned as a whole. Nor is it likely that this will happen until industry as a whole is socialized, the anarchy of individualistic property-rights put an end to, and the power of the monopolist broken. This is the historical task of the workers of Britain.

The main problems facing the workers when they have got the British iron and steel industry in their hands may be discussed under the following heads: (1) mutual relations between the sections of the industry; (2) relation of imports and exports of steel and steel products; (3) localization of the industry.

In relation to the first of these heads, the main problem here is: Shall the industry be built up round heavy steel production

(chiefly structural steel), or shall it be organized in a looser manner as a number of more or less separate sectional industries? If the first method is decided upon, what shall be the relation to the heavy steel section of the lighter steel section and of the cast-iron and wrought-iron branches? Fuel economy and other economies in power, transport and organization indicate strongly that the industry should be built up of a relatively small number of closely integrated units. This would make possible the adoption of much larger coke-ovens and blast-furnaces than are at present general in Britain. Each unit would be served by one large central cokery and would contain a sufficient number of blast-furnaces to furnish the grades of cast-iron mainly required (smaller quantities of special grades might have to be transported from other districts) and to allow for the periodical relining of the furnaces. To these could be added the necessary converters or steel furnaces, rolling-mills, forging-presses, etc. Here a division must be made into two types of units. In the heavy sections of the industry it would be possible to apply the principle of specialization according to product, each unit producing one product or one comparatively narrow range of products. The same principle can be applied to those lighter sections of the industry where very large quantities of one kind of product are made, such as tinplate and wire. The remainder of the light and medium sections, with a greater variety of products, would need a looser type of organization, in which a number of finishing processes were grouped round a central nucleus of cokeries, blast-furnaces and steel-making plant. Even here it would be desirable to make this nucleus as large as possible in order to obtain the economies of large-scale coke-ovens, blast-furnaces and steel furnaces; it would also be desirable to associate the finishing processes as closely as possible with the nucleus in order to economize fuel, power and transport. The same principles apply to the foundry and puddling sections, producing respectively cast-iron finished goods and wrought-iron. These would probably be associated with the manufacture of some convenient group of miscellaneous light or medium steel products.

The second crucial question is: shall the industry import its lower-grade steel and semi-finished products, while continuing to export higher-grade steel and finished products, or shall it become independent of foreign supplies (with probable consequential reduction in exports)? While it is no part of socialist policy to strive after self-sufficiency for its own sake (the autarky

of the Nazis), it is probable nevertheless that considerable advantages would be derived from an advance in the degree of self-containedness of the iron and steel industry beyond the point of 1931. (The protectionist policy of the National Government, although adopted principally as a scheme for safeguarding the profits of monopoly capitalism irrespective of workers' and consumers' interests, seems in this case to have worked in the right direction. However, since the protective dole was unaccompanied by any provisions for enforcing reorganization and increased technical efficiency in the backward branches of the industry, it has raised costs very considerably in many of the growing industries, such as motor-car manufacture). The planning of the iron and steel industry as a coherent and co-ordinated whole would be much easier if all the chief branches of production were under a single control. While certain special products would continue to be imported, it would probably be found desirable to cease importing ordinary pig-iron and lower-grade steel and semi-finished products. There is no reason based on the law of comparative costs why we should not make these goods as cheaply as Germany or Belgium if we modernized our plant and adopted the optimum size of productive units; while the proper balancing and co-ordination of the different branches of production opens up the possibility of considerable reductions in cost. It should be clearly understood that such a policy involves as a corollary a certain diminution in the volume of exports. Here again it would probably be found best to drop the exportation of raw steel and semi-products and to concentrate on the export of finished goods. Whenever possible a Socialist Britain should try to enter into co-operative relations with other socialist countries. If Sweden, Belgium, France and Germany went socialist, it should be possible to set up a joint planning authority for the iron and steel industry which could obtain the advantages of central planning and complete co-ordination of the industry as a whole, while preserving a good deal of the territorial division of labour that has in the past existed between these nations. Nevertheless, there is reason to believe that a good deal of the cross-freighting of iron and steel products across the North Sea and the Channel has been due, not to territorial division of labour based on real differences in comparative costs, but to the competitive intensification of transient differences in cost inherent in the anarchy of capitalist production. If this is true, then the natural result of international planning of the industry would be the setting up of largely self-

contained regional trusts and a considerable reduction in criss-cross trade.

The chief factors governing the location of industry are resolvable into transport costs of different kinds—the cost of transport of the various raw auxiliary materials to the place of production and the cost of transport of the finished product to the place of consumption. If the market is localized it will tend to draw the industry to itself against the contending pulls exercised by the transport costs of the constituent materials. The relative strength of the market and of the materials depends on, among other things, the amount of waste involved in manufacture. The more fuel is used in production and the more raw material is used up without adding to the weight of the product, the greater is the strength of the forces drawing the industry towards the source of power and of raw materials. If the market is very widespread the pulls of the market will be in different directions and may cancel out, leaving transport of materials as the governing factor. In this case the influences of fuel (or other sources of power) and of the various raw materials may be antagonistic: the actual location of the industry will be determined by the resultant of these contending influences.

Of course, it must be clearly understood that these tendencies are tendencies only. They are operative only in so far as the economic organization of society is rational. In a capitalist society they would be effective if the price system worked according to the ideal picture of the working of a free market drawn by the orthodox economists. In real life, however, their operation is interfered with by numerous frictional and distorting forces. Such forces are: ignorance of the true state of the market; imperfect competition, causing the survival of uneconomically situated firms; monopolistic attempts at so-called “rationalization,” which make real rationalization impossible; transport rates which do not correspond to the real costs of transport; the effect of the trade cycle on the optimum size of the plant; and all the other perverting influences, which may be summed up as the anarchy of production, inseparable from a system of private property and private enterprise in industry. Moreover, social considerations, such as rational town-planning, a healthy distribution of the population or the preservation of natural beauty, never enter into

the price-calculations on which capitalist accounting depends, and so are completely ignored in the location of industry under capitalism. This is of particular importance in the case of those branches of industry where nearness to markets is the dominant attractive force; for, where industry is concentrated, there (by the attraction of population) is its market concentrated also; and a cumulative tendency to excessive concentration may occur in what may be, from a social point of view, an undesirable centre.

Let us now consider the location of industry in the particular case of iron and steel. Up till about thirty years ago coal was the decisive factor in the location of the iron and steel industry. The quantity of fuel used in the various operations of smelting, puddling, steel-making, rolling, etc., was so great that the cost of its transport was the chief influence determining the most economic situations for setting up iron and steel plant. The supply of ore and of flux was the next strongest influence. Thus, at this time, the principal centres of the industry were situated upon coalfields and as close as possible to supplies of iron ore and limestone. (Some ores, such as those of Lincolnshire, are self-fluxing, and therefore need no limestone.) In many cases ore was transported relatively great distances and there was much transport of pig-iron and semi-finished steel products.

Of recent years, economy in the use of fuel has reduced the strength of the forces tying the industry to the coalfields, while at the same time the use of lower-grade ores, increasing the bulk of ore to be carried per ton of steel produced, has increased the tendency for the industry to migrate to the ore-fields. In the case of the British steel industry, the exhaustion of many of the native deposits of ore and increasing dependence on imported supplies have caused important sections of the industry to settle on the coast at the ports of entry of the iron ore. Still more recently, the increased use of scrap has weakened slightly the pull of the ore supplies and increased that of the market (especially since the chief consuming centres are also the chief sources of scrap).

The result of all these influences is that, if the British iron and steel industry had to be created new from the beginning, the places shown as the most economic situations for the industry would be (a) the immediate vicinity of ports suitable for importation of iron ore, (b) ore-fields in Britain with supplies of ore (not necessarily high-grade) sufficient for a good many years to come. In either case, preference would be given to those ports or ore-fields which were also close to the chief consuming centres.

We will now proceed to a hasty and very sketchy account of a socialized and rationalized British iron and steel industry. The industry would be organized into nine large regional trusts, each including not only iron and steel production but also a series of iron- and steel-using processes, from shipbuilding down to cast-iron fenders. Three of these regional trusts would be coastal, using imported ores; six would be based on internal ore deposits. The three coastal regions would be the North-East Coast, Scotland and South Wales. The six inland regions would be Lincolnshire, Northamptonshire, Sheffield, the Birmingham region, South Lancashire and the West Coast. A more exact survey made on the basis of full publicity of the costs of all undertakings and with a rationalized system of transport charges might suggest an even more drastic simplification of the industry. Ultimately all production might be centralized in four or even three regions. In each region a few of the most efficient and best-organized plants would be used as the nucleus of the trust, other plants would be either linked with these or organized into rationalized balanced units on their own. Yet other plant would be scrapped as being obsolete, badly located, or of too small capacity. Except in a few cases even the best plant would need considerable reconstruction: e.g., in most districts new coke-ovens and blast-furnaces of higher capacity would be required, and in the districts to which iron founding was allotted new cupolas of higher capacity would have to be installed. In each region, but especially in Scotland, South Wales, Sheffield and the Black Country, the principal steel-using trades (heavy engineering) should be re-organized into units of an efficient size and grouped with iron and steel production under a common regional administration.

This is a region which already contains some very efficient plant. Grouped into one enterprise and supplied with new blast-furnaces these would make a very efficient unit.

(a) **The North-East Coast** Some of the famous Cleveland iron ore is still left, but this region is dependent for most of its ore on imports from Sweden, Spain and North Africa. To reduce the length of sea transport, and so economize shipping, it would be desirable to direct Swedish ore as much as possible to the North-East Coast, and North African and Spanish ore to South Wales and the Clyde. The neighbouring coalfields of Durham and Yorkshire furnish plenty of good coking coal. The

Cleveland hills, although their ore deposits are nearly exhausted, provide immense quantities of excellent limestone. In this region would be concentrated shipbuilding (shared with Scotland) and heavy structural steel work.

This region is handicapped by a shortage of ore and pig, and by the absence of good coking coal<sup>1</sup> (iron is smelted with raw coal, furnaces heated by producer gas). Ore is

(b) **Scotland** imported from Sweden and Spain (a little comes from Cumberland), and a good deal of pig comes in from surplus-producing districts of England. It is also remote from the chief inland consuming centres. With these disadvantages it might seem scarcely worth preserving a steel industry in Scotland at all; but the advantages of the Clyde for shipbuilding makes it worth while producing enough steel locally to supply the shipyards. To this should be added foundry work, since Scotland has some quite modern and efficient foundry plant and produces nearly half the British output of light iron castings. To avoid the use of cold pig it would be desirable to smelt locally all the iron required; and for this purpose Spanish ore could be imported into the Clyde. New blast-furnaces are urgently required here. Unfortunately Scottish coal breaks up in the furnace under the weight of a heavy charge; hence the use of very large blast-furnaces is precluded.

This is another region handicapped by absence of local ores, absence of coking coal, and distance from the market. The tinplate industry, however, provides a justification for its existence and Spanish ore is conveniently imported into Cardiff and Swansea.

(c) **South Wales** Old and small-scale plant in the valleys must be scrapped and the industry concentrated near the water-edge. At present much of the sheet for tinplate-making used in South Wales is made in Lincolnshire and transported overland. This is clearly uneconomic: either the steel sheets should be made in South Wales, or if this is uneconomic, it would be better to make the tinplate where the sheet is made. This would probably mean liquidating the Welsh steel industry; but in view of the large waste of social

<sup>1</sup> There is coking coal in Scotland, but until recently it has been very little used. This year a coking plant with a capacity of 500 tons of blast-furnace coke a day has been set up at Govan, and there are considerable possibilities for the future development of pig-iron production in Scotland from Scottish coke.

capital involved in any movement of industry on this scale, and possibly in the interests of an even distribution of population and social centres about Great Britain, a Soviet Britain would probably require to organize South Wales as one of the steel centres of the new Britain. At any rate it would clearly do so in the first stage of reorganization; whatever might seem economic to do according to a more long-distance perspective.<sup>1</sup>

This is one of the newest and also one of the most promising sites of the British steel industry. Nearer to the principal consuming centres than most of the older steel-making localities, it is situated right in an ore-field which offers abundant supplies of easily won, self-fluxing ore (poor in iron content, it is true, but this is not such a great disadvantage under modern conditions), and is easily supplied with coal from the South Yorkshire coal-field,<sup>2</sup> which again is one of the richest and best-equipped coal-fields in Britain. Here are a number of the most up-to-date and efficient steel-making plants in Britain. These could be made the nucleus of a very efficient and well-balanced regional trust, producing structural steel and semi-finished products. Here and in Northants will be concentrated more and more of the steel production of the country. At first it will be used mainly for the production of semi-finished strip, bar, shreds and plate, to be used in other centres—Sheffield, Birmingham and South Wales—but as time goes on the finishing processes will be brought in an increasing degree to the steel-producing centre and these two regions will grow in importance. Ultimately, it is possible that most of the other regions would be wound up and all the steel production of Britain concentrated on the North-East Coast, Lincolnshire, Northamptonshire, and Sheffield.

This is another region that has recently sprung into importance on account of the economy involved in locating steel plant in the ore-field. Coal is brought by a short train haul from the South Yorkshire coal-field. At Corby, in this district, Stewarts and Lloyds have set up within the last year or two a plant for

<sup>1</sup> As regards the existing position, cf. the facts advanced in Prof. H. A. Marquand's *South Wales Needs a Plan*.

<sup>2</sup> Recently discovered continuations of this coalfield extend into Nottinghamshire and Lincolnshire.



producing basic Bessemer steel in place of that formerly imported from Belgium and Germany. Much of it is used in making steel tubes and there is the possibility of developing in this region many of the finishing processes that use the lower grades of steel. In time, Northamptonshire should develop into the chief producing and processing centre for basic Bessemer steel, just as Lincolnshire will for basic open-hearth steel.

With this might be associated the Northamptonshire plants producing forge pig-iron (for wrought-iron manufacture) and the iron-founding plants of Derbyshire and Nottinghamshire, if indeed it be found economic to keep them in existence.

Here is an old centre of steel production which has always specialized in high-quality steels. Nowadays it is the chief area in Britain for the production of special steels,

(f) **Sheffield** high-grade cutlery and tool steel, and also for the highest class of structural work, heavy forgings, and for all work requiring highly specialized skill. Sheffield makes less pig-iron than any other centre and consequently uses little ore. It imports pig-iron and raw steel from Lincolnshire and the North-East Coast and finishes it, often on a small scale. Much of its output is special steel or high-grade steel made in the electric furnace. Crucible steel is still made in Sheffield for special purposes. Unlike Scotland, Sheffield has little to gain from the setting up of blast-furnaces, or rather, has little to lose from the separation of pig-iron and steel production, since its output is so specialized. For Sheffield a rather looser type of organization than that set up elsewhere would be appropriate, in order to allow the variety of special processes to be carried out each in its own most suitable manner. Here, also, the integration of steel with general heavy engineering would be particularly desirable.

This, like Sheffield, is an old centre of the industry; but while Sheffield has been particularly associated with steel, Birmingham and the Black Country have always been associ-

(g) **Birmingham and the Black Country** ated with iron. Even to-day much of the production of this region is for the foundry and the forge rather than for the steel furnace. Like Sheffield, this region is characterized by the great variety of its products and will therefore require a more loosely knit type of organization. Here, too, there will be a great gain in linking up

iron and steel production with general heavy engineering. More than in any other area the dead hand of the past lies heavy upon Birmingham and the Black Country. The average size of plant—coke-ovens, blast-furnaces, and steel furnaces—is far too small and much of it badly needs modernization. It has good local coal, but has to import ore from the South Midlands. Moreover it is a deficit area, importing pig-iron from Lincolnshire and the North-East Coast. Nevertheless it has one big advantage (besides coal): proximity to the market, which is also a source of scrap. This region should be drastically rationalized, a great deal of plant eliminated and the rest modernized. A few really good coke-ovens and one or two big modern blast-furnaces should be set up; steel production should be concentrated at one or two of the most easily rationalized steel plants, in close association with the new coking and pig-iron plant; but the bulk of the pig-iron should be used for forge and foundry purposes. Here should be concentrated all the British production of cast-iron and wrought-iron (except for cast-iron in Scotland and, perhaps, a little in Derbyshire and Nottinghamshire). The miscellaneous metal industries of the region need rationalization, too. In time there would emerge a great regional organization, loosely federated, of iron and steel, forge and foundry work, metal trades and general engineering—all forming one vast hive of socialist industry. Meanwhile, the proper use of fuel, electrification (for which the numerous small-scale trades of the Birmingham region are particularly suitable), and a bold policy of re-housing the workers would do much towards removing the stigma contained in the words "Black Country."

This is a region that has few natural advantages: the Lancashire coalfield is old and approaching exhaustion (even in its palmy days it was gassy, full of faults and hard to work). Its ore has to be imported—some of it is haematite from Cumberland. Nevertheless the Lancashire Steel Corporation has recently concentrated production and reorganized its works at Irlam near Warrington and now specializes in the manufacture of wire-rod and of wire. It is an up-to-date and technically efficient plant and it would probably be worth while on this account to concentrate the British production of wire upon South Lancashire.

Cumberland and the Furness district of Lancashire has an old-

established iron and steel industry, based on the excellent haematite ores of the district (now, however,

(i) **The West Coast** nearing exhaustion), but handicapped by its isolation from the rest of the country and by the lack of fuel. Coke has to be carried by rail from County Durham across the Pennine range, involving not only transport cost but also the non-availability of gas from the coke-ovens. It is one of the few places in Britain where the acid Bessemer process is still carried on. Much of the output of the West Coast is consumed in the Sheffield region, but rails are produced locally. The existence of the West Coast iron industry involves very heavy transport costs. As long as the local ore lasts it is probably worth while continuing to make steel here, but it would probably not be economic to preserve it on the basis of imported ore and Durham coke. So long as steel production continues, it should be concentrated on one large plant which should be improved and modernized, the rest being scrapped. If it is decided that it is more economic to use Cumberland ore on the spot instead of sending it to Scotland or South Lancashire, the West Coast steel industry should survive for some time to come.

## X

# SCIENCE AND EDUCATION

IT is not usual to think of science as an industry. To most people outside it the scientific world appears as a mysterious kind of activity carried on by people with all kinds of degrees and titles, dealing with things that no ordinary man can be expected to understand. It is realized that out of the work of these "pure" scientists there do occasionally come inventions and discoveries such as the electric-lamp or artificial silk, which help to transform the conditions of life. It is vaguely recognized that science is at the back of the main transformations of the last two hundred years, the bad as well as the good, the war and unemployment as much as easy transport and the stamping out of plagues. But actually science is an industry, though it is not very big either in money or men. Its total budget is about £5 million a year, which is spent (in descending order of importance) on the war departments, Government-subsidized and other industrial research, agricultural research, and medicine and health.<sup>1</sup> It is very

<sup>1</sup> See Julian Huxley's *Scientific Research and Social Needs*, pp. 255-256: "Research directed to industrial needs heads the list—that is, counting the money spent by Government, by university departments of applied science, and by private firms—with, I should say, nearly half the total. Research for the fighting services, not counting mere development, takes about half of what is spent on industry. Research connected with agriculture and related subjects like forestry and fisheries comes next, with a fifth or a sixth of the total; and then research connected with medicine and health, with about an eighth, or even less. And research in all other branches, together with all background research, probably does not come to a twelfth of the total, though I admit that this item is the most difficult to be sure of. As to the actual amounts, I hardly like to give any figures, as people so often quote rough estimates as if they were ascertained facts. But I should say that the total spent on research in this country is between

difficult to assess the amount of money spent on scientific research and the numbers of people engaged on it, because there is no recognized category of what is research and what is not. Probably well over a half of the money spent on research, particularly war and industrial research, is not spent on what would be called science at all, but on plant and machinery which have no immediate military or commercial value and are experimental in this sense only. If we were to take simply the number of qualified scientific workers engaged in research amounting to 4000 at an average salary of £300 a year, and add to that an equal sum for apparatus and overheads, we should get the figure of £2,400,000 to be spent on the scientific part of research.

But the importance of research is not to be gauged by these figures. Unlike other industries that are concerned in keeping a certain state of production going, science is concerned with changing that state. It has grown up to be the chief transforming agent of production, yet it must not be imagined that it is out of any inherent drive from science itself that this transformation is effected. The facts are really the other way round. Science would not exist on the scale we see it to-day if it were not for the importance of its contribution to industrial profits and the necessity of maintaining imperialist military strength. To understand this it is necessary not only to look at science to-day, but to see the stages through which science has passed.

The old civilizations of the world in Egypt or Mesopotamia had a rudimentary kind of science, sufficient for the needs of their economy. They had astronomy, which was needed to draw up the calendar and give the proper times for planting and harvesting; simple arithmetic and geometry enough for the measuring out of fields and the calculations of grain tax, profit and loss, etc.; enough mechanics for the building of temples and palaces and for simple war-engines, and some very primitive chemistry that underlay the traditional practices of cookery,

four and six millions a year, probably nearer the lower figure. It has recently been stated in a German publication (see *Nature*, 24 February, 1934, p. 286) that the amount of money subscribed by industry for scientific research in the United States in 1931 amounted to the colossal figure of \$235,000,000. If this is correct, it represents about forty times the corresponding amount spent in Great Britain, or allowing for the difference in population, about sixteen times as much per head! The expenditure of Soviet Russia on its geological survey in 1930 was larger than that of all the other nations of Europe put together."

brewing, tanning, dyeing and smelting. With ample slave labour there was no need for any power production or labour-saving devices, and the mental activities of the priestly leisured classes were taken up with literature and mystical philosophy. In the Middle Ages, in which economic conditions were even more backward, the feudal system depending on simple agricultural production and consumption inside the same manor did not even demand transport or trade. Science was accordingly at a low ebb; the aristocracy concerned itself with hunting and war, and apart from some improvements in agriculture and handicrafts, theology took up the time of the subsidized religious orders. But with the break-up of the Middle Ages and the re-appearance of trade, industry and transport, there appeared ("miraculously" to the official historians) a new interest in nature and the beginnings of modern science.

The distinction between the situation in the Renaissance and that of the ancient empires was that now there was a great shortage of labour, and that in Europe at any rate no slaves were available. This led at once to the development of machinery, both power machinery in the shape of mills and labour-saving machinery such as lathes, looms, etc. At the same time this was a great period of military struggles, and the old armoured forces of feudal chivalry were destroyed mainly by the new invention of gunpowder, which made the city burghers in the end the masters of the situation. All these developments gave a great impetus to science. The opening up of the new trade routes across oceans made demands on astronomy which the old theories of the fixed earth could not meet, and led to the revolution associated with the names of Copernicus, Galileo and Newton.<sup>1</sup> The new machinery required a science of mechanics and hydraulics, the new warfare led to the study of dynamics and the properties of gases. At this early stage, however, it cannot be claimed that science had much of practical utility to offer. For the moment, industry was helping science far more than science was helping industry. Far-sighted scientists could see that there was here a way of immensely increasing the power of man over nature, but before they could find it they had to learn from the craftsmen, the miners and the engineers, what principles lay behind the trades they successfully practised. It was not until the seventeenth century, when the Civil Wars in England had given the bourgeoisie a definite mastery in the State, that the practical utility of science

<sup>1</sup> See *Science at the Cross Roads*, Kniga, 1931.

began to be felt. England was the centre of this development. In England the Royal Society was founded, not in the pursuit of pure knowledge, and not by university dons, but by practical noblemen and business men, who were concerned with improvements of trade and industry, and primarily with increased profits and lower wage costs.<sup>1</sup> Even then they did not achieve very much of practical utility except in navigation and gunnery. The greatest invention of the times was the telescope, which had obvious military and naval value.<sup>2</sup>

But the seventeenth century had laid the foundations of industry as well as science. Its chief triumph was the development of the idea of the steam-engine. This may be said to be due, on the industrial side, to the need for pumping out deep mines at little cost, and, on the scientific side, to the discovery of the nature of the vacuum, itself a product of a study of the action of pumps. Yet the steam-engine did not become the universal motive power for industry until it had been improved by Watt in the middle of the eighteenth century. It was when

<sup>1</sup> From the *Preamble of a Charter to incorporate the Royal Society (from a first Essay, and rough Draught, by Mr. Christopher Wren)*. ". . . The Way to so happy a Government, we are sensible is in no manner more facilitated than by promoting of useful Arts and Sciences, which, upon mature Inspection, are found to be the Basis of civil Communities and free Governments, and which gather Multitudes, by an Orphean Charm, into Cities, and connect them in Companies; that so by laying in a Stock, as it were, of several Arts, and Methods of Industry, the whole Body may be supplied by a mutual Commerce of each other's peculiar Faculties; and consequently that the various Miseries, and Toils of this frail Life, may, by as many various Expedients, ready at Hand, be remedied, or alleviated; and Wealth and Plenty diffused in just Proportion to every one's Industry, that is, to every one's Deserts.

"And there is no Question but the same Policy that founds a City, doth nourish and increase it; since these mentioned Allurements to a Desire of Cohabitation, do not only occasion Populosity of a Country, but render it more potent and wealthy than a more populous, but more barbarous Nation; it being the same Thing, to add more Hands, or by the Assistance of Art to facilitate Labour, and bring it within the Power of the few.

"Wherefore our Reason hath suggested to us, and our own Experience in our Travels in foreign Kingdoms and States, hath abundantly confirmed, that we prosecute effectually the Advancement of Natural Experimental Philosophy, especially those Parts of it which concern the Encrease of Commerce, by the Addition of useful Inventions tending to the Ease, Profit, or Health of our Subjects; which will best be accomplished, by a Company of ingenious and learned Persons, well qualified for this sort of Knowledge, to make it their principal Care and Study, and to be constituted a regular Society for this Purpose, endowed with all proper Privileges and Immunities."

<sup>2</sup> Galileo sold his invention of the telescope to the Venetian Government for its use in naval warfare. Its previous discovery in Holland had been kept secret because of its military value.

capitalist manufacturers took the place of merchant capitalists that science really came into its own. The scientific development of the eighteenth century largely centred in Lancashire, Cornwall and Scotland, the chief mining and manufacturing districts, and the scientists of that time such as Black, Priestley or Dalton, tended to be poor Nonconformists or Quakers, rather than country gentlemen. It was under these conditions that the foundations of modern chemistry and electricity were laid.

Nevertheless, up till this time science was not recognized in the universities; and scientists worked, first for wealthy patrons, and then for and with wealthy manufacturers.<sup>1</sup> Consequently the growth of science was a very haphazard affair, and it did not take any conscious part in government or in society generally.

By the middle of the nineteenth century, however, the importance of science, primarily to the manufacturers, began to be recognized, and after heavy opposition from the universities, which had a vested interest in the Classics and in liberal education,<sup>2</sup> science teaching became general, and certain opportunities

<sup>1</sup> Watt, a relatively poor man, had to go into partnership with Boulton before he could get his steam engine taken up. And the latter spent £70,000 on it before it brought in any profits.

<sup>2</sup> As the Rev. Mark Pattison, Rector of Lincoln College, Oxford, writes in *Essays on the Endowment of Research* (1876): "According to the opinion of the middle classes of England, Oxford is a place of education. They may like, or dislike it, for being aristocratic, high church, expensive, idle, dissipated, fashionable, but all are agreed that whatever epithets may be applied to it, it is a place of education. . . . The teaching power, for 2,000 undergraduates, staff, apparatus, chapels, libraries, deans, tutors, heads, prize-fellowships, who all exist for the sake of the undergraduate, cost £400,000 a year. This is a striking, not to say staggering result. If the lower and uneducated classes should ever come to an apprehension of these figures, how must they reason upon them? 'This annual sum arises out of national property. National property belongs to us. We are even told by some that it was given by the founders to the poor students. It is all spent on educating the sons of the rich.' It is certain that as information slowly finds its way downwards, this simple reasoning must come into vogue. Meanwhile, so far as the figures have been reflected on by the classes at present interested in the universities, the conviction has arisen that there is something wrong here. The expenses of this educational establishment are out of all proportion to the work done. We have not so much fault to find with the teaching, but it is too expensive. £400,000 a year for 'tuition, prizes, and the use of the globes' is too much. It can be done cheaper." In the same book James Sutherland Cotton, Late Fellow and Lecturer of Queen's College, Oxford, writes: "It is not necessary on this occasion to criticize that conception of a University which has just been given as current in England, and as generally received at Oxford and Cambridge. It is sufficient to state that it leaves entirely out of sight the obligation to advance the bounds of knowledge. It may also be observed that the petty amount of original work accomplished at our great Universities affords ample justification for the limited view which is commonly accepted of



were given for research. All through the century, however, science was very closely connected with industry, and for a scientific man to get on it was generally necessary for him to be able to show the profitability of his line of work.<sup>1</sup> Darwin is an apparent exception, but he was a man of private means, and although he did not show a profit, the ideas he produced—the struggle for existence—were largely so successful because they gave scientific justification to profit-making of a whole class, as the survival of the fittest. In the latter half of the nineteenth century the British monopoly of manufacture and practical science began to be challenged by other countries. Particularly after 1880, the more consciously developed German Imperialism began to make use of science in a much more rational way, improve and spread science teaching, and institute Government research laboratories on a large scale. Science was here first recognized as a necessary unit of industrial production, and one worth paying for.

The backward manufacturers and financiers of this country, however, did not learn the lesson of German subsidized science until it was brought home to them by the War. It was consequently only in 1917 that the Department of Scientific and Industrial Research was set up, with the express purpose of supporting British manufacturers against foreign competition in

their functions." Finally, Dr. Charles Edward Appleton, Fellow of St. John's College, Oxford, writes in the same work: "This brings me to consider the third means of maintenance which original research, in default of endowment, has to rely upon in this country—I mean the attachment of scientific men to commercial enterprise as advisers of large firms, or as themselves patentees. On this point, too, Dr. Frankland's evidence supplies us again with valuable information. He says: 'An analysis of the schedule which I have put in (of distinguished students of the Royal College of Chemistry, whose subsequent positions are known) shows that forty-five professors and teachers and eight amateur chemists have emanated from the college, whilst the remaining of the three hundred and fifteen students whose history has been traced, have devoted themselves chiefly to technical pursuits.' That is, one-seventh have gone into education and five-sixths into commerce, and something more than one-fortieth into research, *at their own expense!* . . . There is no commercial career open for a biologist, for instance; and the existence of a commercial career—and frequently a very lucrative one—for the chemist has the effect of starving all the other sciences for the benefit of one of them. One of our foremost teachers of biology complained to me not long ago, that he was compelled to advise his best pupils, who were desirous of devoting themselves to a life of research, to give up their own study and enter upon that of chemistry, as there was no prospect of a career for them in any other science."

<sup>1</sup> See J. G. Crowther's *British Scientists of the 19th Century* (1935).

peace time and providing the necessary scientific reserve for war.<sup>1</sup> Since the War, the recognition of the importance of science has been universal, but owing to the chronic crisis which capitalist countries have been in during that period, it has been impossible to provide any adequate support for science in capitalist countries. Only in America have large sums of money been available, and they have been for the most part wasted. In the poorer European countries since 1930 scientific research can hardly be carried on at all, and now with the advent of Fascism in Germany the original centre of scientific research in Europe is rapidly being perverted to purely military uses.

As we have seen, science is not a static catalogue of our knowledge of the universe, but an activity which has grown up in close interrelation with the development of capitalist production. The essential function of science in industrial society is to point out the direction of most profitable change in productive methods. It is, so to speak, the second differential of material production. Even when we come to look at the present

<sup>1</sup> *The Report of the Department of Scientific and Industrial Research, 1932* (pp. 7-8) states: "The scheme was devised by our predecessors in office in the middle of the greatest war in history. From the outset of hostilities, it was apparent that the application of science was to play an important part in the conflict; and men of science were enlisted in the nation's army of workers with no inconsiderable effect. The circumstances of war lent force to the pleas of those who had been calling for a closer march of British industry with science, for they demonstrated, with an emphasis which had hitherto been lacking, the consequences of failure to follow up scientific discoveries capable of utilisation in the industrial sphere. For example, it was soon found that this country was to an unfortunate extent largely dependent on foreign sources for some of the supplies necessary for war-like operations. Our greatest enemy of those days had secured, by application of science, a hold upon certain manufactured products which was found to be of an extent and nature to threaten our national well-being. And there was a general awakening to the fact that for success in times of peace as well as of war it was desirable that the resources of science should be utilised to the full. The perils of war furnished precepts for peace, and it was realised that on the conclusion of the conflict a situation would arise in the world of industry which would call for increased effort if British industrial supremacy was to be maintained and if the manufactured products of the nation were to continue to hold their own in the world's markets. In anticipation of that situation, the Government of the day set up the Department of Scientific and Industrial Research and, as part of the financial provision placed at its disposal, Parliament voted a capital sum of one million pounds for the encouragement of industrial research. The most effective way of promoting this aim was the subject of careful consideration by our predecessors in consultation with leaders of industry, and the scheme of co-operative research associations was devised."

situation of science in England, we must have this point of view in mind, and understand by science not only the activities that are being carried out in research laboratories, but the whole front where science meets contemporary life, from popular science, through scientific education in schools and universities, to the actual production of science in research institutes and to its application in industry and war. There is no one of these aspects that does not bear the mark of the social system in which we are living.

In spite of the essential benefits which capitalism has derived from science, the official attitude of the ruling classes is still profoundly anti-scientific, and this not only on account of their reactionary and feudal nature, but more because of the explosive and revolutionary character of science, which would be recognized if its nature and possibilities were fully known. The official attitude to science as expressed through all forms of propaganda is a mixture of advertisement, mystery-mongering and contempt. The marvels of science, particularly in its applications such as the aeroplane or wireless, are paraded as a kind of advertisement and proof of the benefits which capitalist civilization can bring. These practical results, it is insisted, can be produced for the benefit of humanity only by the existence of a number of disinterested and high-minded scientists. When it is asked what these scientists are doing, the answer, produced in so many books of popular science, is that they are concerned with mysteries which are beyond common-sense acceptance, with relativity, with the indeterminacy of the positions of electrons, with the purposive nature of evolution, with the appreciation of wholes and forms in behaviour. The total result is a pleasant state of mystification and at the same time a justification for any of the religious or political irrationalities of the time, on the ground that science is just as bad. Over and above this, scientists, though praised for their devotion, are considered in practice rather inferior. They take no part in the direction of either government or industrial enterprise. High administrative posts are given to those with a classical education at the older universities.<sup>1</sup> Thus a scientific training is a definite bar to advancement in administration, and the same is largely true in business administration, even of industries such as the electrical and chemical, which owe their existence entirely to science. There is no question but that the scientist is the servant

<sup>1</sup> Recently even the subject "Everyday Science" was removed from the Civil Service Entrance Examination.

and not the master of production in a capitalist state.<sup>1</sup> In this general atmosphere it is not surprising that the actual importance and the future possibilities of science for human welfare are not realized, and that scientific activity is carried on under great difficulties, and with the most appalling inefficiency.

The first and primary difficulty that science has to face is that of education. In England, education is on a definite class basis, and recruitment into the ranks of working scientists is on a basis not of intelligence but wealth. As intelligence is, so to speak, the raw material of scientific progress, we have at the outset a waste of some 90 per cent of this material by the simple fact that workers with intelligence and aptitude for science have a very small chance of getting the secondary and university education necessary for them to start on a scientific career.<sup>2</sup> The capitalist apologists point out that the really intelligent will always make their way, whatever the difficulties, though they do not test this theory in practice with their own children. They point to the one or two scientists or technicians of working-class origin, such as Faraday or Stephenson, as examples of what inherent genius can do. But the lives of these men and the struggles and humiliations which they had to undergo show clearly enough that their success was as much a matter of chance as of character, and that for one such proletarian scientist there may have been ninety-nine who were beaten in the struggle. And what applies to the most eminent scientists applies with even greater force to the large army of scientific workers who are competent rather than brilliant, but without whose work geniuses would remain completely ineffective. Here the limitation of the recruitment of scientists to middle-class circles results in a standard which is far lower than if it were open to all of sufficient intelligence. But the educational system filters workers not only according to wealth, but according to temperament. With a very few exceptions the men it selects must be prepared to conform with the system as it is, must blind their eyes to the possibilities of science and content themselves with working out their own

<sup>1</sup> The census returns for 1931 give of 14,500 Analysts and Research Chemists only 400 in managerial positions and 800 unemployed.

<sup>2</sup> Grey and Moshinsky, *Sociological Review*, vol. 27, p. 113, 1935, estimate that 73.5 per cent of elementary school children of high intelligence, but without means, do not proceed even to secondary schools.

particular field. As G. D. H. Cole remarked at the Conference on Academic Freedom (August 1935):<sup>1</sup> "Our older academicians and professional people and those who appoint to positions like people who do not look dangerous. They prefer in fact 'pithed' people. A number of people get through the net and do manage to get appointed, and then there is trouble. But you have to recognize that to a substantial degree the appearance of tranquillity on the sea of English academic life is due to a very careful selection at the start." It is clear you cannot staff science with such people without sacrificing originality and enterprise, not to speak of moral integrity. Success in the scientific world has come to depend more and more on a proficiency in wangling, particularly for money, rather than only on scientific competence.

The teaching of science in England was a right won with great difficulty from the monopolists of the classical languages. But in conceding that science might be taught they did their best to make its teaching harmless and therefore ineffective. The value of science teaching is supposed to be to enable people to reach conclusions from their own observations by their powers of reasoning. But there is little attempt to teach science in this way. It is, in fact, presented in as authoritarian a form as Latin grammar, and consists for the most part in vast tracts of memorizing. The courses of study have not been consciously thought out but inherited from tradition, and are in some cases as much as 150 years out of date in their main outlines.<sup>2</sup> The actual learning of science as a practical exercise and mental discipline only begins for the very few who can succeed in obtaining research posts when they finish their formal scientific education. It is not surprising that we see men who have been trained in science come out just as uncultured and bigoted as if they had received a sound classical education.

Science is not allowed to play an integral part in education. Most of what is taught in universities could be learnt quite easily in elementary or secondary schools. A continual familiarity with

<sup>1</sup> *Report of Conference on Academic Freedom*, p. 14. Heffer, 1935.

<sup>2</sup> The regular course on chemistry in schools and universities is based on the work of Lavoisier and Dalton in 1784 and 1804. Here the foundations of chemistry were laid, but it does not follow that the way a thing was originally found out is by any means the easiest way for a student to approach it, and the modern study of atomic physics has given us an approach to chemistry—a way of showing individual atoms and measuring distances between them—much more direct than the logical inferences on which chemistry was founded. There has been no attempt to introduce these ideas, except as the appendices to chemistry textbooks and lectures.

theory and practice of science, which is not nearly as abstruse as it is made to appear, would make the task of the university not that of instilling knowledge, but of allowing students to find and learn the effective technique of discovery. In the universities a great emphasis is laid on "pure" science. What this means in practice is that science is to be considered divorced from its origins in human attempts to control the environment and from its present-day possibility of further changing it. How successfully this method has been followed is shown by the fact that after six years of scientific depression only a minority of scientists have grasped the social implications of their work.

What has been said about the universities also applies, though in a different form, to the technical schools. Here the class basis is not so pronounced, but the same effects are achieved from the very fact that students of technical schools are under terrific economic pressure and if they are to succeed at all they must attend very narrowly to their specialities. They must not, they dare not, learn too much. Particularly it is not for them to enquire as to whether the technics which they are learning are for the benefit of a particular capitalist or the whole of society. The direction of enterprise of a purely technical nature is nearly always in the hands of financial administrators who often have no technical knowledge whatever. Technical competence is to be bought or sold, it must not presume to direct activities or even to inquire into their purpose. One of the foremost engineers in England was victimised because he wrote a book<sup>1</sup> suggesting that economic enterprise under capitalism involved immense technical waste. Even more than academic scientists, technicians are under the direct control of capitalist forces.<sup>2</sup> But on the other hand industrial depression has hit them far more severely, and that, combined with the growing knowledge of the different and far more important place that technics has taken in the Soviet Union, is gradually tending to show them that technicians like scientists find their real allies in the working class and their most effective future under a working-class State.

It is easy from this to see the fundamental contradiction that lies at the bottom of scientific and technical teaching in capitalist

<sup>1</sup> *The Great God Waste*, obtainable from J. L. Hodgson, Esq., Eggington, Beds, price 3s.

<sup>2</sup> One of the most subtle ways of exercising control which can be applied to those whose eminence puts them out of reach of any direct action is to intimate that any left activity on the part of the professor will result in his pupils finding it difficult to get jobs.

countries. Science is necessary for production and for its increased profitability. But to develop science fully would be first of all to open the way to influence and control to the more intelligent of the working class, and secondly to expose the restrictive and destructive nature of capitalism to all students of science. The capitalist class are forced into an uneasy compromise in an attempt to denature science by making it a class prerogative and by hiding as much as possible its social implications. They can only do this at the expense of stifling science and reducing its benefits to humanity to a fraction of those possible under free conditions.

Scientific research in this country is fairly evenly divided between the universities, the Government, and three or four big industrial monopolies. It has, particularly since the war, and as a direct consequence of the war, acquired a certain degree of organization. The main direction now comes from the State through the Department of Scientific and Industrial Research, the Medical Research Council, and the Agricultural Research Board. The Royal Society has also, through the agency of the Government grants it administers, been grafted on to the State machine, and its Council furnishes the ruling oligarchy<sup>1</sup> that controls funds and appointments. The universities are still nominally independent, but as they too depend largely on Government grants, particularly on the scientific side, they have become essentially part of the same system, as have the relatively minor parts of the research departments of industrial firms which are concerned with "pure" science. Thus administrative machinery exists which would make possible a planned development of scientific research in relation, on the one side, to educational organizations, and on the other to practical applications. In fact, however, nothing of the kind exists. Scientific research in this country suffers from lack of funds, from lack of adequate communication and intelligence, and from lack of any positive plan whatever. It is not difficult, in view of what we have already said, to see why this should be so. There can be no plan for scientific research that is not itself part of a general productive plan. If

<sup>1</sup> In 1935 an unsuccessful attempt was made to get the Royal Society to concern itself with the social implications of science by challenging the election of the Council which had hitherto been arranged by an official list like the parliaments of Fascist states.

industry is to be directed in the service of competitive or monopoly profit, the technique and also the scientific advances must needs be made in a haphazard manner. Julian Huxley says:<sup>1</sup>

"The bulk of research in progress in this country is organized from the production end—that is to say, it is organized and planned with a view to improving efficiency in technical processes and reducing cost to the producer or the State. There ought to be much more research organized from the consumption end—directed towards the needs of the individual citizen as an individual and as a citizen. Of course, there is some research done from the consumption angle—a lot of work in the Research Boards under the D.S.I.R., for instance, on radio, and, of course, a great deal of medical research. But other problems are not taken up at all, or only get tackled piecemeal, because of this general producer bias in research. . . . If there were any machinery for making the needs of the private individual vocal and effective, instead of this scattered haphazard research, in which anyhow there are a number of gaps, we should have a large-scale concerted attack on the problem. You could make out the same sort of case for a concerted attack on diet, and many other problems."

Whole fields of research will not be developed because no profit is seen in them. This applies to psychological and sociological research as a whole, which is grossly undersubsidized compared to physical and even biological research. To quote again from the same author:

"There are less than fifty psychologists attached to our universities, and probably, excluding psychological doctors, less than a hundred professional psychologists in this country. And as for social science, I doubt if Britain supports a couple of dozen people devoting themselves primarily and professionally to the subject. The other day I attended the dinner given to celebrate the twenty-first anniversary of the founding of the Biochemical Society, and learnt, to my surprise, that it numbers over eight hundred members, although it represents a very young and rather specialized branch of chemical science. The contrast is striking, and does, I think, justify me in stating, as the main conclusion of this chapter, that the scientific structure of this country is lop-sided, and that the sciences dealing with man are lamentably neglected."<sup>2</sup>

<sup>1</sup> *Scientific Research and Social Needs*, by Julian Huxley (1934).

<sup>2</sup> Incidentally, biochemistry is in the relatively flourishing state described because of the development of new food-manufacturing industries, such as the preserved milk, margarine, chocolate, jam and confectionery, and meat-curing industries, all of which require for their efficient functioning the services of trained biochemists. All these processes used to be carried out without biochemists in the home or on the farm, and this illustrates very clearly how science can only be evoked when industry is sufficiently concentrated to make it worth while to pay for whole-time research workers.



Even in the physical field there are plenty of examples: there is effectively no industrial silicate research in this country, and actually no research institute for either the glass<sup>1</sup> or the cement industries. We are consequently debarred for lack of finance from knowledge which would not only have practical application in these industries, but could not fail to deepen our knowledge of geology in many of its aspects.

Many kinds of research may actually be suppressed, because they would damage existing interests. Here it is more difficult to find examples, as they naturally occur inside the research laboratories of industrial firms, but, for instance, the Rubber Research Association was shut down for two years because some of the firms in the industry objected to the discovery and publication of results which would have been of advantage to all industry, and not to their particular firms. As long as science is connected with competitive firms, industries or economic nationalist governments, secrecy will be a bar to the full development of applied science. It has always been recognized by scientists that secrecy is against the spirit of their profession,<sup>2</sup> but the present organization of science places

<sup>1</sup> Although the Refractories Research Association has carried out a certain amount of research in these fields.

<sup>2</sup> This attitude was expressed two hundred years ago very finely by Reaumur, in justifying his publication of the secret of the method of manufacture of steel, which had been kept a trade secret for something like 3,000 years: "Altogether opposite reproaches, to which I feel flattered in having to answer, were made to me after the meeting of the Academy. There were people who found it strange that I had published secrets which should not have been revealed. Others would have wished that they had been confined to companies who could have used them, and who, working for their own profit, would have thus worked for the general good of the kingdom. The sentiments which were implied in the first way of thinking are not noble enough for one even to be able to pride oneself by having directly opposite ones. Are not they even against natural equity? Is it really certain that our discoveries are so much our own that the public has not the right to them, that they do not in some way belong to it? Should not we all, is it not our first duty, to assist the common good of society? Anyone who fails to do so when he could contribute anything, and particularly when it is only a matter of speaking out, fails in an essential duty and in most odious circumstances. This principle being certain, are there many circumstances where we can be said to be absolutely masters of our discoveries? . . . But to take up the second objection of which I have spoken, there were people who did not approve that the discoveries which were the objects of these Memoirs should have been made public; they would have wished them to be conserved for the kingdom, that we should have imitated the examples of mystery—little to be praised from my way of thinking—that are given to us by some of our neighbours. We owe ourselves in the first place to our country, but we owe ourselves as well to the

them in an unhappy dilemma. The scientist must make the choice of remaining in academic or pure science, out of touch with industrial possibilities and lacking adequate financial resources, or entering industrial service to gain the possibility for more effective work and better equipment, but to lose the full right of free investigation and publication.

The motive power of science, as of all other human activities, is derived from its economic resources. A society gets just as much or as little science as it chooses to pay for.

**Inadequate Finance** Under present conditions, lack of funds is the primary check on any effective scientific advance.

This is a chronic state of affairs, and is not confined to periods of depression. Scientists nearly all their lives are wondering how to get the money for apparatus or assistants, or even for their own maintenance.<sup>1</sup> Scientific research is not reckoned from the capitalist point of view as a productive enterprise. The less work the scientist does, the less apparatus and labour time he uses up, the greater the economies that can be effected in the department.<sup>2</sup> Unlike profitable enterprises, the pressure on science is all for slowing down rather than for speeding up. After a certain time many scientists give up the struggle, content themselves with spinning theories at little expense, and

rest of the world, and those who work for the perfectioning of science and the arts must consider themselves as citizens of the whole world. After all, if the researches of these Memoirs have the success which made me undertake them, there is no country which can get as much advantage out of them as this country. It can in future do without the fine steel which it imports at present from foreign countries, but that is supposing that we do not neglect, as we do only too often, to make use of our own resources, and supposing that we do not abandon attempts as lightly as we take them up." (*L'Art de convertir le Fer forgé en acier*, par Monsieur de Reaumur, 1722.)

<sup>1</sup> We find in the *Report of the Department of Scientific and Industrial Research* (1932-33, pp. 16-17) the fullest admission of this state of affairs: "Inadequate resources continue to hamper research associations in all directions. Problems await solution which are not formidable scientifically provided the means exist for their appropriate approach by competent men of science. But as the means to employ sufficient staff and to provide them with the tools of their profession do not exist, the problems remain unsolved."

<sup>2</sup> It is a common experience, particularly of those working in Government institutions and some industrial works, that there is the utmost difficulty in working after hours, even when the nature of an experiment imperatively demands it. In one new and expensively equipped biological laboratory in London, no work is possible after 4 p.m., as the laboratory closes at 5 p.m., and cleaners and assistants require an hour to put everything in order for the next day's work.

settle down to live as gentlemen. Among younger scientists and university graduates there is under-employment rather than unemployment. Eighty per cent of the science students at the universities can find no place in research, and most are driven into the teaching professions. It is often denied by those in authority that there is this financial restriction. The lack of ability, they say, is the limiting factor, and to prove their point they ask what would happen if scientific research received vastly increased endowment. Where would the men be found? This argument, in so far as it is justified at all, reflects the inadequacies of the educational system already alluded to. It should be perfectly feasible, as it has been in the Soviet Union, to create effective scientists by thousands in a very short time. Just because science is ill-paid, and because relatively few occupy themselves with it, the idea is inculcated that it is an occupation of a particularly difficult kind. The scientist is pictured as an excessively unworldly man, who devotes himself to this kind of work under the impulse of the love of pure knowledge. In fact, a great part of scientific work does not require any very special ability, as is apparent to anyone who knows scientists, and there is almost certainly to be found in the country ten to twenty times the number of existing research workers with ability at least equal to theirs.

The next great hindrance to the development of science is its extraordinarily confused and old-fashioned organization, particularly in relation to the inter-connection between the sciences and to their relation with practical needs. For a very long time we have heard of the scientific specialist who only knows a small fraction of a small field. But the specialist is a product of the system. In the absence of another effective organization only those parts of science will work which can be based on the most primitive personal contact of people working along closely related lines. There results a series of more or less effectively water-tight compartments, isolating scientists from each other and also from the social consequences of their work.

The vast mass of scientific publications adds to rather than diminishes this isolation. Even in a single field it is often easier to discover a fact for oneself than to find out from the literature whether it has been discovered before. Correlation between the more distantly related parts of science occurs after the lapse

of many years, often on account of accidents of personal acquaintance. Science is primarily an international human activity, and becomes most effective only if the whole of existing information is immediately available to all those to whom it may be of use in their work. The growth of national rivalries, and particularly of fascism, has interfered with this free exchange and threatens to do so more in the future. This isolation is particularly damaging to scientists working in Government departments or in industrial enterprises.<sup>1</sup> These are either for administrative routine or false economy kept to a great extent separate from university scientists and even prevented, for reasons of secrecy, from communicating results to them. The meanness of industrial employers even goes to the extent of preventing their scientific staff from attending congresses in their own subjects, or of insisting that scientific meetings should be held after working hours. It is not surprising that under these circumstances Governmental and industrial science should be notorious for its routine nature and lack of any trace of originality.

Apart from the actual hindrances which lack of funds and lack of proper communications entail, scientific research in this country lacks any positive general direction. The **Lack of Plan** ideas behind the Government departments are essentially negative in character. Governmental scientific research must not be allowed to take directions which would lead to interference with industrial production. A great deal of fundamental research would, if properly followed out and applied, lead to the transformation of a number of industries, such as, for instance, the heavy metal, ceramic and textile industries. This would lead under capitalism to considerable losses, particularly on existing plant. It is impossible for research to take a positive lead in production without usurping the functions of capitalist enterprise itself. For a Government to subsidize such research would be equivalent to going into industry on its own account, and this, under present conditions, is unthinkable. Consequently its main concern will be to remedy defects as they occur, rather than to branch out into new fields. Medical research is to be concerned mainly with disease, not with

<sup>1</sup> A research worker recently appointed to a firm in a provincial town applied for the purchase of some technical books that were not to be found in the libraries. His request was refused with the added reproach: "Do you think you are still in a university?"

the conditions leading to a healthy population. Agricultural research must not lead to anything incompatible with the restrictive schemes devised to bring profits to landowners or to further national self-sufficiency in war. The result, so far as pure scientific research is concerned, is that, within the framework of those general fields of research compatible with profitable production, actual research is left on a very personal basis. Those workers who for one reason or another please the authorities, either because they are spectacular and give advertising value, or because they are personally known and approved, or because they are just "sound" men, will receive funds. They will be free to follow their own inclinations. But the result is naturally not a picture of consistent advance, but a series of brilliant raids into the unknown on a background of competent, extremely dull, and for the most part useless research.

The great advantage of this mode of procedure is that people are accustomed to it. The tradition has grown up that science is a completely unpredictable and haphazard occupation in which geniuses distinguish themselves, and the enormous advances of science in the last hundred and particularly in the last twenty years are cited as an example of the success of the methods employed. The argument, of course, is not scientific. To claim a method as successful requires as a control the trial of some other method, or failing that some proof that any other method would yield worse results. Both these are lacking. The curious thing is that although practically every scientist will complain of the results of the system as far as it affects his work, he will generally support the system as a whole from traditional loyalty and inability to imagine anything else. There is no question but that outstanding personalities and good organizers can under the present system produce valuable results. The organization of an effective research laboratory under a good head has, in fact, that combination of unified direction, democratic consultation, and individual voluntary work which in many ways mirrors the social state of the future. But these individual and corporate successes only show up more clearly the essential inefficiency of the system. The results are good not because the system is good, but because scientific discovery is really a perfectly easy and straightforward job. The fact that it is not supposed to be so is due, partly to the scientists themselves who have to keep up some kind of reputation in order to earn their livings, and partly to the social system which insists that

not too much science should be done, and which could not cope with the results of the rush of people to scientific work if opportunities were made freely available. To strike out entirely original and new directions in science is given to very few, but a single new field will give honest and not too exacting work to thousands of other scientists. There are many researches in which arriving at the right answer is simply a matter of common manual competence, and honesty enough not to cook the figures. In fact some nine-tenths of published papers contain nothing above this level. The growth of science, if its efficiency remains the same, depends directly on the amount of money spent on it, and the brilliant results of the last few years reflect its greater endowment and are an earnest of what could be done if science was adequately endowed, well organized, and purposively planned.

Before it is possible to see how science could be used for the benefit of humanity, we need to consider the way in which science is actually applied to-day. This is by no means a simple business. Science is not a commodity which has simply to be added to the existing stock to improve it; nor is it entirely a method which can be applied uniformly to all branches of industry. It is both at the same time, and its relation with industry and agriculture varies enormously both with the special nature of the industry and with the historical and economic development which that industry has undergone.

There are roughly four stages in the present-day relation of science to industry. The first stage is the slow infiltration of scientific method and scientific appliances into traditional industries which have grown up almost imperceptibly since the earliest days of civilization. Such an industry, for instance, as brewing has remained substantially the same since long before any historic record, but it has been, since the advent of capitalism, carried on on an increasingly large scale. The old rule-of-thumb methods for judging the brew and knowing the proportion of ingredients and the time of the stages become increasingly difficult with larger and larger quantities. Here science steps in (where the brewer is wealthy and intelligent enough to use it) to standardize the traditional processes; it introduces measuring appliances, thermometers for temperature, saccharimeters to determine the degree of fermentation. Every big brewery must have its laboratory, but the laboratory is only a relatively unimportant part of the works.

Recent developments in the baking industry show how important this stage may be. Baking is a process as old as brewing, in fact they probably have a common origin; but up till three years ago nothing was known about the fundamental processes which determine the quality of baked bread. To quote from the *Report of the Department of Scientific and Industrial Research, 1933-34* (pp. 126-127):

“Why does one flour from one kind of wheat produce better bread, and dough of more satisfactory handling and fermenting character than another? Precisely what is meant by the term baking quality? How can a satisfactory dough be described? What are the actual changes brought about in a dough by the so-called chemical improvers or improvement processes? What happens during fermentation which causes a dough to ripen and thereby to produce a satisfactory bread? What is dough ripening? Bread made from dough which is under- or over-ripe, that is from dough which has been insufficiently fermented or over-fermented, is not of satisfactory character.

“The problem has been studied for many years by many workers, but our knowledge of the fundamentals of the problem has hardly been advanced at all. This slow advance is probably due to the purely chemical character of the earlier work, whereas the problem in the first instance appears to be a physical one. During fermentation a dough assumes a sponge-like structure, the individual cells increasing in size owing to the pressure of gas generated within them by the yeast. The cell walls are consequently in a state of varying strain, and it is their behaviour when in this condition (for example, whether they rupture easily or whether they stretch without rupture) that largely determines the quality of the resultant bread. In other words, the properties of dough which are of most immediate and direct importance in breadmaking are the purely physical ones of plasticity and elasticity. It is important to be able to measure these properties with precision and in particular to follow their changes during panary fermentation and to study their relation to the water content of the dough. Little progress in our knowledge of flour quality is possible until the individual physical properties of dough which collectively make up quality can be measured.”

Researches now being carried on by the Research Association of British Flour-millers are certainly beginning to lead to a scientific understanding of these traditional processes. The same could be said for many other industries—tanning, pottery. The pottery industry, one of the most important in England, has no scientific research association, and only a few chemists

attached to different works. In all these cases science only comes in to standardize established practices, to prevent waste, and to enable old methods of production to be carried out on a far larger scale.

The second stage appears when, under the influence of science, old practices are radically changed. Under capitalism this has taken mainly the form of substitution of new materials, often in the form of adulteration, and of replacing manual by mechanical operations. Once the old tradition is broken away from, science has much better scope to show its powers. The new material is often not a natural product, but a synthetic chemical of known properties. It is not so much now a matter of standardizing the process of production as of improving it. A great deal of scientific research of a purely practical kind is done in connection with these industries. All kinds of new combinations are tried out in the laboratory, and those with the desired properties can then be used on a large scale in production. This is the state of affairs in the metallurgical industries—which have changed in the last hundred years from being purely traditional to being semi-scientific, using continually new metals and alloys and new and more economical ways of smelting and heat treatment. Similarly in light industry, science appears mostly in the production of automatic or semi-automatic machinery, the aim of which is to imitate as closely as possible the old hand operations.

The third stage arises when the scientific basis of the industry is completely understood, so that it is possible to determine theoretically what should be done in any given case to achieve a desired result. This will naturally happen most easily in industries which do not involve any difficult scientific principles—such as mechanical engineering or heavy chemical industry. Both were traditional industries, but by now they are practically completely scientific. It does not follow, of course, that under capitalism anything like the most is got out of the scientific possibilities, but at least there is no longer anything mysterious and uncontrollable in the processes used.

The last stage is the first in which science is applied positively, that is, not merely as improving existing traditional trades, but producing new trades entirely based on scientific discovery. This is the case with both heavy and light electrical industry, and to a large extent with the gas, the dyestuffs, and the fine chemical industries. Here the industry from the beginning arose out of the scientific laboratory; it was not hampered by existing tradi-



tions. Consequently, it is those industries that are the most up-to-date in their practices and provision for development.

The whole of this sequence is clearly a moving one. Completely traditional practices, such as ordinary cooking, are beginning to pass into the first category; the first category is passing into the second, and so on; and science is always producing completely new industries. In the end, all industry will find itself in the category of purely scientific industry.

But such a conclusion cannot occur during the existence of the capitalist system, and even the approach to this conclusion can only be made in a halting and half-hearted way.

**Science in a Capitalist Economy** The motive behind all the applications of science to industry has been that of profit. At first sight, it would seem that as scientific discoveries had in their application yielded very considerable profits, there would be a continual pressure for the development of more and more science in the assistance of industry: and yet this is not what we observe. There has been, on the contrary, a very considerable lag. It has taken time and the lifework of many scientists to persuade manufacturers that such-and-such an application would pay. The first large-scale use of the dynamo in 1882 was made fifty years after its discovery. The reason for this is that the detailed motive for any form of indulgence in research under capitalist conditions is wanting. An individual firm, under competitive conditions, does not incur expense for the profit of capitalism as a whole, or of its own particular industry as a whole, but only for the profit of the firm.

Now scientific research, even when protected as adequately as possible with patents, is always likely to produce results of more general than particular value, and consequently it is only the more far-sighted industrialists that will undertake it. But foresight, from a business point of view, implies the possession of adequate financial reserves; no firm in a struggling condition can afford to engage in expenditure on which the returns are uncertain to the extent that there is a considerable probability that nothing will come out of it at all, and that, even if something does come out of it, it is improbable that it will result in a net gain until a period of anything from ten to twenty years has elapsed. Further, scientific research is not a thing on which economies can be made. It is no good saying; we cannot have much scientific research, let us have just a little. In any given field cutting down

research beyond a certain minimum absolutely prevents any useful results being obtained. Consequently no small firm can afford scientific research except of a very immediate and practical kind, and such work is not likely to lead to great developments either in a pure or applied field. Finally, research under competitive capitalism is inevitably split up among a number of firms, and that, combined with secrecy and lack of communications, enormously hinders its rate of progress.

All this is, of course, changing as we move towards a more and more monopoly capitalism. Large combines can afford to take small risks, and to wait years for results; but, on the other hand, they have not the same motive for wanting improvements. Under monopoly it pays to restrict production and to prevent the application of such discoveries as will render certain products far cheaper or, even worse, completely unnecessary. For example, the production of aluminium has been deliberately starved of research by the absolute monopoly which controls it, and, until its use for military aircraft was appreciated, no research at all was being done on the production of magnesium, which might replace aluminium and many of the heavier metals entirely. At the same time, owing to the change in the internal structure of science, it has become more and more impossible to carry out any important development, and still more any application of science outside laboratories, without the means provided by the research institutes which are owned or endowed by large monopoly-concerns.

Monopoly at first sight seems to favour scientific research, because it provides the means necessary for its existence, but under monopoly the direction in which science is used is limited to the simple lowering of costs of the product, for the consequent greater profits accruing to the monopoly. It may even pay to allow science to reduce not only the cost, but the price of goods, as long as more of these can be sold. But this is not the way in which radical improvements in pure or applied science can be made. The research laboratories of the great monopoly concerns (such as General Electric, or Imperial Chemical Industries) show in themselves all the advantages and defects of this way of using science. Admirable as they are from the point of view of equipment, they suffer at the same time from a kind of sterility which is due, partly to the almost inevitable red tape and bureaucracy of

such large-scale undertakings, but far more to the overriding influence of the financial interests of the trust. To run such institutes in a fully effective way requires direction of the highest scientific quality, and, in spite of the large salaries offered, it is difficult to find really first-class scientists who will serve under these conditions. There are exceptions, of course, particularly in America, where, until recently, service for profit was considered the most honourable of occupations, and Edison was a model to aspiring scientists. But on the whole scientists will prefer the relative freedom of university work, however poorly paid. The scientist entering the service of such a combine cuts himself off to a large extent from the scientific world outside, and that not only on account of the degree of secrecy which he is obliged to maintain, and the fact that for the most part he will work under conditions that will make frequent intercourse with academic scientists difficult, but more subtly because he can no longer claim even that relative disinterestedness which is still the privilege of the academic scientist. The result of this shows itself in the generally lower quality of the work produced by such laboratories, in spite of their vastly greater material resources. In the long run, monopoly would have the effect of stifling science as effectively as competitive capitalism starved it.

Capitalist monopoly in its present form is not universal; it is predominantly national-imperial monopoly. Competition still exists, but it is competition on a far larger and more dangerous scale than that which existed in the hey-day of liberal capitalism. It is in this phase of economic nationalism that governmental scientific research comes into play, with the primary and avowed object of improving—that is, increasing the efficiency and diminishing the cost of—national manufacture and national and imperial agriculture. This assumption quite openly underlies the organization of governmental research in England as in other imperialist countries.<sup>1</sup> The effect of this is

<sup>1</sup> See the *Report of the Department of Scientific and Industrial Research, 1932-33*, quoted above on p. 413. Further on in the same Report, (pp. 17-18) it says: "If Great Britain can no longer claim to be the workshop of the world, it is in no decadent condition and it still has the brains and ability to keep in the forefront. But what served yesterday will not suffice to-day or to-morrow, and one of the ways in which the British industrialist can maintain his name and reputation for quality is by active participation in scientific research into materials and processes which will

to diminish, and would ultimately be to destroy the international character of science. Science would cease to be considered as working for the whole of humanity, and come to be considered as working for the benefit of one nation or, more strictly, of the capitalists of that nation. We can see the way things are moving by comparing the attitude of Napoleon, who allowed Davy to visit France in full war-time and conveyed the highest honours to him (even though Davy was to a large extent an industrial chemist) to the attitude of all belligerents in the late War. Then scientists were not only kept to their countries, and were engaged directly in war-work of the most discreditable kind such as the development of poison gases, but were obliged to abuse their fellow-scientists in other countries for doing the same things, and to be false to the central core of scientific honesty by denying that there was any other science but that of their own nation and its allies. In Germany, the profession of national German science has once again become obligatory on pain of imprisonment,<sup>1</sup> and there are strong forces here which have the same ends in view. But quite apart from this, national science is grossly uneconomic and inefficient. Scientific advance depends to a large extent on the number of workers harmoniously co-ordinated, and the division into separate national spheres, duplicating and overlapping as they are bound to be, and, even worse, keeping secrets from each other, inevitably hampers the rate of progress of science, as well as largely destroying its spirit. The chief international agreements between the big trusts are to share existing patents and secret processes, i.e. to agree not to utilize their research departments. The natural balance between materials and processes, as the result of the best applications of scientific knowledge, cannot be achieved under such a system.

pave the way for further advances. Science is destined to play an increasing part in industrial production, and those who fail to learn that lesson will inevitably find themselves relegated to the position of 'navy nations'—hewers of wood and drawers of water for more enlightened peoples. For some years prior to the war there was a danger that great prosperity in the past had lulled British manufacturers into a sense of false security, so that neglect of modern tendencies arose; inadequate appreciation of the increasing importance of science to manufacturing processes was one of these manifestations. The war furnished a rude awakening, and we trust that the lessons gained by that grim ordeal will not be wasted; but that industrialists will seize the opportunity of making greater use of facilities that lie to their hand."

<sup>1</sup> Prof. Lenard who had recently a physical institute dedicated to him in Heidelberg amid much "Heil, Hitlers" and denunciation of the Jewish science of Einstein has just published a new work entitled *Deutsche Physik*.

Even where the profit motive is effective in leading to further scientific research, the application of that research is directed without any consideration of the convenience, or even the health and life, of the workers operating the process. The application of science has vastly improved the methods of industrial production, but it has not made them any more comfortable or less dangerous. Often new scientific industries, such as the match industry, have meant death and disaster to thousands of workers. The discovery of new chemical means for extracting gold cost the lives of more natives in South Africa through silicosis than centuries of inter-tribal warfare. Even when science has been applied for the safety of the workers, the results have been, paradoxically, not less, but more danger for them. The classical example of this was the invention of the miners' safety lamp. In 1812 ninety-two men and boys had been killed in an explosion in the Felling Mine in Gateshead-on-Tyne. This and other explosions prompted J. J. Wilkinson to form a society for the study and prevention of mining explosions. Davy was invited to co-operate. The result was the safety-lamp. It certainly decreased the danger, at the same time decreasing the illumination. The result, however, did not conduce to the safety of miners. All that happened was that more and more dangerous seams were worked, and explosions continued as they continue to this day. As Crowther says:<sup>1</sup>

“The safety-lamp allowed the coal industry to grow rapidly. It did not diminish the number of miners killed because it greatly increased the number exposed to danger by making deeper and larger mines workable. Davy refused to patent the invention because his ‘sole object was to serve the cause of humanity.’ The chief effect of his invention was to increase the wealth of the owners and bring more men into the mines and expose them to the dangers of which fire-damp is only one. Hence Davy’s lamp was more important as an instrument of economics than of safety.”

Even after a hundred years there is no sign under capitalism that the comfort and safety of the workers is being seriously taken into consideration. Government research, which might be expected to do something in this respect, is almost completely unconcerned. It is possible to read through the whole of the reports of the Department of Scientific and Industrial Research

<sup>1</sup> *British Scientists of the 19th Century*, by J. G. Crowther (1935).

devoted to the improvement of every form of industry and only find one or two examples of research directed towards improvement of working conditions or safety, the most notable exception being the British Colliery Owners' Research Association which was set up by the first Labour Government, and which is definitely concerned with an attempt to mitigate the conditions of that industry. We can find from statistics of mortality in different trades that thousands of people are killed every year simply on account of the occupation by which they earn their livelihood, besides thousands that are killed in industrial accidents, and in addition to this we must count an immense amount of ill-health and discomfort of which we have no statistical measurement. If science were directed towards human needs, the prevention of this state of affairs would be the first charge on it, but any such positive use of science for the people, both as workers and consumers, is altogether outside the scope of capitalist economy.

The place of science in Soviet Britain will be very different. Its purpose will be turned from profit to welfare. The function of science is two-fold: first to ensure that the actual operations of production are carried on with the maximum efficiency—both with regard to the abundance of the product and the ease of production, and with regard to the comfort and well-being of the workers. That is, so to speak, the day-to-day function of science, and the processes in all industry will require to be resurveyed as a whole from this point of view. The second and long-range function of science is so to develop our knowledge of nature as to produce discoveries which in turn can be used for new satisfactions, or for the less laborious achievement of older ones. Science has progressed quite far enough to enable these two aims to be undertaken consciously and in an organized fashion, and it is only the existence of science for profit and the mentality among scientists that goes with it that prevents these possibilities being seen to-day. There can be no question that in Soviet Britain science will be used in this way, as it is being used already in the Soviet Union, but to describe in detail how this will be done is more difficult in the case of science than in any of the other industries, because of the specially new and unpredictable nature of scientific development. Consequently we shall attempt here only to indicate what can be done immediately in the way of the setting-up of the new forms for the study and application of science

(assuming only existing knowledge and its possible development in the next twenty years or so), and then indicate in a much more general way the further possibilities which science can bring and can bring only under Communism.

The immediate task during the revolution will be to preserve, as well as the circumstances will allow, as much of the material and personnel of scientific research as is possible. Luckily, science is something very difficult to destroy in a material way. Scientific apparatus is of an essentially provisional nature, is generally made afresh every year or two, and the actual knowledge of science is continually summed up in the books of the last five or so years, so that even the destruction of many libraries would not materially delay its ultimate advance. The question of personnel is more troublesome. We cannot be sure that in the destruction of modern war and in the subsequent civil wars a considerable number of scientists may not be killed, particularly as they are likely to be involved in directing the technical side of the warfare. Besides this it is probable that at first in the general uncertainty immediately following a revolutionary change a number of scientists will either refuse to collaborate or collaborate unwillingly and ineffectively. But even this is not nearly as serious as might be imagined. Only a relatively small number of influential scientists are definitely reactionary, and they are for the most part old men who have nothing more to contribute to science. The younger scientists, particularly those in the rapidly advancing parts of science, such as physics, biochemistry or genetics, already feel cramped in the present system and would unquestionably welcome the opportunities which the Soviet system would offer for their work. The great majority of other scientists, particularly those working in applied science, although they accept the capitalist system blindly, would probably be even more willing to work for a Soviet system once it had achieved unquestioned power, not only because of the greater scope it offered but because of their enhanced status and the public recognition of their function in society. We may take it for the start, then, that we shall have in this country at least half of the present equipment of laboratories, libraries, and staffs. A greater or less proportion than this will speed up or slow up the first stages, but will make little difference to the ultimate result.

The main direction of transformation of science will be to make it no longer an exclusive mystery, but an intrinsic part of the workers' every-day life and of all processes of production. The

lines along which this can be achieved are, firstly, a larger endowment—both absolutely and in relation to industrial productivity—rising within a few years to some ten times the present endowment of science; secondly, a greatly increased number of working scientists of higher average intelligence than that of the scientists of to-day, through opening the possibility of scientific work to all workers and not to a privileged class, and by making science through the schools and adult institutes integrally part of the life and thought of all workers; thirdly, an increased internal efficiency through improved teaching, democratic and flexible organization, and rationalization of publications and of information; lastly, a much closer relation between science and industry, agriculture, and health, both in the direction of using scientific knowledge to the full in application and in using the problems of industry as a spur to the development of old and the creation of new branches of science.

The finance of science is taken first because it is a measure of the importance which is given to science in society and of the expectation of the benefits which society in return expects from science. **The Financing of Science** The present income of science, even in such an advanced capitalist country as England, is fantastically low—amounting for Pure and Applied Science together to an expenditure of some £5 million, of which at least half may be written off as really industrial expenditure, on experimental plant, guns, submarines, etc. This two million odd pounds going to science represents less than 0.1 per cent of the national income of £4,000 million. A more exact comparison can be made in the application of science to industry alone.

The net industrial output of Great Britain in 1933 (including transport but not distribution) was roughly £2,000 million. The corresponding expenditure on scientific research by the Government was £650,000. Allowing an equal expenditure on research by industry, certainly an overestimate, we have a total expenditure of 0.065 per cent or 6s. 6d. on £1,000 of net output.

“It is clear that organizations working on the slender basis that has been indicated are hardly commensurate with the industries they serve, nor can they hope to be the fully effective weapons for dealing with the wide range of problems presented by major industries that they would wish to be. We find, in fact, that the average contribution to the research associations amounts to no more than about 7s. 6d. per £1,000 of nett output—a small sum



when it is remembered that, on an average, a £35 subscription entitles a donor to the benefits of an organization costing £14,000 odd a year—a four-hundred-fold return. We recognise that the subscriptions paid to research associations are no measure of the amount expended on research in those industries, but even when full recognition of the fact that many firms maintain research establishments of their own is made, they must be recognized as being on a scale which is entirely inadequate and which, in some cases, cannot be called anything but meagre in the extreme.

“Our criticism of the movement is therefore that it is financed on a totally inadequate scale to realize the full measure of its possibilities.” (*D.S.I.R. Report*, 1932–33, p. 16.)

It will obviously be possible to multiply this by a considerable factor—at least by 10—without putting any appreciable check on industrial production, even if science brought in no tangible benefits. Actually the resulting economies would far more than cover the expense. A further quotation from the *Report* (p. 12) shows how large such economies can be, relative to the total sum expended on scientific research:

“A few years ago it was computed on reliable authority, after full investigation, that the annual savings which have accrued from the work of the Electrical Research Association through researches costing at that date £80,000, amounted to no less than £1,000,000 a year, a figure which must have been materially increased since that time.

“The Cast Iron Research Association has conducted investigations which, if fully adopted, would result in a saving of fuel and other economies amounting to £200,000 per annum, besides producing a range of heat-resisting iron alloys of great importance.

“The Iron and Steel Industrial Research Council, one of the more recently established co-operative organizations, has completed research work, the full appreciation of which it has been calculated on a basis of production in 1930, would result in a saving of about £392,000 worth of coke used in the production of pig-iron and in the production of finished steel, a saving in coal of no less than £1,341,000.

“The Non-Ferrous Metals Research Association has made outstanding advances, and we will mention two only—the work on new ternary lead alloys used in the sheathing of cables and for water-pipe service; and that on aluminium-brass for condenser tubes with its corrosion-resistant properties. The Refractories Research Association has been able to make suggestions which have had the effect of prolonging the life of some types of saggars (the fire-clay boxes in which pottery is fired) from 7 firings to 200

firings. The estimated annual expenditure on the replacement of saggars is £200,000."

In all departmental expenditure totalling £400,000 have led to a saving of at least £3,200,000 per annum or 800 per cent on money invested.

It is very difficult, in fact strictly impossible, to fix a sum for the expenditure on science which will bring the best results to society. The narrowest estimate would be based on considering science in its purely utilitarian aspect and investing in it up to the point when the strain of initial investments began to reduce productivity in other directions. From the figures quoted, however, it can be seen that this narrowest basis would be far above the expenditure made in any country on science. In the Soviet Union, with an effective national income of 100,000 million roubles, the expenditure on science has grown from 470 million in 1932 to 850 in the present year (1935). This is well below the optimum expenditure and shows that an industrial country can easily support an expenditure on science of 1 per cent of the national income.

The amount of money which can be used for scientific research would be limited, even in the most favourable cases, not by the amount of money available in the economy for scientific research, but by the amount scientific research can absorb in an advantageous way. It is even more difficult with science than with other industries to transfer workers. Effective scientific workers, even with more education and facilities, would be relatively few, and for a long time to come no budgetary limitation of the amount of money required for science need be made, as it would be fixed by the requirements of the number of adequately trained scientists. Of course, strictly there is no limit to the amount of money these could absorb. All scientific apparatus might be, for instance, gold-plated. But the amount that could be used efficiently is certainly limited. In a capitalist economy the limitation of the budget of science is of course not related at all to the capacity for effective employment of all scientists, actual and potential. It is limited by the difficulties already discussed, of financing an occupation not immediately profitable to those investing money in it. This limitation would vanish in a Soviet State. But the question of the inefficiency of science would still remain. Under the present system, owing to the various forms of waste and inefficiency already mentioned, the actual effectiveness of money spent on science is extremely small. A 3 per cent efficiency would be an optimistic estimate. Endowments of science

in a Soviet State would of course be conditional on the removal of these inefficiencies, so that the actual cost would probably never rise to more than 1 per cent of the national income within a foreseeable time. But this 1 per cent represents an eight-fold increase in the present budget of science.

The increase of endowment must, of course, be progressive. At the beginning it will be necessary to strengthen the structure of science at its extreme ends, that is, to put the money into the development of scientific teaching, on the one hand, so as to provide for research workers needed for the full development of science, and, on the other hand, to increase the money spent on those branches of industrial research that are likely to lead to the most immediate returns in productivity or economy of resources. Gradually, as able men are turned out, it will be possible without reducing this expenditure to provide also for the endowment of ever-increasing research laboratories, less closely related to immediate production. Following the tendency of modern scientific development, these laboratories would acquire a new character. They would tend more and more to resemble small factories and would require a correspondingly increased expenditure on the non-scientific side, i.e. electric power, elaborate and heavy apparatus, workshops and technical equipment, and at the same time, in the case of biological laboratories, tracts of land for field experiments, and ships for marine investigations. All this could be done on a scale beyond the dreams of present scientists. It should be possible before very long to ensure that, within very wide limits, any scientific investigation for which men were forthcoming should never be held up for lack of funds.

A large part of the funds available for scientific research is necessarily devoted to the salaries of scientific workers. The present arrangements for the pay of scientific workers are highly anomalous. On the whole, the actual standard of pay for scientific workers is slightly lower than that for men of the same general ability in business or administration. In times of capitalist boom they are, of course, relatively underpaid, but they are also apt to be better secured against times of depression. The chief criticisms of the present method of remuneration are those of inequality and uncertainty. The difference between the pay of research workers and junior-teaching staff, ranging from £150 to £450, and that of professors,

which ranges from £1,000 to £2,000 is remarkable. As a consequence a man may work for years with no increase in salary, and then have it suddenly doubled on being appointed to a Chair. This leads to quite an exaggerated importance being attached to academic promotion, with the corresponding temptation to win the approval of the powers that be. Naturally, only a small proportion of scientific workers do become professors or laboratory directors, but this possibility which lies before them acts as a great incentive to conformity. "If you ever expect to be a professor," as one of them once remarked, "you must learn how to behave like one beforehand." For the junior scientific staff the great abuse is uncertainty of salary. Only teaching posts have any degree of permanency, and they are renewable generally every three years, and terminable at six months' notice. For research, grants are generally available only year by year. A man's income may have to be made up from a number of small sums of money collected from different sources, and he is very lucky if he knows where the money is coming from next year. In this condition of uncertainty many scientific workers struggle for years, and indeed for all their scientific lives, unless in despair they accept the comparative security of the Civil Service or of the teaching profession.

Compared to the industrial worker, with his constant fear of unemployment under capitalism, these conditions may seem comparatively good; but it must be remembered that scientific work is not a job that can be done from day to day. It requires long-range planning; ten years is not too long to go before the results of a man's work may begin to have any value. When employment is from year to year it is absolutely necessary for the research worker to try and find a field where results can be got certainly and rapidly, and this leads to the production of an immense amount of trivial work, and to the neglect of clearly thought-out schemes. Attacking the unknown is always a risk, and it is a risk few people will take if they know that their livelihood and that of their wives and children depend on the result.

The evils of this method of payment are recognized. Even the reports of the Department of Industrial and Scientific Research (1932-33), say:

"Inadequate resources continue to hamper research associations in all directions. Problems await solution which are not formidable scientifically, provided the means exist for their appropriate approach by competent men of science. But as the

means to employ sufficient staff and to provide them with the tools of their profession do not exist, the problems remain unsolved."

Similarly in a report on "Agricultural Research" prepared by *P.E.P.*, 1935, we find:

"The research worker, for example, may claim that a very substantial contribution is being made in the face of many difficulties and widespread obstruction. He may point out that, whereas the State pays many of its medical and legal advisers salaries of £1,000 a year and upwards, very few who make a career in agricultural research can aspire to getting beyond £800, even if they get as high as that. The level of salaries being so low, and the overlapping of educational, advisory, research and administrative functions so general, it may be submitted that an underpaid and overworked staff can do no more than it is doing. Again, it may be said that effective research depends on keen and intelligent co-operation which is not always forthcoming from farmers, who cannot expect their needs always to be sensed without taking more trouble to think out and make clear what their needs are. Finally, the research-director may claim that a large proportion of his time is wasted on grant-giving bodies, official and unofficial, each with small resources to dole out."

But in spite of that, little has been done to remedy the situation. Under capitalism, where science is a commodity which can be picked up whenever wanted from the masses of ambitious young men leaving the university, consideration for the scientific worker will come in only if, as in war-time circumstances, there is any danger of shortage.

We must group with research workers the increasingly large number of auxiliary staff. These can be divided into two categories, the maintenance and administrative staff in laboratories who are not in any specialized way different from corresponding maintenance and administrative staff in factories or offices—that is, caretakers, cleaners, and clerical staff, and the more specialized laboratory assistants and mechanics. These workers are now absolutely indispensable to the achievement of scientific results. They are to a large extent specially trained. They have to be acquainted with the working of apparatus and the details of its construction. Under capitalism, however, there is an absolutely sharp distinction, such as divides gentlemen and players pr

officers and men, between the graduate research worker and the possibly far-more-experienced laboratory assistant. Facilities are given for laboratory assistants to acquire technical knowledge, but except in rare cases they are not encouraged, and particularly they are not given the means, to become qualified scientific workers themselves. This is both unfair to them and a great loss to the possible development of science. The greatest of all experimental physicists, Faraday, started his career as a "lab-boy", and if other lab-boys had had the exceptional opportunities which he enjoyed science would have been enriched by many more fine experimentalists. But, apart from the possibility of becoming full-time research workers, the inferior status of the laboratory assistant, and the relative ignorance in which he is kept, hold up the possibility of a much closer co-operation between scientists and assistants which would certainly tend to quicken the pace of experimental advance. At the same time this separation is a loss to the academic scientists who are kept from contact with the mechanical and routine sides of the operations they are directing.

In a Soviet State all this would be very different. The scientists would not be reckoned as a class apart, but as belonging to a specialized group of workers. The question of their pay would be decided in relation to their needs. An intellectual worker, to be fully effective, requires certain possibilities, particularly of privacy and leisure, which are neither so necessary to nor so appreciated by other workers. Nothing is more ridiculous in the present system than the way in which industrial scientists clock in and clock out, just like the rest of the office or works staff, and waste their time in the laboratories every day when often they could be doing far better work for their firms sitting in their own studies or walking along the seashore. How far these facilities should be given to scientific workers in the form of larger salaries depends on the arrangements for housing and travel. The question would probably be best solved by dividing the remuneration of scientists into salary and expenses, the salary itself being roughly on the level of a worker's, while the expenses would either come as an allowance for travel or the purchase of books and private equipment, or these would be issued free by the institutes. The extra pay of professors and directors of institutes is often justified by the obligations incumbent on them to collect libraries, to entertain, to travel, and to give hospitality to foreigners. All these could again be counted

to expenses, and there need be no sharp distinction between different scientific grades. At the same time full security of income would be given to scientists and, as the work they did would be part of a general plan of work, there would be no question of their having to get immediate results unless they had chosen such a line quite freely. As far as laboratory staffs are concerned, here again there would be much closer assimilation between them and research scientists. It should be a perfectly regular matter to approach science not only by the intensive course of scientific research already indicated, but more gradually by working as a laboratory assistant, and qualifying, while carrying on this work, for scientific degrees. At the same time, as already indicated, the laboratory staffs would take part alongside the academic scientists in all discussions on planning and carrying out the work of the laboratory.

An important part of the structure of scientific research is the scientific instrument industry. This has grown up as parasitic on science, often by the setting-up of laboratory assistants as mechanics on their own, but **Scientific Instruments** is now a very considerable industry, as it supplies no longer only scientific laboratories, but industry, with all forms of measuring instruments, thermometers, galvanometers, etc. It is at present an industry on capitalist lines which is not mainly concerned with the system of science, but with making profits, and particularly, owing to the relatively small scale on which it operates, it tends to adopt a restrictive practice of charging very high prices on a small turnover. As no one knows (industrial users in particular do not know) the necessary cost of a scientific instrument, prices are extremely high, and may amount to something like ten times the necessary cost. For instance, a type of galvanometer sold in this country for £5 has recently been made—but on a mass-production scale—in the Soviet Union for something like 7s. 6d. Practices like this, of course, hamper science extremely badly. In effect, something like a third of the funds given to science at present go directly to swell the profits of scientific instrument-makers. At the same time the actual production of scientific-instruments is, with a few notable exceptions, out of touch with the latest developments of science, and the instruments are not nearly as good as if proper scientific attention had been paid to their manufacture.

It is true that the larger instrument manufacturers are enabled

to carry on considerable research bearing on the design of instruments, and that this research is often of value to pure science. But as they are trying to do this on a commercial basis they are the firms whose prices are most extravagantly high. This state of affairs is tolerated by scientists partly because their own economic interests are not directly involved. The instruments are paid for not by the scientist, but by the grants from the institution that he works in; and this permits of a certain laxity and even in some cases of gross abuses. Thus, in some cases prices are actually raised for universities with the connivance of the authorities.

All this would be radically modified in a socialist State. Scientific instruments would no longer be made for profit: they could therefore be made on a very much larger scale with resulting economies of mass production. At the same time their manufacture could be brought closely in touch with research laboratories, as it is in the Soviet Union, with the result that new and improved types would be continually appearing. This would result not only in economies, but in the mutual stimulation of the production of instruments and the knowledge of scientific principles on which these instruments are based.

The source of funds for scientific research would naturally not be a matter of much importance in a socialist State. They might come directly from the State exchequer;

**The Origin of Funds for Scientific Research** but it would probably be found more advantageous to divide the funds allotted to science into different categories, so as to reflect in the development of different branches of science the needs of different departments. This is the

system at present functioning in the U.S.S.R. Thus the funds for fundamental scientific research and for the teaching of science in higher institutes might come directly from the Department of Science and Education, each main group of industries (coal and power, textiles, etc.) might be charged with the upkeep of special industrial institutes, and the Ministries of Health and Agriculture could deal with the corresponding institutes in their field. The chief danger of this system is, of course, overlapping of institutes subsidized by different departments, and lack of contact. It would be essential to see that separate financial support was balanced by unitary control. The advantage of this system at the start, at any rate, would also be that it would be the easiest to



put into action, as representing the smallest divergence from the present source of funds.

After securing adequate finance for science, it is necessary to consider the supply of scientific workers, and this brings us to the whole question of education. This is not the place to discuss education from its general cultural aspect. The extension and the transformation of education is in itself one of the greatest tasks of the Soviet State. Here however we are only concerned with education in relation to science. It should be clear from what has already been said that in a Soviet State science must enter into education at every stage, and that the facts and methods of science must underlie a great deal of the teaching, which is at present of an entirely unscientific nature. This was a point very much insisted on by Marx and Engels, and has been carried out to a large degree in practice in the Soviet Union. For the first time it has been possible consciously to incorporate scientific teaching as an essential part of, rather than an addition to, the ordinary curriculum. The skeleton of our knowledge of the universe—physics, chemistry and biology—should be available to every citizen, and at the same time he should have, through practical experience, the possibility of carrying out the types of experiment on which this knowledge is based. Preferably, he should have an opportunity by such means to discover something new for himself. Science teaching has also to be brought much more into contact with practical life. This means a complete revision of present school science curricula, a revision in which not only scientists and teachers, but also technicians, doctors, industrial and agricultural workers must take part. What the curricula should be cannot, plainly, be laid down here. But a great deal can be learnt from what has already been done in this direction in the Soviet Union (as described, for instance, in Pinkevich's *Science and Education in the Soviet Union*). It would mean in practice far more scientific training for school teachers, and an addition on a large scale of workshops and laboratories to all schools, both elementary and secondary. It is a mistake, however, to suppose that this would involve the use of elaborate or expensive apparatus. A great deal of the most essential part of science can be taught with apparatus of the sealing-wax and string variety, and where more elaborate apparatus is required (as with optical and electrical instruments) instruments suitable for

schools could be made available cheaply in large quantities once the old monopoly of the scientific-instrument maker is broken down and replaced by the mass production of high-grade scientific instruments, a process which is already in full swing in the U.S.S.R. For instance, electrical apparatus which can show the working of a photo-electric cell can be bought in Russia for a price equivalent to 10s., and can be shown to all classes in elementary schools.

The great advantage of a reformed curriculum would be to make science far more comprehensible than it is now, to bring it into the range of many more minds, and into their range at an earlier age. With a different social atmosphere it should be possible for science to be absorbed with about the same ease and universality as is now one's native language, or simple mechanical operations like riding a bicycle or cooking a dinner. In this way children leaving secondary schools (and in a Soviet State that means all children) ought to know as much of the essentials of science as an average university science graduate. They would know it in the sense of being able to use a piece of apparatus and understand the meaning of a scientific article, and of being interested in the progress of new discoveries rather than being able to get marks for reproducing knowledge in an examination. Only those who felt an inclination to go deeper would go on to study science in universities and technical institutes, which would, of course, be very much more in contact with each other than they are at present. The course of studies at university would also require almost complete revision. After a short lapse of time it will be able to start at a much higher general level, and from there on it can proceed in a way which will not demand nearly as much learning and memorizing on the part of students, but more original work and particularly experimental work. It should be possible, with the higher grade of intelligence that will be available at universities owing to the substitution of ability for means as a test of admission, to allow science to be taught as intelligent appreciation rather than dogma.

One of the causes of the resistance to the part of science in education is, of course, the entrenched position of religion. Not more than seventy years ago religion was still fighting a battle with science, but under capitalism it was found that neither could be allowed to triumph. Science was needed for the technical advantages of increased profit-making, religion to supply a justification for it and a reason for its acceptance by the

masses. At present, we have in the teaching and practice of religion a confused mysticism instead of the older dogma. The Old Testament has been re-interpreted to fit with modern scientific knowledge, and with each new scientific advance a justification is sought for the palpable irrationality of traditional religion. All this must necessarily vanish in science-teaching after the revolution, and it will be found that science at the same time will become far simpler and more comprehensible, when it is not occupied in the impossible task of justifying the ways of God to Man. This does not, of course, indicate a return to crude materialism. The philosophical problems implicit in the development of the universe have to be faced, as well as the different solutions which have been propounded to them by thinkers from Aristotle through Descartes, Hume and Berkeley to the thinkers of the present day.

How the universe develops of itself is the central theme of dialectical materialism, and here the stress will be laid rather on the evidences of this development than on the supernatural accounts formed in earlier ages and maintained down to ours for social and political reasons. Dialectical materialism is not only concerned with the passive interpretation of nature, but with men's activity in relation to it. In particular it is concerned with the development and organization of science. It does not take the place of scientific method, but adds to it general conceptions and directions for future work which in purely scientific method is left to individual genius. To understand the general structure of science and in particular to understand its organization, the dialectic method offers enormous advantages.

There is no question here of imposing a doctrine on those who cannot, for reasons of tradition, temperament, or mere ignorance, accept it. It is a question of giving an opportunity for those learning science to see it as a human enterprise, itself part of a universal development and not as a meaningless set of prescriptions and laws. Dialectical materialism can afford to win its way to the acceptance of the post-revolutionary scientists by the very comprehensiveness and positive direction that it gives to the universe and to their work in it.

Particularly, in the new curriculum, the importance of the history of science and the relation between the development of science and that of production will be kept in mind, so that the young scientists will be alive to the future possibilities of their work and aware of the problems which are calling for scientific

solutions. Specialization will necessarily take place, but it will be robbed of most of its dangers by the extension of general scientific education and by the wider interests which the historical and social aspects of science necessarily bring.

Complete scientific and technical education is a slow business. No one would claim that it is complete at graduation. The next stage in the learning of the technique of science is independent research. It is already being recognized in this country, as it is expressly in the Soviet Union, that it is only after three years or so of research, that is, at the age of twenty-six or twenty-seven, that a scientist can really start doing his full share in production. The process, of course, must be made a gradual one. At every stage from the school onwards the student should be encouraged to take the opportunity of producing independent results. At some stage the education of scientists who are going to continue in research should be differentiated from that of those who are going to be devoted to teaching, but a considerable flexibility must be allowed between these two spheres, so as to keep the teacher sufficiently up to date and alive in his scientific work, and to leave the research worker the opportunity of learning how to convey his results to others, through lectures and demonstrations. Apart from the regular training of scientists, scientific education would by no means end at school: it would be one of the main purposes of the State to see that workers at all stages were kept in active touch with scientific and technical development. The scientists have as much to learn from the workers as vice versa; both sides must learn enough to be able to understand each other. It should be possible for a worker at any stage in his life to take up scientific courses and, if he gets on with them, to devote himself entirely to research. In any particular branch of production workers will of themselves see that they are acquainted with the scientific principles at the basis of their work and with the developments which may improve it, because under socialist methods of production all scientific advances can be turned to immediate advantage in addition to production or to the comfort of the worker, and not, as in capitalist countries, simply to increased profits and speed-up. This difference should reflect itself in a quite different attitude of the workers towards science, where the full co-operation of the scientists will be required to bring this about quickly.

Invention is one of the most important channels of the relation of science to production. Under capitalism, invention is very haphazard and is carried on in a frightfully wasteful way.<sup>1</sup> The only motive given for invention is financial gain, and that is generally snatched away from the inventor. The history of successful invention is not so much the history of people with sufficient mechanical or scientific ingenuity as that of people with sufficient greed or financial ability to get their inventions across. Sir Charles Parsons, speaking of the invention of the turbine, said: "There were several others in the field who had as good ideas as I had, but I had the most money behind me." Even in the invention of the reciprocating steam-engine in the eighteenth century £70,000 was spent by Boulton and Watt before any return was obtained. In the case of the invention of textile machinery, Arkwright succeeded, not because of his inventiveness (he had actually stolen the invention) but because of his business ability. In the nineteenth century, Smiles's *Lives* shows how difficult were the efforts of the inventors, and how wasteful the society that can allow such things to be.

At the present day the private inventor is gradually being squeezed out, and his place taken by the research worker in the pay of a big monopoly, whose invention belongs to the firm which employs him, which may or may not use it, as it suits its profits. Even what did exist as a possibility of the private inventor to rise by his own ingenuity from poverty to a controlling position in society has been destroyed by this process. Not only manual workers and administrators, but even men of ingenuity are under present conditions nothing but wage-slaves. Naturally under these circumstances no one has attempted the task of a rational approach to invention, and this can only be done in a socialist State. The production of new processes and new mechanisms can be to a large extent foreseen, though never entirely so. There will always remain a field open to chance or brilliant intuition. Here the institution, as in the Soviet Union, of societies of worker-inventors will enable these opportunities to be fully utilized. Every idea which might improve production or the conditions of work, whatever its origin, will be examined on its merits, and, if acceptable in its original or modified form, the inventor will be suitably rewarded and, particularly, urged, if he has the inclination to devote himself to this kind of work. Already this society has

<sup>1</sup> See H. S. Hatfield: *The Inventor and His World* (Routledge.)

several thousand members, scattered through every factory in the Union, and has resulted in the saving of millions of roubles to the community.

The organization of scientific research and its internal management will be radically affected by the revolution. Science has grown up partly out of the tutelage of growing

**The Organization of Scientific Research** industry and Governmental departments (the oldest scientific institute in England is the Greenwich Observatory designed to assist British shipping) and partly in the medieval

universities. The cramping effect of this domination will be entirely removed. The control of the internal development of science will be left in the hands of the working scientists themselves with the understanding, of course, that the general direction of science in the service of human welfare should be under the control of the central planning authorities. It is not possible at this stage to foresee the ultimate method of internal government of science; we are still too much here and even in the U.S.S.R. under the influence of the older traditions. But we can see some of the directions of the change. The fundamental aim is to secure efficient direction and co-ordination, while retaining that freshness and originality which is essential for scientific advance. This can be achieved, and in fact has been achieved, by a kind of scientific Soviet system, the unit being the laboratory or small institute concerned with some particular branch of research. The procedure of the research, the funds and apparatus required, are determined roughly beforehand by a council of the research workers themselves, at which, of course, the mechanics and laboratory assistants also attend. But a council of this sort is most unsuited to be an executive authority, and consequently each laboratory will have its director who will be concerned with the relation of the laboratory to the general plan of scientific research and with the question of finance and internal administration. A serious problem here is that the director, in order to understand and integrate the work of the laboratory, must be an eminent scientist, and may or may not be a good administrator. In the former case he runs the risk of diverting most of his time to administration, in the latter the administration itself is neglected. In either case it may be worth while to have an administrator or administrative secretary on a more or less equal footing with the scientific director. It is, of course, important that such admini-

strators should themselves have a sufficient knowledge of science to appreciate the nature of the work of their laboratories.

The problem of safeguarding originality of research is more difficult. It can be to a large extent solved once financial supplies are available in sufficient quantity, because then the rule may be laid down that it is sufficient for anyone to want to do a piece of research to allow funds to be allocated to it. It might be possible to prevent apparently futile researches, but the safest way to do this would be to allow the research worker himself to find out that they were futile. A certain amount would still have to depend on the general estimate of whether a man is a fool or a genius. But here it would always be safer to take a wide margin of error, as we have plenty of examples of tragic mistakes which ordinary people have made in this kind of judgment. Even then in this way a lot of useless work would certainly be done, but on the average it would probably be repaid by the few brilliant pieces of work which might have been stifled under a more bureaucratic control. Place must always be left for the isolated scientist who can cope with his work but cannot manage to co-operate with his fellow-scientists, although with better education this disharmony will certainly tend to be reduced. At present it is the bitter economic struggle for existence between scientists that goes far to cause the personal feuds for which they are so notorious.

It is often objected by scientists, and even more by such patrons of science as the heads of large industries, that science cannot be planned: it is a free flower of human genius, and any attempt to plan it would reduce it to a soulless bureaucracy. These are interested charges, but there is enough truth in them to stop to consider them.

**The Planning of Scientific Research** The difference between scientific research and other human occupations is that, as it is looking for the unknown, it cannot decide beforehand what it is going to meet and when it is going to meet it. Luckily for science, the completely unknown is not met so very often. Most actual workers know what they are looking for and many of them find it. It is true that the occasions on which they do not succeed in their object are often the most fruitful in discovery, but still the safest plan to follow is to search as if something were going to be found, and to be prepared to modify one's search if something different is found or if insuperable difficulties arise. It is as feasible for groups of

scientists to adopt this course as it is for an individual scientist, and in effect this has been done for some years in many Russian laboratories. The plan of work is laid down at the beginning of the year—such and such a field to be explored, the relation of such and such properties to be examined—but in the plan there is a very large margin left for unexpected difficulties and the time to follow side clues, and there is always a proviso that if anything of extreme importance is found the whole original plan can be scrapped and a new research started. Some kind of plan is in effect necessary even in the laboratories of capitalist countries. A provision has to be made for apparatus of a specified kind, often apparatus which will take years to make and be expected to be in use for years. Suitable men have to be found for assistants, and all this has to be done before the results of the work for which these preparations are made can be known. The drawing up of the plan must be the work of competent people—the director in a very small institute, or the director and the laboratory council in a larger one. In drawing up the plan the director has before him the knowledge of the approximate chances of success in following out different fields of investigation, and he will also know roughly what kind of reliance can be based on this probability. That is, whether he is embarking on a completely chance adventure, or looking for things which there is a more than half-probability that he will find. It is clear that the precision of the plan will vary very much in these two cases, as will the length of time for which it is worth while planning.

The plans for individual institutes need, further, to be co-ordinated under the general scheme which will be described later; but this general plan is not an imposition from above on individual institutes, but an integrated sum of the plans of the institutes after taking into consideration the demands for the solution of problems which are presented to them and of their own internal programme of fundamental research.

At the same time as the administrative organization, the means of communication between scientists will need to be vastly improved. At present they are unbelievably chaotic. This state of affairs is recognized by most scientists, but the vested interests of learned societies and publishing houses has prevented for years anything effective being done.



There exist something like 36,000 scientific and technical periodicals whose fields all overlap to a greater or less degree. They can roughly be classified into the journals which contain original papers in considerable detail, and the magazines which have the more general function of giving reviews and summaries of important papers, and at the same time giving news of their recent scientific advances. This is particularly necessary because the time taken to publish in a journal can vary from anything from three months to two years. Besides this, there exist the abstracts giving briefest accounts of all effective papers.

This system certainly ensures that no piece of scientific work should go unrecorded. It may, if it is at all good, even be recorded five or ten times over. The main criticism, however, is that it is recorded in an entirely unsystematic way and that the mass of scientific publication is too large for anyone who has not a lot of time to spare to keep abreast even with his own subject. The magazines choose their material in a completely haphazard way, better or worse according to the skill of their editors. The abstracting journals overlap in some fields and leave gaps in others. The result is that in field after field it is becoming actually easier to do a piece of work over again than to find out where it has been done. In the relatively small field of crystallography, for instance, papers appear in no less than eighty-five different journals, most of which are accessible only in the largest libraries.

Actually science has grown so large that a Science Intelligence Service is urgently needed. Its function would be to keep every scientist throughout the world posted with all the information that he needs, not only in his own subject, but in all other subjects which may be relevant to his work, either in providing him with new material or with problems which he may solve. This can be done on something like the following lines. The basis of scientific publication should be, not the periodical, but the individual paper, containing an account of a work sufficiently complete to enable some other worker to repeat it or to make use of the results. Such complete papers, however, would be circulated only to laboratories and to scientists particularly interested in that field. For the rest, the content of the paper would be shortened in one or two stages of abstracts which would have a far wider circulation. These abstracts would be supplemented by a series of graduated reports summarizing the advances of knowledge in any field, but written specially for the benefit of those working in the same or other specified fields. In this way it would

be possible for a scientist at any time to be able to lay his hands on any piece of knowledge he wanted, with the minimum of trouble. A service would be required for the circulation of this material, but this would not involve any more work than that of the advertising agencies of large firms of to-day. There would still be room for scientific journals containing articles on special questions, and for a kind of stop-press news bulletin giving accounts of the latest discoveries. In addition, there would be, of course, a very large popular scientific literature. The more permanent scientific records in the form of books and monographs would also, as far as possible, be rationalized, but not in the present restrictive way. The greatest freedom of scientific publication would be given, even though the result would be a good deal of nonsense.

The written word, however, is not enough. Personal communication and visits are an essential part of scientific communication, particularly with relation to experimental technique. This could also be made possible in an organized way on a scale not at all manageable at the present moment. It should be possible and desirable for all scientists to spend at least three months of the year working in laboratories other than their own, and another month or so in the field in contact with agricultural or industrial workers, or in some remote part of the world. The expenses of scientific travel and hospitality would be part of the regular expenses of scientific institutes, and these exchanges could also be supplemented by congresses deliberately held more for informal conversations than for the reading of papers, which can as well be done at home.

In all this no precise reference to country has been made. It is hardly necessary to point out that science is international, and that whatever the political stages through which the revolution in England is brought, continual contact with scientists in other countries will be maintained and increased as far as it is physically possible. Once the Soviet State has become world-wide, what has been said here of organization will apply universally, including the provision for travel and intercourse. The language question will for some time offer a difficulty, but that may be overcome by moving towards the acceptance of a secondary or auxiliary scientific language, or of a more comprehensive scientific symbolism.

Meanwhile the Central Scientific Intelligence Bureau will naturally have attached to itself boards of translators for all but the most lengthy and detailed scientific material. The internationality of science should not obscure the fact that for practical purposes it will still be most convenient to organize science on a national or regional basis. As the world stands at present, the organization of science goes on in three levels in this respect. There are the basic units, the universities or independent institutes; the national learned societies such as the Royal Society or the Soviet Academy, which vary enormously with the size and the interest of the country in science; and finally the great circles of scientific communication which depended on one large country and a number of small ones, contributing to common journals and attending common conferences. Before 1933 there were virtually in the world only four such circles, which naturally overlap and were to a certain extent unified by international conferences. There was a German circle which included Austria, the Scandinavian countries, Czechoslovakia, and in part, Holland and Switzerland; an English circle, practically confined to the British Empire, but including some contributions from Scandinavia, Holland and Japan; an American circle, centred on the U.S.A.; and the smaller, but older, circle of French science, including contributions from Holland, Switzerland, Poland, Rumania and many of the Latin countries. Italy was too small to form an effective circle of her own and too proud to join in any of the others. Japanese science, particularly strong on the technical side, belonged almost equally to the English, German and American circles. Since 1933 the Nazis in Germany, through their expulsion of Jewish scientists and their general dragooning of science, have broken up this organization and a new one is slowly forming, mostly to the advantage of England, although the U.S.S.R. is appearing as an independent circle with a scientific output which is rapidly catching up with the other circles.

This arrangement has its advantages. The scientists in order to be effective must be able to meet together pretty frequently, and an attempt to plan in detail a whole science on a world scale will probably break down. In any case, it is of great value to have a certain amount of independent work along parallel lines, both from the point of view of checking the results, which may be accepted too easily if only done in one place, and the advantage which could be got out of friendly international competition, unimpaired, as it is now, by economic and political nationalism.

So far nothing has been said about the actual plan for scientific research as a whole. This is because it cannot be considered in itself alone, but only in relation to production

**A Scheme for  
the Organization  
of Science**

and to the welfare of the workers. The relation of production to science is a double one; in the first place, from production and the needs of life come problems and difficul-

ties which can only be solved by understanding the nature of the processes and the structure and functioning of the inanimate or animate bodies concerned. *The problems of production lead to the problems of science.* In the second place, in discovering this structure and at the same time discovering the operations necessary to modify it, new and unsuspected relations and new and unsuspected powers are discovered. These in turn lead back to application in practice in the form of improving old and creating new industries. *The discoveries of science lead to improvement of production.* The organization of science should therefore reflect this double process. We shall require a set of inter-related institutes connecting the most abstract and fundamental science with the everyday problems of the factory and home. In this sequence, the problems will continually be coming up from practice, and their solution, together with new ideas, coming down from theory. This can be imagined to take place in three main stages.

First, we have the works laboratories—far greater in number and better equipped than those that at present exist. In fact we can say “*No factory without its laboratory.*” Corresponding to these will be field agricultural stations and fishery stations, and on the medical side clinical laboratories in the hospitals and health centres. These laboratories will have two tasks. First of all, the routine task of control of the operations carried out and of observation both individual and statistical of the processes, in order to provide the material which may be required for more thorough studies. They would also serve as part of the educational system in the training of scientists, it being obligatory on all scientists to spend a certain amount of time of their career in one of them. Even the most brilliant of theorists often lose effectiveness in their sheer ignorance of practical matters with which they have never had an opportunity to get acquainted. In another way, these laboratories would form part of scientific education in serving as the means for arousing interest among the workers, in the particular factory or agricultural district, in the

value and development of science. They would be foci of local scientific societies.

The next stage would be represented by the semi-technical institutes, such as those for metals, fabrics, animal breeding, etc. Many of these institutes already exist in some form or other, particularly the Research Associations under the Department of Scientific and Industrial Research. They would have two functions: first to deal with problems of production passed up from works laboratories as too difficult to cope with there, or from the corresponding agricultural station or medical clinic; but their second and most important function would be a scientific study of the industry they cover, with a view to more thorough understanding of it and to its modification along rational lines, with the introduction of radically new methods. The different institutes would, of course, be in continual communication with each other, and in their general direction subordinate to the planning authority, so as to see that effort was not wasted in developing certain lines in one industry which could be more conveniently dealt with by another (for instance, in the relative uses of cement or metal in the building industry). The direction of the technical institutes taken together would be in the hands of the technical intelligence service of the central planning authority. It would be responsible for maintaining efficiency and for the most harmonious and rapid possible development. The scientists in the technical institutes would for the most part be fully trained, and have a wide knowledge both theoretical and practical. But the institutes would also serve as a stepping-stone for workers who had already passed through works laboratories to enter scientific careers.

The third stage would be the laboratories devoted to fundamental scientific research. These would take the form of an academy, or in this country of an enlarged Royal Society. It would itself be departmentalized, and each section would maintain connections with the other branches of the academy and also with the universities and with the technical institutes connected with its own field. Universities would send selected men into both the academy and the technical institutes, and some branches of the academy might actually form part of the universities, although from the point of view of the research administration they would be responsible to the Central Academic Council and not to the university administration. The function of the academy would be the general development of fundamental scientific knowledge, but the direction of this development, although not, of course,

its detailed researches, would be determined by the general cultural plan, that is, not the plan for carrying out day-to-day activities of society, but the plan for the improvement of the standard of life and work. Thus the relative amounts of money and men put into the different large sections of science would be so determined by the Central Planning Authority. Far more would be given by the academy to biological, physiological and sociological research than is being given at present, though under its general financial expansion this would not mean that less would be given to physical science, but only that its rate of growth would be relatively slower. It must not be thought that the work of the academy would be distorted by co-ordination with technical activities. There would be no more reason for it to be so than it is at present. In fact, far less, because the overwhelming importance of fundamental research would be more clearly realized. The academy would be working not only in relation to industry, but also in relation to the universities, and in particular to the teaching of science in them. This would ensure that it did not take on a too markedly applied character. At the same time there would be no attempt to restrict fundamental research to the academy. It may always happen that results which are of a fundamental character arise directly from practical considerations. Joule's classical work on the mechanical equivalent of heat was of this character, and incidentally was refused for publication by the academy—the Royal Society—to which it was sent. Ultimately, fundamental work in any sphere would be taken up by the academy for the convenience of the work, but every attempt would be made to see that work done outside received its due recognition. Here again it would be important to avoid too authoritarian an administration. If judgment on what should be taken up is spread over a number of scientific workers the chances are that some of them will see any value there is in a particular piece of work. Apart from its own work in developing our knowledge of the universe along the lines of an already well-formed scientific tradition, the academy would, through its contact with the technical institutes, be continually presented with new problems of a fundamental nature, which would be either in the form of a question as to the nature of the functioning of some inanimate or animate system, or would be increasingly the problem of how best to arrange a certain organization or system of production. At the same time, the new discoveries set out by the academy would be, owing to its close contact, immediately taken up by the

technical institutes, and tried out in practice by the experimental factories, farms, or hospitals.

One of the major economic difficulties of production—the capacity to deal with rapid technical improvements without great loss of material through obsolescence—**The Problem of Improvement and Obsolescence** would have to be solved in this way. At present, under capitalism, improvement is deliberately slowed down, in order that capital should not be lost through ruthless scrapping of still undeteriorated machinery. In the development of any invention definite stages can easily be observed. First, there is the appearance of a new idea or principle which will generally be economical only under very special circumstances of demand. This will be because the most economical way of using the principle in practice has not been discovered. The subsequent development is first of all slow, because of its limited economic value, but ultimately it reaches a point at which the new process is economic to apply on a large scale. Thereupon it is taken up and put into action at great expense. At the same time far more money is suddenly expended on its improvement. The result is that without any fundamental change it goes through a rapid evolution, which pays individual successful capitalists on account of extra profits, but may in the aggregate be a loss because of the enormous amount of capital wasted among the factories that have failed to keep up with the march of progress. Sooner or later a stage is reached when improvements cease to make much difference to the profitability of the method, and a steady state is arrived at, only to be broken down by the appearance of a new fundamental improvement.

Now it is generally easy for intelligent people to see from the outside the possibilities that lie in any fundamental new principle. If these are considered at all promising it will always be worth while to spend considerable sums on developing it to a stage where its economic value can be tested, because, although for technical or economic reasons nine-tenths of such inventions may be failures, the success of the tenth will more than recompense the total effort spent. This trying out on an economic scale, that is, the telescoping of all the earlier stages of improvement, can be done in the institutes and their experimental factories, and the extra rapidity by which the earlier stages are passed will more than compensate the delay in the later stages which are so hectic under

capitalist conditions. At the same time by avoiding undertaking steps prematurely the worst consequences of obsolescence, the scrapping of machinery and plant soon after it has been put into operation, will be largely avoided. It is not a question of slowing down of invention or of its application, but of seeing that applications are made as rapidly as possible and with the minimum of material loss. In this way the rate of obsolescence of a process might be adjusted to be of the same order as the rate of deterioration of the machinery. But this would probably not allow for a sufficiently rapid development and a certain amount of scrapping will undoubtedly be necessary.

Under conditions of capitalist boom there was a tendency to plan industry entirely for maximum production. Already slumps have taught capitalists the value of flexible production-methods adjusted to a demand which may vary in either direction. But the full flexibility of production can only be reached in a socialist State when industries are closely co-ordinated with each other, and with the needs of society, and the changes in them are introduced in a scientific way.

The decision of the method of applying technics to production under a socialist economy will differ very much from capitalist economy, because the test for the efficiency of any new method of production will be gauged not only by the reduction of cost, that is, on the lesser effort required for the same product and the improvement of product, but also by the safety and comfort of the worker. There will be a steady transformation or elimination of all processes involving risk greater than the average; dangerous trades and occupational diseases will be considered sufficient justification for changing a mode of production or abandoning one altogether if it is impossible to make it safe. For instance, in the Soviet Union such processes as the use of mercury in making felt, or the paint-spraying by hand of motor vehicles, have been prohibited and replaced by other processes which are more expensive, but which do not expose the worker to any risk. On a strict capitalist basis such alterations are wasteful, but when the whole society is considered, even on the most utilitarian basis, the aggregate effect on industry of eliminating unnecessary risks and injurious processes must be beneficial. At the same time, in the actual running of industry there will be a gradual elimination of purely



monotonous tasks, which are retained under capitalism because at any stage of production it may be cheaper to employ low-paid labour of women and children than to pay the interest on the machinery which would do the work as well. It is generally possible to produce automatic machinery for nearly all routine tasks, and also for routine inspection. This is not to say that all routine work is bad or that all should be eliminated. There are a number of people in present-day society who actually would prefer routine work to work requiring initiative or response to varying conditions. But the amount of this work should be so apportioned to the people available for it that no one who did not like routine work should have to do any of it; and that those who did, have to do relatively little of it. This would become more marked with improvement of education, and effective education would certainly diminish the number of people capable only of doing routine work, and at the same time enable all workers to enjoy much more fully than at present the additional leisure which would be provided by increased mechanization of production processes. The kind of work that more and more people will go into will be repairs, design and new construction and skilled work generally, as well as into distributive and administrative posts requiring greater ability to deal with people than with things.

We have described the type of organization which science would begin to assume in a socialist economy and its general relation to productive processes. All the reforms and revolutions suggested have their basis in possibilities which can easily be seen to be abused in the present system. They are not visionary possibilities, but have been tried out already with great success in the Soviet Union.

Already, after seven years of efforts beginning with the first Five Year Plan in 1927, there has been built up in the Soviet Union an imposing structure of scientific institutes both for fundamental and applied science.<sup>1</sup> In 1933 there were 840 research institutes, 48,000 scientific workers, 6,000 technical and 8,000 scientific post-graduate students, and all this inside an organization which is rapidly increasing its internal efficiency and its ability to cope with the problems of socialist construction.

<sup>1</sup> See Pinkevich, *Science and Education in the Soviet Union; The U.S.S.R. in Construction*, June 1934. See also J. G. Crowther, *Soviet Science* (Kegan Paul); A. E. Fersman, *The Scientific Side of Soviet Mineral Resources* (Martin Lawrence); Ilin, *Men and Mountains*.

The outstanding achievements already in the Soviet Union have been mainly in those fields where the necessity was greatest: in applied mineralogy which is concerned in making available as rapidly as possible enormous natural resources of the Union, and in agriculture, where it is a question of transforming primitive, peasant communities into modern efficient mechanized farms. In neither of these fields could any effective work be done without extensive organization. The contrast is particularly striking between the order of development of mineral resources under control of the State Planning Commission in the U.S.S.R. and the scramble of prospectors in rival mining companies that have opened up the mineral resources of the British Empire.

Of course, it is not quite correct to compare the development of science in the Soviet Union with that which would occur in this country after the revolution. But the differences all go to strengthen our conviction as to the value of the changes proposed. In the first place, the structure of science before the revolution in Russia was extremely backward even for capitalist countries, and not only so technically, but politically, so that there were fewer scientists capable of working after the revolution and many of those that were capable were more inclined at first to sabotage than to help. In England we shall start with an immense initial advantage in this respect, but we shall also have the addition of the previous experience in the Soviet Union, and this will act, as it has already acted, towards making scientists more ready from the start to co-operate with the new system. At the same time it will enable the earlier mistakes that occurred in the Soviet Union to be avoided, thus giving, organizationally as well as technically, a start on a higher level. More, of course, will be demanded from science. In England we must make up by superior technical and intellectual equipment for the vastly greater material resources of the territories of the U.S.S.R. Otherwise we shall not be doing our share in the construction of a communist world economy.

So far, however, much has been said about the organization but little about the concrete results which such organization might be expected to give. It is impossible here to give more than the roughest outline of what these results might be, first on the grounds of space,<sup>1</sup> but more particularly because of their nature.

<sup>1</sup> A more detailed account of the possibilities which science offers are to be found in *The Frustration of Science* (Allen and Unwin). See also J. N. Leonard, *Tools of To-morrow*, C. C. Furnas, *The Next Hundred Years* (Cassell).

Predictions of advances in science are more difficult to make and more liable to error than any other kinds of prediction, even in the economic and political sphere. We can never tell what radical new possibilities may be opened up by a single discovery. The improvements that science, properly applied, can give can be divided roughly into mechanical, chemical, biological and physiological, corresponding to heavy industry and transport, chemical industry, agriculture and food, and health.

The immediate advantages of the revolution so far as it affects heavy industry will, of course, be realized not so much by the application of science as by the rational use of its present possibilities, as described in other sections of this book. After a time the effects of rational scientific and technical research should make themselves apparent in an increased *tempo* of advance.

In power production and distribution the direction will be towards smaller size and lower cost per unit of production, and towards cutting distribution losses to a negligible figure. This **Power** will probably involve the development of molecular engines of high thermal efficiency reaching up to 100 per cent, of direct-current electrostatic generators,<sup>1</sup> and of high-potential direct-current transmission. The problem of power should be for all practical purposes completely solved. That is, it should be impossible to get a greater amount of mechanical power from natural sources, by any other methods. The value of power would also depend to a great extent on the economy of the production processes. A great deal of power now produced is wasted owing to inefficient planning and running of machinery. This can only be avoided in socialist economy. In the Soviet Union, for instance, the effective utilization of power plant is some 50 per cent greater than in any other country.

At the same time, for transport there would be the development of smaller and lighter power units, and the approach to the problem of wireless power transmission, thus limiting the prime movers to the central power stations. Considerable advances could be made once the business of mechanical engineering became scientific and not largely rule-of-thumb as it is at present. This would apply not only to individual machines, but also to whole production trains, leading ultimately to the semi-automatic or automatic factory for most simple production and distribution goods such as, for instance, steel rails, kitchenware or motor-cars.

<sup>1</sup> Such generators have already been made by Mandelstamm, see Crowther, *loc. cit.*

The most striking contribution of science to heavy industry would be the development of new materials. We now know, from physical theory, how existing materials—  
**Materials** which are given us from nature or through the traditional processes of metallurgy or pottery—are made up from their atoms. We should soon go further, and be able to make up materials of any desired quality, not only imitating existing ones, but producing others with new and far better properties. There will be a general tendency towards lightness combined with strength. The light metals—magnesium and aluminium—will tend to replace to a large extent iron and steel. This process is of course already beginning. New light metals such as beryllium, lithium and their alloys may also come to importance. Up to the present for the most part the only hard materials used have been those easily to be provided by nature, such as the diamond and emery, or discovered accidentally, such as carborundum. We now know enough about the fundamental causes of hardness deliberately to make hard substances, and if money was available for research we could probably find something much better than any we know at present. The introduction of plastic materials is already revolutionizing all light industry, and the possibilities which lie in the rational development and industrialization of chemical knowledge in this field are far greater than any as yet realized. The production of extremely hard materials will completely transform all processes of working and make it possible to work metal and even glass as easily as we now work wood.

Much more use will be made of non-metallic materials, particularly those that can be derived from cellulose or coal, or even in the last analysis from the carbon dioxide of limestone and the nitrogen of the air. By using these materials reinforced with metals it will be possible to a large extent to replace wood, bricks, pottery and glass, in construction of walls, floors and roofs in buildings. The particular advantage of such materials is that they can readily be moulded into shape even in complicated pieces, and are also easy to work. Consequently, all constructional work would be greatly simplified. One possibility along these lines is the substitution of some light, porous, and flexible material for textiles, thus cutting out in one process the spinning, weaving and finishing trades. Under present conditions, of course, this would be simply disastrous and would lead to mass unemployment and financial ruin for whole districts and countries. But in

a socialist economy none of these troubles need arise. The replacement of the old materials by the new would take place in an ordered way, and the cessation of old industries would not be felt as a disaster, but as a release from monotonous toil.

It is true that in all industries there are a certain number of workers who take particular pride in the quality of their work and in their mastery of the processes. With some workers this could be transferred to mastery of the new processes. In any case the rate of development cannot be expected to be so rapid or the change in the demand so complete that enough room will not be left for the relatively few workers who still cling to the older processes.

The new materials will also enable an entirely new scale of life and work to be attempted. With light enough transparent material it should be possible to roof in whole acres of land, and thus carry out large-scale agricultural operations under greenhouse conditions.<sup>1</sup> This would be, of course, of far greater value in dry tropical regions than in England, and would be one more factor in assuring that ample food of the best quality was available for all. In the same way, whole cities could be roofed over and entirely transformed. This proposal is one to which, curiously enough, violent objections are raised. Some people would seem to prefer smoky and dirty cities to the possibility of living permanently in wide spaces, well lighted and with pure air. What is not generally realized is that construction of a city on these lines, together with mechanized agriculture, would leave much more space available for wild nature and much more time for people to go and enjoy it. In spite of this there will inevitably be a certain conservative clinging to older ways of living. Naturally, here again the transition would have to be effected with due regard to people's feelings, but fortunately none at all to vested interests, and the benefits would be immediately available to all and not be, as now, first of all a perquisite of the rich.

The chemical industry will have certainly a larger and larger part to play in economy, particularly under a socialist State. Its immediate prospects have been described in the chapter devoted to it. Here we are concerned only with its possible later developments. It is, of course, from the chemical industry that will be obtained the new materials which we have just described. The

<sup>1</sup> Experiments on these lines are already under way in the Soviet Union, see Ilin, *loc. cit.*

building-up of substances to order is chemistry just as much as physics. But the most useful functions of the chemical industry will probably be in circumstances more closely related to life. The first and most important case is food. The old traditional methods, provided by agriculture, of getting our food chemicals from the sun through plants and animals will probably continue for many years to come, but they are not economical, and may in the long run be replaced by more direct chemical methods. We know already (by a combined chemical and biological method) how to produce sugar from cellulose, that is, from any kind of vegetable rubbish, how to produce fat also from wood by means of mould, and we are very close to being able to produce it from mineral oils. The proteins (meat-like substances) are more difficult to synthesize, but many of their simple constituents (amino-acids) could be produced as by-products of coal-tar industry or ultimately from the air. This knowledge might come in useful if in the course of the revolution or in revolutionary wars the industrial regions of England or the whole country were blockaded. How soon this could be carried out would depend, of course, on the state to which chemical knowledge and chemical industry had reached at the time, but the experience of the last war showed that there is no industry in which complete changes in the nature of production can be so rapidly carried out as in the chemical industry. A more immediately practical use for chemistry in relation to food is the full development of food storage, freed from the restrictions that imperialist and nationalist economy put on trade in food materials. At the same time, in the new economy chemical science could be applied to cookery, not only to improve the process and remove the waste existing in present-day cookery, but to devise new dishes of equal food value to those now in use and to see that every dish was within the reach of the whole population. In just the same way, chemical science will come to the assistance of all household tasks, particularly cleaning in all its aspects. In the first place, houses properly constructed and fitted with labour-saving devices will make this a simple business, and there are possibilities for the development of new cleaning agents far easier to use and less harmful than the soaps we now employ.

After food, the most important set of chemical substances are the various biologically active substances—the natural drugs or hormones of the body and the vitamins of food, and the whole range of artificial drugs each with its special range of action. With these drugs, which the science of biochemistry is rapidly

discovering and could, properly supported, discover far more rapidly, we shall have in our control not only disease but pain and even happiness. Our states of mind depend far more than we think on the presence of various chemicals in our bodies. So far these are under internal, unconscious control; but that is no reason why they should always be so. Of course such gifts would be too dangerous to be let loose in a world of private profit; they would lead, as their forerunners have led already, to scandalous traffics and international difficulties.

The possibilities of chemical science, great as they are, are small compared with those of modern biology. The development of biology has proceeded under capitalism far more slowly than that of the other sciences, mainly because it is more difficult to see how to make profits out of it. After the revolution here, as in the U.S.S.R., far more money and men will be devoted to biological work, and we shall see the theoretical advances of the last thirty years being turned to practical account. The immediate effect will be a great improvement of plants and livestock, and the elimination of noxious species such as rats and many insects, the stoppage of waste due to disease, and the development of new breeds and possibly entirely new species with unexpected and desirable qualities. But we are just beginning to learn the two methods of control of living beings, through the chemical substances passing through their tissues, and by means of the genes that determine the inherited characters. The next stage will be to pass from this knowledge to its application in such a manipulation of animals and plants as we cannot now even imagine, although, in a simple way, the first man to graft fruit-trees started the process. Up to now man has lived as an intelligent parasite on other living beings. He has made use of their qualities as nature gave them, and has, even as a breeder, selected those that pleased him best. He will soon be in a position to make animals and plants as he wishes to have them. This will probably not take a spectacular form of interference with large animals—except in so far as increasing their health and strength goes—but of the creation of new forms of the lowest animals (bacteria, moulds and so forth) capable of carrying out complicated chemical processes and of making food. It may even be possible to build living systems that will perform mechanical operations, and imitate more closely in our machines the balanced play of muscles of an animal.

Finally, the place where science will touch man most directly will be in its study of man himself, necessarily helped, of course, by its study of animals. Under socialism it will be possible to advance the study of physiology and medicine far more rapidly, particularly when the cumbrous, antiquated system of medical education and practice is swept away, and replaced by one in which medicine is not a trade to be plied for profit, but an application of science for human welfare. With every increase of our knowledge of human physiology will come not only increased possibilities in the fight against disease, but, even more important, in the ways of maintaining life, and these discoveries will not, as heretofore, be the privilege of the few who have money enough to pay for their application, but, immediately their usefulness is proved, will be made generally available.

The whole of the apparatus of living, food, houses, clothes, exercise, will be controlled primarily by our new knowledge of physiology. Housing particularly will be considered ultimately not so much from the point of view of available building materials, because with the new methods there will be materials in plenty both for quality and quantity, but in relation to human needs of sun and air. Housing will attempt to reproduce for everyone the most advantageous and enjoyable conditions. In the same way, the new knowledge will be used in relation to work and conditions of work, not as at present with the object of getting the most out of each worker without causing his physical or mental break-down, but in seeing that the work should be as near as possible to a free and enjoyable activity, with the knowledge that everything done is for the good of all and not for private profit. Throughout, medicine will be striving, now consciously, for the prolongation of healthy life. There will be no need to check population, because Malthus's law of the limitation of available supplies will have been finally overthrown in a communist economy.

It would be easy to go further than this, and to paint a picture of man completely master of the earth, reaching out towards the skies and pushing back and finally defeating the spectre of death! These ends may take centuries to achieve; they may never be achieved at all; or it may be found that they are foolish things to try for. But the pursuit of them will give a better scope to human activity

**Physiology  
and Health**

**Conclusion**



than the futile struggles for money or power that fill our present world. However that may be, these are things which are for the generations after the revolution to think of and attempt. We shall have enough to do to achieve what is already in sight.

Here is some all-too-brief indication of the benefits which science, organized as it will be in a Soviet State, will bring to the worker, that is to everyone. Science will then be an unmixed blessing, for it can no longer be made use of to increase exploitation or to intensify the horrors of war. This is the use which all the great scientists of the past have thought of as an ideal, but they have had either to blind themselves to the social realities or to accept the fact that up till now the ideal has had to be sacrificed to practical necessities. The socialist State will be the first to give the scientist the full material and organizational possibilities for his work. It will also be the first to allow him to turn his work to its true end.

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