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THE STATE AND THE RAILWAYS

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There is no doubt that for certain economists political and social economy is a science whose entire content can be expressed in these four words: *laisser faire, laisser passer*. Whatever question you may put to them, be it about women and children working in factories, the colonial question, the wheat trade, or the transport industry, they only ever see one single possible solution: the full and free exercise of individual initiative. Read the article 'Chemins de Fer' by M. Michel Chevalier in the *Dictionnaire de l'économie politique*, a notable article in many respects, and which has remained so though written nearly 25 years ago; there we see all the problems raised by these means of communication discussed in turn, except one: that of whether it should not be up to the state to build and run them. The author does not seem to doubt for a moment that this task belongs to private companies.

[Chevalier is quoted at some length. He denounces those who called for compulsory railway nationalisation in England, as undermining the spirit of partnership in society and the 'freedom of industry'. Private firms would eventually learn to correct any mistakes they made. In another quotation Chevalier insists on freedom for banks to issue notes, referring to the principle of 'freedom of labour'. Walras continues with a dismissal of Chevalier:]

We see that the construction and management of railways by private companies and the free issue of bank notes are applications of the principles of 'freedom of industry and labour'; and anyone who will not support these

**Translator's note.* I have tried to use modern English vocabulary to translate Walras's own formulations as directly as possible, though at certain points clarity required re-writing whole phrases and sentences. Passages I have summarised are in square brackets and indented. An initial bibliographical footnote and a lengthy bibliographical appendix surveying literature between first and subsequent publications of the essay have been omitted.

systems is an enemy of free enterprise, an enemy of political economy and, bluntly speaking, a socialist. And yet, you do not need to go very far to realise that for different, but equally decisive reasons, the issue of bank notes has nothing more to do with the freedom of labour than the construction and management of railways has with freedom of industry.

We know that the formula *laisser faire, laisser passer*, translated as 'free competition and free trade' has been adopted by the Manchester School and pushed to its furthest limits by them, but we also know that a vigorous reaction to this excessive individualism has grown up in Germany, under the name of 'academic socialism' ('socialisme de la chaire'). A significant proportion, perhaps a majority, of the professors of political and social economy in that country have declared themselves ready to recommend, within certain limits, the intervention of the state in the field of industry. These innovators have declared their desire to be midway between a socialism which has too much state intervention and a Manchester approach which has too little. From Germany academic socialism has already spread to Italy where many men of distinction and even several eminent economists have given it their support. Needless to say railways and banknotes are among their fields for state intervention. But, in truth, up to now the economists of the new school have not shown themselves superior to the old in the manner in which they derive their conclusions. The old economists asserted *laisser faire, laisser passer*; the new assert the need for state intervention, but neither side proves anything. Now we are above all tired of gratuitous assertions and short of rigorous proofs. What we are reproaching M. Michel Chevalier for is not so much his conclusions about railways, bank notes and free enterprise, but his lack of any basis for them at all, whether deductive or experimental.

So it could not satisfy us to hear the academic socialists say they would have the state intervene in the railways, and generally a bit more than economists but less than full-blown socialists. By what right can and must the state intervene in the railways? That is what we should like to know. We would then know exactly in which cases and within what limits it can and must intervene. We would finally break out of dogma into science.

1. Public services and economic monopolies

Pure political economy teaches us that production and exchange under competition among land-owners, consuming workers and capitalists and productive entrepreneurs, on the market for factor services and for goods is a process by which factor services are turned into goods of a type and quantity such as to give the maximum possible satisfaction of needs under the following double conditions:[1]

[1]See *Elements d'économie politique pure*, 20e, 21e, 22e lecons.

(1) every factor and product should have only one price in the market, that at which supply equals demand; and

(2) the selling price of products should equal their cost in terms of factors of production.

The condition that there should be a single price for goods and factors at which supply equals demand and that the selling price should equal factor cost can be reduced to the requirement that factors should be exchanged for one another in equal ratios according to the dispositions of their owners. This condition is required for justice, proof of which it is in the field of social economy to establish.[2]

There is self-evident utility in a state of affairs where products are of a nature and quantity such as to give the greatest possible satisfaction of needs, in other words that the best use has been made of factor resources. Once pure economics has established this point it is up to political economy to seek out, carefully, the cases where competition is possible, so as to rely on it then, and those cases where competition is not possible in order to have recourse to some other mechanism.

Now competition is generally possible in the field of goods and services of private interest. These are goods and services which interest men as individuals, freely attending to their personal requirements, that is to say the satisfaction of diverse and unequal needs for each. Every individual consumer calculates the amounts of food, clothing, furniture, etc. that he might consume. He compares the utility of the different forms of the products and services. Once prices are announced he sees how to distribute his income among the various items to get the greatest possible utility. Finally he buys so much of this or that good or service.

Thus there is in general a large number of consumers buying every good or service of private interest; at the same time there are many producers supplying who can always find another buyer for what any one customer will not buy. Now competition can work. If demand exceeds supply for some products, consumers will bid up the price; the selling price will go above cost; and production will increase. If on the contrary supply exceeds demand for certain products the producers will cut prices; the sale price will fall below cost and production will fall. Scale and proportion will be established by themselves in equilibrium.

It is not the same with goods and services of public interest. In theory these are those items of interest to men as members of the community or the state acting so as to establish social conditions for the satisfaction of needs which are identical and equal for all. We may, if we wish, imagine the state as a consumer also calculating the number of units of goods or services for internal and external security, justice, education, communications, etc. it

[2]See *Etudes d'économie sociale, Théorie de la propriété.*

might need; comparing the intensity of the utility to be had from the units of the various goods and services available; seeing, in view of the costs, how to get itself the greatest possible utility; and finally buying certain goods and services. But the similarity ends there. For every good or service of public interest there is a single buyer, the state; as a result there will be no producers supplying, as everyone realises that what they cannot sell to the state cannot be sold to anyone else at all.

Being in possession of a principle – inadequately proved and even inadequately defined, but nevertheless justified up to a point – and wishing to apply it as widely as possible, the economists are always trying to bring private and public interest goods under the same heading. This is a mistake: they are absolutely different. The need for private goods and services is felt by individuals: the need for public goods and services is only felt to its full extent by the community or the state. Just as individuals do not always judge their needs wisely, so too the state may judge its own needs unwisely if its representatives have been badly chosen. Both cases are unfortunate and it is necessary to redress the cause of the harm; but in the second case it does not follow that you should hand over to individuals the business of looking after the demand for public goods and services; for it is certain that then these products would most often be neither demanded nor supplied, neither produced nor consumed. So the economists who wish to submit the production of public goods and services to a regime of free competition are making a mistake which their tone of self-assurance and levity makes all the more serious and inexcusable. They have compromised political science as much as economic science; they have brought confusion into the whole of social science.

Only in exceptional cases can the state expect competition in the production of public goods and services; in general it must produce them itself, and if there are reasons for wishing not only that these goods or services be consumed but also that this should be subject to certain conditions, the state may declare that it alone will produce them: in technical terms it may reserve the monopoly for itself. On the other hand it is only exceptionally that the individual must produce private goods or services for himself; in general he can expect competitive production. This is when the 'principle of free competition' applies; however, alongside state monopolies of public goods and services based on right, which could be called moral monopolies, there is a useful place for state monopolies of private goods and services which could be called economic monopolies which whilst not being outside the realm of industry are at least outside the sphere of 'freedom of industry'.

In fact competition presupposes a multiplicity of producers as well as consumers; as a result the whole principle of free competition also rests on the hypothesis that, just as in cases of loss the quantity produced will fall and the price will go up as a result of the departure of producers, which will

eliminate the excess of cost over sale price, so also in case of profits the quantity produced will rise and the price will fall from an influx of entrepreneurs, which will eliminate the excess of price over cost, equating the two. Now this influx of entrepreneurs will not happen when for one reason or another the entire enterprise is in single hands, that is to say, a monopoly. Then in the case of a profit the excess of price over cost is not eliminated, because production will only increase to the extent that profits can be increased and not by enough to reduce profits to zero. It follows that the principle of free competition is not necessarily applicable to the production of private goods and services which can only be run as monopolies.

We know that the difference is that whilst *laisser faire* applied to an industry capable of unrestricted competition will lead to the maximum satisfaction for consumers with price equal to cost, and neither profit nor loss for entrepreneurs, the same rule applied to a monopolistic industry will lead to the consumers obtaining only the maximum satisfaction available subject to the price exceeding the cost, with the monopolist maximising his profits.[3] In the first case the entrepreneur is an intermediary who can be abstracted from, and the land-owners, workers and capitalists exchange factor services amongst themselves; in the second case the entrepreneur intervenes to absorb some of the value of the wealth traded.

It is to avoid this onerous levy that one must in certain cases no longer apply '*laisser faire*' but have the state intervene. The state will intervene either to run the monopoly itself or to organise it so it is run without profits or losses. This is the origin of economic monopolies based on the social interest, alongside moral monopolies based on natural right. They are private monopolies transformed into state monopolies or into monopolies with concessions granted by the state. It is important to distinguish moral and economic monopolies. Not only does their rationale differ; but also in the case of a moral monopoly run by the state for the benefit of the community, the products, which are public services, can and often must be given away free, whilst in the case of economic monopolies run in the interest of individuals, it is enough for products to be sold at cost and not at a profit-maximising price.

Does this mean the principle of freedom of industry must be suspended and that the state must intervene without exception in all industries susceptible to monopoly? Far from it. Our analysis shows monopoly to be against the social interest and state intervention to be based on the social interest. But, first of all, interest must yield to right, and then an inferior interest must give way to a superior one. We can imagine a case where the private monopoly would have a right. If, for example, the producer of our product was an inventor completely in control of his secret not asking for

[3]See *Elements d'économie politique pure*, 37[e] lecon.

any help from the state, would it not be his right to run the monopoly? Just as the community or the state has rights which the individual must not infringe, so too the individual has rights the state must not ignore. We could maintain that in this case the entrepreneur has a property right in his invention, which he is selling in marketing the product which incorporates it and that he has a right to make the product in the quantity which suits him and to sell it at a price which suits him. So the interests of consumption would give way before the interests of property. We can conceive of another such case where the private monopoly would be of interest. If for example our entrepreneur was an inventor less in control of his secret than in the former case and asked the state to protect his monopoly for a certain time on the condition that after this period the invention should be put into the public domain, then it could be in society's interest to make such an agreement. In effect it would be better for the consumers to have the product right away rewarding the inventor for his efforts by several years of monopoly, than to wait indefinitely for a chance discovery. Here one would make an inferior interest give way to a superior one. However, having said all this, one can envisage cases in which private monopoly would neither have a right nor be in the public interest, and state intervention would then be useful and legitimate.

Suppose the product in question is water or gas, and our entrepreneur is an individual or company wanting to deliver this water or gas to people's homes. There is no secret to safeguard, no discovery to encourage. But the entrepreneur needs communal authorisation to put his pipes under the street. Monopoly is inevitable. The community cannot authorise an unlimited number of entrepreneurs to put pipes in the street; it can allow two or three at most; and these two or three would soon be led to form a coalition to share monopoly profits rather than to compete with one another. Competition between a limited number of entrepreneurs is, rationally, only a transitory phenomenon to be followed for sure by a monopoly, either of one firm based on the ruin of the others, or of all or some firms in coalition. If on the pretext of free enterprise the delivery concession was given without conditions to a single entrepreneur or to two or three, the final result would be certain: 1000 m^3 of water or gas per day would be delivered at a price of 5 Fr. per m^3, and a cost of 2 Fr. per m^3, with a daily profit of 3000 Fr.[4] What grounds in utility or justice are there for this? None. If the town supplied gas or water for consumers itself it would sell 5000 units per day with no profit or loss; or alternatively it could auction off the right to supply to the firm offering the lowest consumer price. The result would be the same.

[4]This is why: consider in turn prices of 100, 50, 20, 5, 3 and 2 Fr. with the quantity sold at each price respectively 0, 10, 50, 1000, 2500 and 5000 units. The net revenue, deducting the cost of 2 Fr. per unit, would be 0, 480, 900, 3000, 2500 and 0 Fr. 3 Fr. [sic.] is therefore the profit-maximising price. Fixed costs would reduce total profits but could not change the price.

It is thus that in economic monopolies, the state intervenes, either to manage them itself or to have a concessionary monopoly selling at cost price.

But we also know that monopoly undermines, not merely the condition of equality of price and cost, but also the unity of prices.[5] Thus in our example the final result would be to have 2500 m^3 of water or gas supplied, of which 10 would be at 50 Fr., 40 at 20 Fr., 950 at 5 Fr., and 1500 at 3 Fr., with the sole seller or the coalition thus making a profit of 5550 Fr. per day.[6] In the eyes of some it is simple and obvious that a monopolist should seek and obtain extra profit with price discrimination. At the end of his work *De l'influence des péages sur l'utilité des voies de communication*,[7] Dupuit discussed the solution implicit in a monopoly: 'This solution rests on the general principle that for a service provided the price must reflect not the cost to the supplier but a sum which depends on the value placed on it by the customer.' We, ourselves, cannot accept without restrictions such a so-called principle which if applied in such an absolute manner would be contrary to all justice. There is no doubt that it is in the monopolist's interest to have a price above cost and not merely a single profit-maximising price, but several prices equal to the maximum sacrifice consumers are prepared to make; whether it is his right to do this is quite another matter.

In this regard we must return to our earlier distinction. In the case of an industry open to free competition or a monopoly based on right or the general interst we have nothing to say. In these circumstances the seller has as much right to sell the same product at different prices as the customer has to buy them if he wants. I say 'the same product', when they are perfectly identical; there may well be some differences of nature, quality or appearance. A confectioner differentiates wrappings and labels, a book seller formats and paper, in both cases avoiding any deception over the quality of the goods, despite selling the same thing at different prices. If you believe the difference in price is not justified by the difference in the form of the products, then buy accordingly; or if you choose to indulge a whim rather than paying for a real product, you cannot complain.

Now in the case of ordinary monopoly we may ask why as well as being able to raise price above cost the monopolist should also be able to set several prices according to the consumers' maximum willingness to pay. In the example of water or gas, is it not enough that the monopolist can make 3000 Fr. profit by selling 1000 m^3 at 5 Fr. instead of 5000 m^3 at 2 Fr.: must he also be able to raise profits to 5500 Fr. by having the additional higher prices of 50 Fr. and 20 Fr. and the lower price of 3 Fr. alongside the 5 Fr. price by some device such as by giving certain customers priority at certain times? We feel that if there is a need to warn people of the first consequence

[5]See *Elements d'économie politique pure*, 37[e] lecon.
[6]The figures in footnote 4 above will explain this calculation.
[7]*Annales des Ponts et Chaussées*, No. 2, March–April 1849.

of monopoly there is all the more reason to prevent the second one. And we claim without hesitation that if multiple prices are unavoidable for monopolies by right and those in the general interest, then in other cases this gives all the more reason to turn de facto monopolies into state economic monopolies.

2. Railways as public services and economic monopolies

Railways, though subject to certain conditions of slope and curvature, and having fixed rails for their passenger and freight trains, can be classed as means of communication along with roads and canals. But they are distinct in that the use of rails results in a unity of the track, the vehicle and its motive power. At first people thought you could let any transport user go freely on the tracks, just as on roads and canals. But it was soon recognised that the transport entrepreneur had to be the manager of the track as well, and he had to charge both the toll for the use of the track and the freight charge for the vehicle and its power. However, as it is the role of science to distinguish by abstraction what is confused in reality, we will first consider the permanent way alone, independently of the locomotives, carriages, and goods trucks on it, and bring them together again later.

Is the service of means of communication a public service?

[There follows a lengthy quotation from Adam Smith's *Wealth of Nations*, vol. I.V, section III, in which it is argued that roads and canals should be built privately, the cost being passed on to the consumer in the price of the goods carried, which would nevertheless be on balance reduced owing to the cheapness of the transport.]

J.B. Say in his *Cours*[8] mentions Smith's view but opposes it.

[Say is quoted as arguing that means of communication would be among those services mentioned by Smith which it would be in the general social interest to have but which no one person would want to pay for. He cites canals as an example and argues that there may be cases in which toll charges would not cover financing costs even though the general interest would require the canal to be built; this would have to be undertaken by the state.]

We see that on this point, as on others, the experts disagree. Let us begin by saying that Say's argument seems right, up to a certain point, but his example is badly chosen and his argument singularly unfortunate. If you want to place, at least in part, means of communication among public services you have to go beyond goods transport for grounds for this, and you cannot rest the case on canals, which are exclusively intended for freight. Transport is part of goods production, and so means of communication in

[8] *Cours d'économie politique*, 7[e] partie, ch. XXIII, XXIV.

allowing goods distribution are productive capital and come under the general rules of production and investment. Under competition just as factors are combined into goods so as to give the greatest possible satisfaction of wants, so savings are turned into capital of a kind and in quantities such as to give the greatest effective possible utility. So free competition is in the social interest for investment as well as production, and any attempt to steer savings into other than the most remunerative outlets will result in a loss for society. The way the issue is posed, then A. Smith is right and J.B. Say is outside political economy.

But do means of communication and in particular railways only transport goods? This is the point. In this respect we would remind A. Smith, who included national defence and justice among the functions of the community or the state, that since the use of means of communication is necessary for the execution of these public services it is itself a public service. Roads or railways are needed to bring armies to the frontier; in 1838 the French Parliament was right to attach great importance to strategic questions in its discussions on railways. This importance is real: it appeared in the American War of Secession and the wars that have occurred since in Europe. Railways or roads are needed for the authorities to pursue wrong-doers; and the survival of banditry in certain areas like Greece and Sicily is due to inadequate communications.

This first consideration alone would be enough to justify state intervention in railway building and incentives and subsidies; but there are others. Leave aside those travellers who travel for their own pleasure at their own expense as an item of consumption, and those travelling on business whose expenses are reflected in certain product prices, and finally the soldiers and gendarmes; there are still a number of passengers who are not travelling on their own account, not on account of the consumer, nor for the state, but who are nevertheless travelling in the interests of society. I will cite for example, men going to various scientific congresses, or to industrial or fine arts exhibitions, which have become so frequent thanks to the railways. An analogous observation would apply to certain goods whose transportation is of interest not only to the paying consumer but also, in a sense, to society itself, for example those newspapers which between evening and morning bring daily political news from one end of the country to another. You would really have to bear a double blindfold of the narrowest individualism and the most limited utilitarianism not to see that apart from what they do for goods production, means of communication have another object, which is to build up and reinforce national unity; that just as a town without roads would be reduced to a mass of isolated houses, so a country without communications would be a collection of districts, foreign to one another; that thanks to means of communication the population distributes itself between country and towns; that by them, certain towns become centres of scientific,

industrial, literary and artistic movement from which ideas not paid for in the cost of goods, are spread around the whole country; that communications are thus vital agents of civilisation and progress in all senses.

The services of means of communication, especially roads and railways have, within certain limits, unquestionably the character of public services and more crucially that of monopoly, for whose exploitation the participation of the state is indispensable. In this context there is a perfect analogy between the position of an entrepreneur wishing to provide water or gas to a town and that of an entrepreneur wishing to provide passenger and goods transport from one town to another. The one requires authorisation to put his pipes under the road; the other needs authorisation to acquire by expropriation the land which he needs. And just as one community cannot permit an indefinite number of entrepreneurs to put pipes under the roads, so the state cannot allow an indefinite number of entrepreneurs to acquire land by expropriation between one town and another.

This is not yet the most decisive reason, however. In these two cases there is another basic feature of the industry in question, which is that the costs of initial installation, and up to a point the costs of operation, can be spread over a larger or a smaller number of units of production. Ten different carpentry or construction workshops require about the same amount of land, the same extent of buildings, the same number of workers and machines as a single workshop producing the same amount. At most in the latter case you would make a rather slight saving on energy. On the other hand a single conduit can provide a whole population with water or gas as easily as ten conduits; a single road can carry as much passenger and goods traffic as ten roads. Once the conduit is laid or the road built the same construction costs can be spread over a flow ten times as small or ten times larger. J.S. Mill[9] has rightly remarked that this is a case which puts industries outside the sphere of free competition, because such competition could only occur at the cost of wastefully duplicating the installation costs. To build a second set of water or gas pipes in a town which already has an adequate system, or to build a second road network in a country that already has a perfectly adequate one would be an absurd way to pursue efficiency. Even supposing that competition could secure relative cost reduction if introduced in this way, it could not bring down the absolute costs, in the sense that it would always be better to obtain the products at a price that did not incorporate double or treble initial costs.

This point is especially important when the initial costs are very high. Then in effect there is a double obstacle to competition being able to achieve its customary cost-reducing effects, and even to its very existence: firstly the difficulty of raising capital and secondly that of rewarding it. Now this is the case for roads, canals and especially railways. Dupuit, in his article on 'Tolls' in the *Dictionnaire de l'economie politique* offers a very good example:

[9] *Principles*, vol. 1, ch. IX, para. 3.

[Dupuit is quoted from the *Dictionnaire*, vol. 2, p. 340 in a lengthy passage which can be summarised as follows (P.H.'s summary):

A canal or railway company may be able to make 12 or 15% return on capital or even 20% when the normal rate is 6 or 7%. If the capital costs were 100 millions, the gross receipts might be 30 millions and the operating costs 15 millions, producing a 15% annual return for the shareholders. Such a high return would normally induce new competition to share and then reduce the profits of the first enterprise, but whereas in most cases if a hundred firms can prosper so can the hundred-and-first, in this case any new entrant can only prosper at the expense of the first. A second railway or canal is likely to have to use a costlier route; but suppose that it too could be built for only 100 millions and that the new route takes 12 millions of business annually away from the first and generates 2 or 3 millions of new business; it will have a turnover of 15 millions from which must be deducted up to 12 millions of operating costs (most of which are independent of the number of journeys) to leave only 3 millions of net revenue, giving a return of 3%. The first firm will have revenues of 18 millions left but expenses still of 12 to 13 millions, giving it a return on capital of 5 or 6% instead of fifteen. The new enterprise will thus have ruined the shareholders of the first and instead of one healthy enterprise you will have two unhealthy ones.

Walras goes on to commend Dupuit but observes:]

It was futile for Dupuit to contradict himself in his article on 'Means of communication' in the same *Dictionnaire de l'économie politique* by arguing the identity of railways with other industries in order to establish the possibility of applying the principle of free enterprise for railways. He could not refute his own arguments. Note in fact that under his own hypothesis the two rival firms will have a common interest in maintaining monopolistic tariff levels, and the consumers will pay for transport not at cost but at the profit-maximising price level. This always happens in practice sooner or later. Dupuit does not worry about this because he finds it natural and proper; but we must indicate our disagreement with his view.

The building and management of a railway, like a road or a canal, necessarily eludes competition. But there is more to it: if the road and the canal are in themselves a natural monopoly, at least the traffic that goes on them can operate under competitive conditions because an unlimited number of vehicles or boatmen can go on a road or a canal. The toll, if there is one, goes to a monopolist; but the freight charges go to competitive firms. With railways on the other hand the track constitutes a natural monopoly and the actual transportation another which is essentially linked to the first, because, as we have said, an unlimited number of firms cannot have trains running on the rails. Here the fee for the track, the vehicle and its motive power, the toll and the freight fee, all go to one monopolist. For these reasons it is a

complete aberration to invoke freedom of industry for railways; and it is all the more urgent to seek efficiency by the application of sound rules to the powerful and redoubtable monopolies that they are, as we shall see in studying the question of tariffs.

3. Railway tariffs

The output of the railway industry is passenger and goods transport. The unit of production is the transport of one passenger or one tonne of goods for one kilometre; we speak of passenger-kilometres or tonne-kilometres. The tariff rates indicate the prices of these units, and the study of tariffs is the study of prices for railways.

The industry being a monopoly, there are two prices to consider: one price corresponding to the cost of the passenger- or tonne-kilometre, and another price corresponding to maximum net product. The consumer wants the first; the monopolist the second. In fact, while it is certain that the railway companies wish for the maximum profit, their lack of a grasp of the principles of monopoly in theory and practice means they are not very successful in this. M. Gustave Marqfoy appears to have demonstrated this curious fact in his notable work *De l'abaissement des tarifs de chemins de fer en France* (1863).

[Walras explains that Marqfoy understands the railways better than other writers and is clear on a number of theoretical points: he distinguishes cost price from the profit-maximising price and is aware of the distinction between fixed and variable costs, and that only the latter influence the profit-maximising price. Walras observes that railway companies should vary prices only in relation to the variable costs per kilometre of transport and that their position is analogous to the proprietor of the mineral water spring of Cournot. He goes on to discuss Marqfoy's figures.]

The French railways are subject to the following maximum charges for passengers per person per kilometre: first class 10c.; second class 7.5c.; third class 5.5c.; average 7.66c.

Against these M. Marqfoy has estimated variable costs as follows, using figures from the Compagnie du Midi for 1860 but still relevant today and applicable to other companies: first class 1.12c.; second class 0.56c.; third class 0.24c.; average 0.64c. We are referring for simplicity to stopping trains only, not express or mixed trains.

So between 7.66 and 0.64c. the companies have a range of 7.02c. to grope across to find the profit-maximising price. They have never taken any steps in this direction, and since the start of the railways passenger fares have

remained tied to the maximum permitted. The companies have only tried to cut prices for special tickets, excursions, season tickets and return trips, about which we shall say something later.

For goods the maximum allowed prices per tonne-kilometre are: first class 16c.; second class 14c.; third class 10c.; average 13.33c.

M. Marqfoy has estimated the variable cost per tonne-kilometre as follows: 1c. for whole trains with fully loaded wagons and 2c. for whole trains with wagons half full, an average of 1.5c.

Thus between 13.33 and 1.5c. the companies have a range of 11.83c. to explore to find the profit-maximising rate. Here they have done something. They have lowered their prices to an average of 6 or 7c. Tariffs below 4c. are rare and there are no tariffs below 3c.

Does this mean that the companies, acting in full knowledge, stopped their rate reductions when the net product began to fall? This is hard to believe. In the ten years from 1852 to 1861 traffic increased thus: for passengers (with fares fixed) 7%; for goods, with rates cut, 142%. The reduction in rates must surely have had a part to play in the latter result. And one may even wonder not only whether a reduction in passenger fares might not have increased the almost constant passenger traffic, but also whether a bolder reduction in freight rates might not have raised the traffic even more. One is tempted to think so from reading the various documents such as company reports to their shareholders.

None of them makes the distinction between fixed and variable costs and suspects the independence of the profit maximising price from the fixed costs. The Compagnie de Lyon in its report for 1860 refers to management staff, up-keep of buildings, heating, lighting, interest on fixed capital, etc. as elements of the cost of transport. And in particular it invokes the cost of establishing its Rhône–Loire network, which cost more than 1,200,000 Fr. per kilometre, in order to justify a charge of 10c. for coal, while a rate of 7 or 8c., or 5 or 6c., would probably give it a larger profit. All the companies are amazed when net product increases following a cut in rates. When railways were first established it was thought that passenger transport would be the most productive part of the enterprise. These predictions were refuted: with the rate cuts, the increase in traffic was above all in goods.

[Walras goes on to quote from certain railway company reports in which the companies show little enthusiasm for lower prices.]

The same is true of the other companies; they tie themselves to high prices, not only against the public interest, but against their own interest; not only do they not try to approach a cost price, they do not even think of coming down to the profit-maximising price.

As well as allowing a profit-maximising price above cost, monopoly

facilitates, as we have seen, the maintenance of several different prices for the same product. We have shown that the railways exploit (more or less intelligently) the first circumstance; they similarly exploit the second.

At first sight it would seem that this observation does not apply to passenger fares. French companies charge 10c. for the first class, 7.5c. for the second, and 5.5c. for the third; but they put 24 passengers in a first class coach, 30 in a second class and 40 in a third class. They also vary the comfort of the seats, etc. Neither in terms of space nor comfort provided is the service identical, and the prices seem to be related to the differences. They would in fact be so if they were roughly equal to the costs: 1.12c., 0.56c., and 0.24c.; but as they are far higher, and so completely independent of the nature of the service, we must reason otherwise. In reality, the companies consider, rightly or wrongly, the average price of 7.66c., which is quite close to the second class price of 7.5c., to be the profit-maximising price; but they do not want to miss the chance of taking more from passengers willing to pay more, nor to turn away passengers not willing to pay as much. This is why there are three separate classes, and great efforts made to accentuate on the one hand the advantages of the first class and on the other the disadvantages of the third class. When some time ago there was an outcry that third class coaches should have windows fitted as laid down in the regulations for 1857–8, and now when heating is demanded for them in the winter, people complain about the meanness of the companies without understanding its true cause. If the third class coaches were comfortable enough for many first and second class passengers to go in them, total net product would fall. That is all there is to it. The companies only have third class coaches to avoid losing a large number of less well off passengers who would rather go by stage coach than pay the first or second class fare. Similarly, they have season tickets for daily travellers who, rather than pay the ordinary fare, would stay in the town instead of going to live in the country; and excursion and return tickets for those who would not travel without such reduced rates. But all these rates are, of course, well above costs.

However, our observation applies especially to goods rates. Here the classifications clearly are intended to keep different prices for the same service; for apart from differences in volume, care required in handling, or risks due to the high value of some items, all of which would only justify minor price differences, the transport of a tonne of any one thing is the same service as the transport of a tonne of anything else between the same two places. Looking down the nomenclature of goods in each class, we have in the first class: spirits, carpentry timber, chemicals, game, sugar, coffee, fabrics, manufactures; in the second: wheat, grain, building wood, cotton, wool, drinks, metals; in the third: coal, manure and fertilizers, stone, minerals, sand, clay, bricks, slates. We see clearly that the classification is based simply

on the value of the materials, that is to say, really on the amount consumers would be willing to pay to have them made available.

[Walras goes on to quote M. Ruolz criticising the system (no reference) and M. Lame-Fleury who argues (in the *Journal des Economistes*, vol. XXXV) that the companies are just legitimately maximising profit. Walras goes on to note that the classes laid down in the fare lists ('cahiers des charges') set a limit on the multiplicity of prices. The next two paragraphs contain further examples of discriminatory pricing. The first enumerates various special rates, for example, for firms who send all their goods by rail; the second observes that lower charges per kilometre for longer journeys are a form of price discrimination, and gives lengthy examples from French and British railways. He goes on to comment on the consequences of differential fares according to distance:]

These differential tariffs, and those for through traffic, which have analogous effects, are the subject of vigorous discussion. People have energetically objected to the trouble caused to industrial and commercial towns by gratuitously reducing or increasing their distance from certain centres of production or consumption of raw materials or manufactures, and it has been questioned whether the companies have the right to so modify the natural conditions of industry or commerce for towns, and if the state should intervene to maintain these conditions. Another objection has been raised as to whether the companies have the right to kill off the canals, and whether the state has the duty to intervene to keep them alive. These confused questions are illuminated by the application of our principles. If industrial or commercial conditions had been altered for the towns, or the existence of the canals jeopardized as a result of the railways' providing transport at cost, that would have simply been an ordinary effect of technical or economic progress, which causes changes all the time. Or if these results came about as a result of railways being run with monopolistic prices by the community or the state with a definite interest in mind, there would only have been a sacrifice of particular interests in favour of the general interest. But when these things happen as a result of monopolistic management by private companies, for the greatest profit of their shareholders, this is something rather strange both to common sense and from a scientific point of view.

4. On the intervention of the state in the railways

The conclusion of the preceding reflections is clear enough: the state must intervene in the railways under two headings: firstly because railways, in so far as they transport goods or services of public interest, are themselves a

public service; secondly because the railways in carrying private goods and services are a natural monopoly, which if a private monopoly would not be based on right or interest, and which therefore must be run as a state economic monopoly. Under this latter heading, railways would have to be run, whether by the state or on its behalf at cost price. But under the first heading, and in view of the special characteristics of railways, this condition must be interpreted much more loosely than it might seem at first sight.

Leave aside for a moment the transport of public goods and services and consider railways as part of the capital stock which goes into the production of private goods and services. As with other capital the yield varies with the place and the time. Just as the draining of a swamp which might not be remunerative in one place at a certain time, would be so elsewhere, near a big town, or later on when population and wealth have increased, so a railway line which could not cover its costs, fixed and variable, at a particular place and time, might be able to do so at a different place, between two industrial and commercial centres, or at a later moment after further economic progress. Thus a country might be able to have four or five railways just covering their costs at one time even if run as monopolies, but some years later the same lines would more than cover costs. In effect the demand curve, which decreases as a function of price,[10] and upon which the whole of monopoly theory rests, is not an invariable curve. And, so, as population and wealth develop, costs fall as fixed costs are spread over a greater number of units supplied and fares which initially only just covered costs, would become more profitable. At the same time as the first lines built earn more than their costs, others will become in a position to just cover theirs. In these conditions the state can manage its monopoly in two ways. It could treat each line independently, only building and running new ones when they seemed likely to cover their own costs, and always reducing fares as they started to bring profits in. Or else, it could treat all the lines as one network, and without reducing prices on the first which more than covered their costs, build and run others not yet able to cover theirs, the profits on the ones covering the losses on the others. It would be like farmers who lose on livestock but gain on crops.

[Walras quotes other examples of cross-subsidisation within firms.]

But all the same, in the second case just as in the first the operation would be in some sense at cost.

The first method would mean cheaper transport but a more slowly developing railway system. The second would mean more costly transport but a faster developing railway system. If one only considered railways as industrial capital providing transport services for merchandise, one would

[10][Walras's diagrams of demand curves had quantity on the vertical axis (P.H.).]

perhaps prefer the first approach. If on the other hand one brings in the public service aspect there is no doubt one would go for the second approach. Let us also note that as railways are a powerful way to open up markets, and so a stimulus to production, they would themselves hasten the progress which would make the unprofitable profitable, and the profitable more profitable. Note also that the profit-maximising price on all lines would be constantly falling as a result of increasing demand.

Such is the choice open if the state runs the railways: cheap transport or a fast-growing network. But what happens if for the sake of free enterprise, the monopoly is left in private hands? The companies would willingly build lines able to cover their costs; but when they could earn more than their costs the companies would neither reduce their prices, nor build and run other unprofitable lines using up the profits on the ones to cover the losses on the others. The country would have expensive transport and see its netowrk expand slowly; this is what is happening in France.

The reasoning above is based on the hypothesis, generally accepted in economics, that private interests are both selfish and clear-sighted. But this hypothesis, we have seen, is not entirely realistic. Private interests are always selfish, but clear-sighted is another matter. Here is a second proof of this taken from the history of railways. It has happened in certain countries, like England and Switzerland, that the success of the first lines built led investors to rush unthinkingly into the industry. Companies whose shares were giving two or three times the normal interest and had in consequence doubled or trebled in value are overloaded with endless branch lines, have favoured others with share subscriptions and interest guarantees, and have thus reduced their own returns to 2 or 3%, causing the value of their shares to fall below par. It seems that thoughtless precipitation by private initiative might have in the end the same results as rational development by the state. But only the frivolous could be indifferent as between a normal and an irregular means of reaching the outcome. In a country where the state had proceeded as we have outlined, there would be no profits or losses for anyone, no trouble, no crises; and the development of railways would go on from day to day. In the countries we have referred to there are profits and losses; profits for those who built the first lines and losses for those who built the last ones; profits for those who sold their shares above par, and losses for those who bought them then and saw their values fall. Along with the speculation came sharp practice. This is not all. One must think of the secondary disorders accompanying the main ones; the bribes paid to obtain concessions; the form of blackmail by which concessionaries for parallel lines had themselves bought out by the existing lines; the fierce and ruinous battles where mergers could not take place. These crises and scandals brought railway investments into disfavour, and they have stopped, perhaps only to resume with the same consequences.

These problems must be treated scientifically. Now, the scientific method in applied political economy is to suppose private interests to be clear-sighted and to say to oneself, when they are at first not, that they will become so with experience. To gamble that they will, exposes one to sure disadvantages in seeking hypothetical advantages. From a scientific point of view one must admit that railways will be built when they are profitable and not otherwise, if they are left purely and simply to private initiative. And so the construction and management of the railways by and for the state as a monopoly has a great advantage over their construction and management by private companies as monopolies, namely that in the first case the progressive success of existing lines assures the construction of new ones, while in the second case success only serves to enrich a class of parasitical speculators whose rewards are out of all proportion to the risks they have run.

The modern school of economists, for whom *laisser faire, laisser passer* expresses the whole of political economy and social science, would not fail to object to construction and management of the railways by the state on the eternal grounds of the supposed incompetence of the state in all business matters. The profits which can be obtained by the shareholders represented by interested and mindful administrators, would not be available to the state represented by uncommitted and negligent officials, it is said. Jobs on the railways would become lucrative sinecures distributed by nepotism and political favouritism. Built and run by such a personnel, the railway lines would cost a lot and bring in nothing. Instead of profits for expansion of the network, the state would make losses that would be a heavy burden on taxpayers.

For our part, we cannot accept this dogmatic attribution of all virtues to the individual and all faults to the state. If it is true that private initiative, stimulated by free competition, can best provide any private services, it is equally true that collective initiative under the control of publicity and discussion, can best provide any public service. If there is a well-informed public opinion, a free and serious press, public offices properly filled and magistrates of integrity, then sound officers, enlightened administrators and skilful engineers often carry out considerable duties for sometimes very modest remuneration. Regard and honour, it must be recognised, are natural incentives to man as well as the desire to earn a lot of money. The state has its role as the individual has his, and one must have confidence in the state within the confines of its responsibilities, as in the individual within his. It is out of place for the state to replace the individual in industrial enterprises; but no less so for the individual to replace the state in public functions. And of course, there is scope not only to draw up the applied theory of state functions, but also to proceed to the practical organisation of the state, so state officials should be people who have taken university courses, undergone

a training period, taken professional examinations, and not be people who made their names as novelists or vaudevillists.

If the railways were exclusively a public service, one would have to hand over the construction and operation to the state without hesitation. But they are a private service at the same time. This might be a reason to turn them over to the companies if competition were possible, but not when monopoly is natural and inevitable. By this fact alone, and *a priori*, the prediliction of economists for private initiative is out of place. And in fact who can we hope to convince that the privileged railway companies are run with intelligence and are not 'rotten little states' as Dupuit privately called them? Who would believe that nepotism and favouritism are unknown there? Who doesn't know how mediocre and small-minded the administration and management is? Paying their staff badly, treating the public as material for exploitation, keeping to the highest tariffs when reductions would be in their own best interests properly appreciated; in short, meanly and casually exploiting a profitable monopoly. 'But, at least,' one hears, 'they do make profits!' Who is to stop the state doing the same?

Everyone knows that the shareholders in railway companies count for nothing, and most of the management for very little, and that most of the running of the enterprise is in the hands of certain directors and heads of department with a particular interest in their success. What is to stop the state using the same people on the same terms with the same results? Suppose the shareholders were bought out, the administrators given leave, and only the operating staff kept on, with the state collecting the dividends, nothing would have changed except the use of these dividends. And even if the state did no better on receipts, and did actually worse on expenditure, there would still be a profit to society. The cost of transport would not be what it should, from the point of view of the consumers or the railways; but on the other hand, we should no longer see pointsmen given a task beyond human capacity for a derisory wage, and the lives of employees and passengers jeopardized and haggled over. In this way the public would still realise the gains now going to the shareholders.

Moreover, there exists a solution to the difficulty here. Let us admit that for railways the private service aspect outweighs the public service aspect, and on this count their management requires the same spirit of greediness needed in agriculture, industrial, commercial and financial businesses, but which is incompatible with the exercise of public functions. There is a way to separate economic from moral monopolies, and to return them to competition: that is to auction off the concessions to run them in the best public interest. What could be more appropriate for the railways? According to whether one wants the enterprise to be run at cost price or at the profit-maximising price, one could ask for bids to be submitted thus: in the first case one would look for the bid representing the lowest proposed fares for

the public, while in the second case one would look for the highest rent offered to the state. The railways, still to be built on the state's account, through debt borrowed and guaranteed by the state, would then be leased to private companies to be run at their own expense. In the system of pricing at cost the rent to be paid would equal the interest on the debt, with the fares being determined by this and the other fixed and variable costs. In the system of profit-maximising prices, fares would be determined by the law of demand, and the state would build all lines for which it could pay the interest. There is every reason to believe that such companies thus restored to the normal conditions of industrial enterprises and effectively subject to free competition would display an activity and intelligence which has so far been shown by neither the companies nor the state.

Certainly this solution would not be without complications and difficulties. If the state owned the operational equipment and materials as well as the track and the buildings, the rent being based on this capital stock, then inspectors would have to check most carefully if the materials and equipment had been maintained according to rules that would have to be very precise and detailed. And if the materials and equipment belonged to the companies, there would have to be very strict rules determining the manner and conditions of any repurchase in the case of nonrenewal of the lease. It will be necessary, after all, to do this when concessions run out, unless one would rather ask the companies if they would not mind remaining in possession of their networks, because the state does not know what to do with them. In reality this solution may be what is in store for us; we must admit we prefer our own solution, with all its complications and difficulties.

It is not science proper, but a more specialised study to go into all the details. Science proper has done its work in a country when it is accepted that sound principles are the basis of successful applications and there is no contradiction between theory and practice, once these principles have been laid down. Now, the principles for the railway industry, are that the rule of *laisser faire, laisser passer* is totally inapplicable. Firstly because the service of transport in the public interest is a public service, and then because transport for private interests is naturally and inevitably a monopoly; and that the railways must be built and run as economic monopolies, whether pricing at cost or for maximum profit, whether by the state itself or on its behalf by concessionary companies. Outside these principles there is only error, confusion and disorder; if proof is needed one only has to look at the history of the railways in the various countries of Europe and the New World.