

OF THE COMPETITION BETWEEN THE RAILWAYS AND WATERWAYS.

P.-J. Proudhon

(1845)

NOTICE.

The articles that you are about to read appeared in the *Journal des Économistes*,¹ which thought it necessary to accompany it with the following reflections :

The question of transport becomes important as civilization advances, as needs multiply, as products increase.

When it came to creating canals, men of the *status quo* asked Brindley what the rivers would be used for: “To feed the canals,” replied this great man.

Today the canals and rivers are revolting against the railways, and writings about them are springing up everywhere on these controversial questions.

The name of Mr. Proudhon, the personal knowledge we have of his sagacity, the novelty of the subject and its importance, have persuaded us to give space in the journal to the article whose title you have just read.

Let us say, however, and without preamble, that we in no way accept the figures on which Mr. Proudhon's reasoning and conclusions are based. To say that a railway cannot make more than three passenger convoys and three goods convoys per day; saying that a machine cannot tow more than twelve or fifteen wagons, are assertions that current facts deny every day and that it is easy for everyone to verify.

In the present state of things, we say, without fear of being contradicted by the facts, that the railways are more perfect means of communication than all the others, and that should be the case. We would not understand why governments encouraged the swallowing up of people's capital in these enterprises if they were to be inferior to some other. We would understand even less these monopolies in their favor, if they were not profitable for all by reducing transport costs.

¹ Issue for May 1845.

But Mr. Proudhon raises a serious question in his article, and this is above all what determined us to accept it, despite the lack of accuracy of some of his figures.

We can summarize Mr. Proudhon's proposal as follows: "If the rivers were monopolized, if the number of carriers was fixed, if in a word the State did for the watercourses what it has done for the railways, the prices of transport could go down indefinitely; they might not exceed, for the Saône for example, 2 1/2 to 3 percent per kilometer and per ton."

This idea of monopolizing rivers and lands is certainly a very new thing, and it deserves to leave the communist domain to be discussed with maturity.

In any case, what Mr. Proudhon says supports what we have declared many times, which is that, in the current state, society has a much more direct action on the railways than on other means of communication. In fact, on the railways, everything is planned; everything is fixed. The maximum price is designated: there would be extortion if it was exceeded. Maintenance costs are the responsibility of the company.

On the roads, the canals, the rivers, on the contrary, the State's role is complete; then it has delivered the instrument to everyone, to competition, to the monopoly of rich associations. When the instrument deteriorates, the State restores it, the public is not *protected* by it against abuses. Will we say that on the roads at least everyone can establish themselves? Well! It is the same for a railway. There is in all the specifications an article that allows any person to circulate a locomotive on the track; prices are fixed in advance. The right exists.

Moreover, Mr. Proudhon, if he does not know the railways, if he cannot know at what price transport can be made there, seems, on the contrary, to know the waterway industry thoroughly. His article will therefore be fruitfully consulted. We only wanted to warn the reader against his conclusions.

H. DUSSARD.

I thank Mr. Dussard for the impartiality he has shown in welcoming an article whose several insights were perhaps outside the habits of his editorial staff. I am especially grateful to him for having recognized that the idea of involving the State in water transport *deserved to be discussed*. But I must protest against the sort of blame that he casts on all of my considerations by denouncing to the reader *the lack of accuracy of some of my figures*.

I know that a double-track railway could send out every half hour, with two or three locomotives, convoys of 60 to 90 wagons, or 180,000 and 227,000 kilograms per convoy,

and 4 to 5,000 tons per day, a tenth of what the Alsace railway transports in a year. But if I had reasoned about such a *possibility*, I should have added that on the Saône, for example, we could only send upstream, every half hour, one tugboat loaded with 1,000 tons, or 20 to 30,000 tons of shipments per day, also a tenth of what is transported on the Saône in a year. As for the descent, the transportable quantity would have no limits, since the boats could make the chain from Saint-Jean-de-Losne to Lyon and row down in forty-eight hours, and the daily arrivals could rise at 400 million kilograms.

I was therefore forced to establish my comparison based on known facts and by confining myself to *practice*. Now is it true, yes or no, that railway fares throughout Europe generally rise for travelers from 5 to 8 centimes per head and kilometer, and for goods from 9 to 25 centimes per ton and kilometer? Is it true that, based on the experience of 866 kilometers of railways built in France, that the average establishment costs are 300,000 francs per kilometer? I could multiply these questions indefinitely; but that would be repeating what I said in my brief. So, when I spoke of convoys of 15 wagons, of 6 departures per day, and even of 25 kilometers traveled per hour, instead of 50 or more that locomotives can cover, I alluded to well-known facts, which did not prevent me, when I wanted to establish a serious comparison, from admitting the hypothesis of 30 wagons per convoy, twelve departures per day and a speed of 40 kilometers per hour. Whatever anyone says, I am right, and all the more so as I get closer to practice, which is synonymous with reality.

I admit that railways are means of communication *more perfect than all others*, but on condition that they become *profitable to all by reducing transport costs*. I therefore asked whether, in practice, the market price of transport by rail could fall to 2, 3 and 4 centimes per ton and kilometer, as it is possible to obtain immediately by water? If the answer is yes, then how can we justify tariffs of 16 and 18 cents?

We take advantage of the *encouragement* granted by those in power to railway companies. On the contrary, it seemed to me, and I cited evidence, that the authorities showed even more distrust in this regard.

They say: "According to the specifications, the route is free on the railways; anyone can launch a locomotive there. Therefore, the course of the rivers must also remain free." I answer that if, as far as the railway is concerned, freedom is in the *law*, the monopoly is the *fact*: not everyone has 100,000 francs to spend on a locomotive and its wagons. Now I say that it is the same for the river: not everyone is allowed to go to Le Creusot to command a tugboat. Against the monopoly of high industry, consumers therefore only have the protection of the State, and if my project to lease the Saône is not exempt from

reproach, it cannot be denied that I had the right to raise this question: "How, in matters of transport, will general interests be guaranteed against monopoly?"

Moreover, and to confine myself to the general question, if it is true that rail traffic is at its dawn, it is just as certain for me that inland navigation is still in its infancy, and all that I wanted to do was to draw public attention to a competition that cannot take long to break out between the two most powerful industries that civilization has invented. It will be a battle of giants. It is important that the guardians of the people are informed of this.

P.-J. PROUDHON.

OF THE COMPETITION

BETWEEN

THE RAILWAYS AND THE WATERWAYS

Question proposed by the Académie de Lyon. — The Saône, the Rhône, the canals. — The railways. — Impossibility for the railway from Châlons to Avignon to survive alongside the waterway. — Free travel: problem of political economy. — Physiognomy of the railway: response to the Academy of Lyon. Competition: organizational plan: 140 million savings.

The line from Paris to Marseille will not be interrupted between Châlons-sur-Saône and Avignon, this is a point that has been resolved: perhaps even within two years this part of the railway will be completed. To enlighten the power, if there remained any truth to teach it, it would now be too late; and there is also hardly any point in indulging in conjectures. Ignorance has spoken; the government proposed; the House voted; the good and the bad that must happen will happen; we just have to wait for it in all tranquility and resignation.

So I would have been careful not to return to an exhausted text, if the Academy of Lyon, — in its civic pride or in its concern?... — had not launched into the public this double-sided question: *What are the advantages and the inconveniences that may result for the city of Lyon from the establishment of the railways?* The honorable company does not find that everything is rosy in what brings joy to MM. Fulchiron, Terme, Sauzet and Lamartine; it believes in *disadvantages* as well as *advantages*; instead of offering an ode to celebrate the greatest marvel of the nineteenth century, it asks coldly and prosaically what the old city of Lyon, once the queen of the commission and the warehouse, can hope or fear from the new carriage. Lyon, by the Rhône and the Saône, was one of the centers of European commerce; Lyon, by rail, would never have been anything other than the equal

of Bourg-en-Bresse or Rive-de-Gier: we can imagine that an Academy wonders what, with such an instrument of communication, it can produce in fortunate or subversive results for a city whose river navigation has always founded its existence and prosperity.

Since, therefore, by the irrevocable decision of the legislative power, the extension of the railway from Châlons to Avignon can be considered accomplished, since the actions are already on the rise, and all we are waiting for is the award order to put our hands to work, since it is no longer a question of flattering selfish interests or indiscreet hopes, we will explain the fact as if it were already history; we will study it with all the impartiality of experience; and, always reasoning on authentic evaluations, and according to the irrefragable principles of science, we will try to formulate our judgment in such a way that if the event were to contradict it, the error would not be attributable to us, but to the ignorance in which we would have involuntarily remained of some element of the problem.

Certainly, it is not my intention to oppose railways, any more than to extol the advantages of navigation: I believe, depending on circumstances and places, in the usefulness of one, and to the necessity of the others, and do not intend to sacrifice any system. The question that I am dealing with, general in terms of principles, is very specific, very local in terms of subject matter; it is, if I dare say so, in the perspective of an almost unexampled rivalry, a monograph of the Lyon region and its outcomes. I am seeking, in a word, not which is better, for an abstract society, to dig canals or to lay down rails; but what, according to the known operating elements, and in the given case, will result, for Lyon and the valley of the Saône and the Rhône, from the competition of a railway and a waterway.

STATE OF INLAND NAVIGATION: THE SAÔNE, — THE RHÔNE, — THE CANALS.

To properly judge the Saône, we must see it not as it was *fifty years ago*, as Mr. de Lamartine said in the Chamber of Deputies, pleading for the railway, but as it is today, as it will be in ten years, if the government continues to provide the gentlemen of bridges and roads with the means to continue their work, and, we can say with regard to this river, their successes .

The *Journal des Débats* said, in its issue of June 15, 1844, that hauling entrepreneurs did not have to worry about the new railway, that the railway like the Saône would have its specialty, and that there would be loads for everyone. The steamboats are very grateful to the conservative paper for its concern, but either I am very wrong or there is less question of knowing whether the goods and the travelers will desert the Saône, or whether

the railway will transport most of the time something other than its inspectors and its wagons. Because, according to all the information that I have been able to obtain, the prosperity of the railway from Châlons-sur-Saône to Lyon would be based on a hypothesis of which nothing, either in the alleged insufficiency of the waterway, or in industrial progress, or in the railway economy, guarantees the achievement.

The costs of transporting coal, by steam hauling and back, are established as follows:

Expenses of tug transport.

1 boss, 4 sailors, 1 mechanic, 4 drivers and 1 cabin boy, per me, 1,510 francs. The route of the tugboat between Lyon and Verdun being 173 kilometers, the number of trips per year 50, and per month 5, each trip costs in personnel costs: 302 fr.

Fuel. The average duration of work per trip of the tug is 90 hours: the force of the machine, low pressure, being 60 horsepower, at 5 kilos of coal per hour and horse power, and the price of coal, ordinary quality, of 2 fr. 60c. the metric quintal, we find for fuel costs: 675

	To transfer	977 fr.
Oil, tallow and cotton.		80
Interest on the tugboat, 120,000 fr. 5%. per year	6,000	
Depreciation of the tugboat, 120,000 fr. 8% per year	10,000	
Maintenance and repairs	4,000	
	Total 20,000	
Per trip		400
Horse backups in Saint-Bernard		400
Ropes and unforeseen costs		250
Rent of boats used for transport, loading time included		180
	Total costs per trip	2,287 fr.

The average load per trip being 650 tonnes,² and the distance being 173 kilometers, the cost price of traction is 0 fr. 02 c. 2 per ton and kilometer. By adding navigation rights,

² This assessment is too low. During the months of April and May that have just passed, the tugboat *Dragon*, with a force of 60 to 70 horsepower, constantly moved convoys of 1,000 to 1,200 tons from Lyon to Verdun, every five days.

which are on the Saône of 1 c. 5 per ton and myriameter, and as much for management and paperwork costs, we arrive at a total of 2 c. 5.

The goods require more care and pay a higher duty: by raising the price of their transport to 3 cents, we are sure to exceed the real cost price.

In the campaign of 1844, we saw hauling entrepreneurs transporting coal, from Lyon to Saint-Jeande-Losnes (214 kilometers), at a price of 4 fr. per ton, or about 1 c. 8 per ton and kilometer. Certainly I will not take advantage of this price, a temporary effect of competition from entrepreneurs, or rather of the shortage of transport. In the spirit of anarchy in which the carriage industry finds itself today, like so many others, the price of 1 c. 8 per ton and kilometer must have left little profit. But, since the inauguration among us of the railways the general tendency has been towards centralization, and, to use a term now used, towards the organization of labor, who knows if the government, intervening as agent of association and of mutual guarantee in transport, could not definitively fix them on the Saône at 2 cents, per ton and kilometer?

I ask the regular readers of the *Revue* not to be alarmed if I sometimes present to them considerations imbued with some socialism. I know what they can bear, and will not burden them. But they must not lose sight of two things: one, that the opinion of the majority persists in attributing to the State the execution and operation of the railways; the other, that this idea of the *republicanization*, if I dare say so, of an industry, an idea born in all minds with regard to railways, which has been pointed out alternately with applause and with suspicion by skillful economists, could very well extend and will probably extend sooner or later to canals and hauling.

It is therefore not a question here of communism, but only of guarantee and association, so that if the State declines the role of conciliator that is assigned to it by force of circumstances, conciliation will take place immediately by itself. And how? Through competition. Indeed, one of the properties of competition is, in certain cases, to reduce indefinitely the general costs of production, either by monopolizing orders, or, what amounts to the same thing for commercial results, by merging antagonistic interests: the splendor of commerce, especially in Lyon, abounds in examples of this nature. It is true that private industry still only knows how to produce, through competition, instead of cheapness, monopoly, instead of permanent associations profitable to all, only temporary coalitions; and this is why the development of private industry is only ever the harbinger of a rout. But is it not possible that in the presence of the railway, an association of water carriers would come, with a guaranteed rate for five, ten or fifteen years, defeat the new administration from the outset? We will see that they would not lack the elements necessary for success.

We found that the cost prices for the hauler from Lyon to Châlons-sur-Saône, goods received and delivered by boat, today 2 to 3 cents, can go even lower, to 2 cents. per ton and kilometer. Whatever happens to this forecast, which it would be easy for me to justify, as it is indifferent for the hauler to transport goods or coal, insurance, unloading, trucking, the profit of the entrepreneur counting in addition, and as we have established our account on a length 27 kilometers greater than that of Lyon to Châlons-sur-Saône, where the tugs leave in passing the portion of their convoy destined for this city, we can boldly set the normal price of transport by the Saône at 2 c. 5 per ton and kilometer.

Let us rectify in passing an error made by the Châlons Chamber of Commerce. In its table comparing current transport prices with those of the tariff planned for the railway, this Chamber puts it at 14 francs per ton the transport of rolling goods; then it adds that in this price it does not include *the costs of loading, unloading, trucking, commission, etc., which are approximately equal in the two modes of transport.*

The Châlons Chamber of Commerce, or rather the writer of its address to the minister, is wrong: the price of 14 fr. (10 cents per ton or kilometer) is, or better said was precisely the trade price, including trucking, loading and unloading, commission, bonuses, discounts, etc., etc. Too much passion spoils the best causes: why would the Châlonnais reject the extension of the railway laterally to the Saône, if according to their admission the current price of transport was 10 c. per ton and per kilometer, that is to say just the one at which we can hope to see the railways descend?

The price of the carriage itself, including the navigation fee, is as we found it, 2c. 5: the surplus is used to cover the salaries of crocheters, truckers and clerks, plus competition and stock trading for masters. We also see the price of a carriage between Lyon and Châlons rising to 20 and 22 francs. per ton: but it would be as unfair to accuse the Saône of this as to reproach, for example, the railway from Saint-Étienne to Lyon for being listed by its administration at 58 kilometers of route, while it does not really only has 56.

The Châlons Chamber of Commerce, after having said that the descent is carried out by ordinary shipping at an average price of 3 fr. per ton (2 c. 1 per ton and kilometer), falls back into its first fault with regard to the steam hauler. "The descending journey," she said, "is done by steam gondolas *at the same price as the ascent.*"

This assertion is as imprecise as the previous one and doubly false, first in that it confuses the incidental costs and the commission agent's levies with the price of the carriage; then, in that it supposes that the descent by steam costs as much as the ascent. Now, this last proposition is not more true than the other; steam gondolas only cost 3 francs per ton for the descent from Châlons, like the ordinary navy: and I am sure that, due to the almost permanent shortage of work in which the navy finds itself, or if you

prefer, by the overabundance of means, the entrepreneurs would gladly take charge of the descent at 2 Fr. 50, save the guarantee of supplies.

Despite the opposition of the public and the Châlonnais newspapers to the Saône lateral railway project, it is believed that, the spirit of monopoly and local interest driving them much more than the good of the State, they did not dare to present the facts in all their accuracy; that, by promoting the cheapness of transport by river, they feared, by showing too much frankness, to pull the rug out from under their feet, as they say; and that they fought for their gods and their homes much more than for treasure. We will still have other opportunities to appreciate the insincerity, very excusable indeed, of people of commerce and industry towards the State, as soon as they believe their interests are compromised.

PASSENGER TRANSPORT

From Châlons to Lyon the price of the railway being, by hypothesis, fixed at 8 c. per person and kilometer, the Châlons Chamber of Commerce immediately noted a difference of 3 fr. 25 c. in favor of steam liners throughout the journey: it also observes that on these boats travelers' luggage is received free of charge.

The Châlons Chamber of Commerce, in making this calculation, treated the passenger boat companies as it had previously treated the commission agents; out of respect for established positions, it presented an exorbitant figure as normal. But why do we need the owner of the *Hirondelle* to earn 160 thousand francs per year in perpetuity? The Châlons Chamber of Commerce reasons here on the hypothesis of prices at 6 and 8 francs per person; we who aim at the best market for the general interest; we who, in determining the lowest possible cost price, seek not the ruin or exclusion of anyone, but knowledge of all eventualities, we cannot accept the accounts of the Chalonaise Chamber of Commerce.

During these last years, the price of places on steamboats has risen, as we have just said, for the distance from Châlons to Lyon and vice versa, from 6 to 8 francs per person. For more than ten months it has been 1 fr. and 2 fr. And note that this price of 1 fr. and 2 fr. is not the effect of competition from a railway, it is the result of competition BETWEEN steamboats. We therefore have to ask ourselves if the prices of 1 and 2 fr. could be maintained, and under what conditions: in other words, we have to ask ourselves what is the cost-price of transport by current services.

The staff of a passenger boat is made up of 1 captain, 1 skipper, 3 boatmen, 1 cabin boy, 1 mechanic, 3 drivers, whose monthly salaries make up the total sum of 1,340 francs. —

Add 220 fr. for pontooners, sweeps and barkers (this last function, like the multiplication of pontooners, is a special effect of competition),

Total 1,360 fr., and per day:	52 fr.
Interest, depreciation and maintenance of the boat, 20,000 fr. per year, per day:	55
Fuel: 5 kilos. per hour and horsepower; machine power 60 horsepower, average working time, eight hours; coal at 3 fr. 50 c. per 100 kilos:	84
Oil, tallow and cotton	20
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Total costs per trip	211 fr.

Thus the costs of a passenger boat capable of transporting 500 people can be broadly estimated at 211 francs. per day. Allowing for 40 days of interruption per year for repairs and other unforeseen cases, an average of 220 travelers per day, at 1 franc, would be enough to maintain the balance between expenses and revenues. But at prices of 1 and 2 francs, we can count on at least a third of travelers for the former; it is therefore 75 fr. per trip, and at the end of the year 24,275 fr. of net profit, which, added to the interest on capital, would form an investment of funds at 25 percent.

However, it is certain that the circulation of passengers traveling the entire line from Châlons to Lyon and *vice versa* is more than 500 people per day; it is therefore not for lack of supply if, at prices of 1 and 2 fr. per person, steamboats do not make money; the fault lies rather in their too large number, a circumstance that it is again absurd to blame on the Saône.

If the government, finally giving in to the increasingly strong demands of public opinion, intervened in any way, I will not say against competition, but against the abuses of the carriage industry, it is clear that the prices of returns from the Saône being reduced to their weakest expression, with four departures per day that would serve as much as the seven or so with which we are fatigued, and a material of 5 boats, including one as a spare, the price of the places could be fixed in a definitive way at 2 fr. 50 for the first, 1 fr. 50 for the second, and leave a large profit to entrepreneurs or farmers. But the government, which has its traditions and its maxims, has not yet become a supporter of public order thus understood; it would consider anyone who proposed such an intervention to it as an adversary. The government protects on principle people who ruin themselves by ruining others; not understanding that it is a past term in which competition, instead of progress and good market, only produces dearness or ruin, it makes its wisdom consist in not intervening in any way in matters of commerce and industry: thus thought Necker, Turgot, Colbert, Sully, and all the statesmen of the old regime; so desire MM. Duchâtel,

Guizot, Thiers, Molé and all the illustrations of the new, who surely no longer have the same reasons.

On the side of the power therefore, we have nothing to expect any time soon.

But, with the railway arriving, is it not possible that the passenger boat companies, whose prices of 1 fr. 50 and 2 fr. 50 promised a net profit of more than 200,000 francs, to share with each other every year, will come together suddenly and do in their own interest what the government cannot bring itself to do in ours? The railway speculators must have foreseen this situation, and planned accordingly. Now, I say that this is precisely what will happen; I say that the passenger boat services will arrange to make money, even at the price of 1 and 2 francs per person, as long as competition forces them to do so; and my conviction in this regard is such that I suspect the government, in its wisdom full of prejudices, of having designed, created in favor of the public, at the expense of idle capital, and against the competition of water carriers, an instrument of guarantee and stability for transport.

In summary, the cost price of transport from Lyon to Châlons for coal and goods, boarding and disembarking not included, varies, today from 2 to 3 c. per ton and kilometer, and can go down to 2; — for travelers, it would be, with eight departures, 1 c. at most, and with four of 0 c. 5 per person and kilometer.

Now let's take a look at the subsequent navigation.

From Saint-Jean-de-Losne, grains and flours shipped via the Burgundy Canal go down to Lyon at the current price of 1 fr. the 125-kilo bag, all costs included, minus the unloading, which usually remains the responsibility of the baker. From Dijon, the transport of the same foodstuffs varies from 1 fr. 25 to 1 fr. 40; and on this price there is 10 c. rights for 29 kilometers of canal, which leaves the same proportion remaining. Let us suppose that the railway fixes its rate, for goods of this class, at 12c. (the price of the railway from Paris to Lyon, recently announced by the newspapers, brings the transport of this class of goods to 26 cents per ton and kilometer); the difference, for flour from Troyes sent to Lyon, would be 54 fr. per ton in favor of navigation, the price of carriage by the canal, with the reduction in the tariff, being at most 4 c. Now, as Adam Smith demonstrated, the merchant must cover not only his advance, but also the interest of this advance and the trouble he has taken to make it; the additional 54 fr. for transport costs would immediately translate into an increase of 10 cents per kilogram on the price of bread in Lyon. We know how delicate questions of subsistence are. Would the railway only have the effect of making life more expensive for the workers of Lyon? Certainly this is not how Mr. de Lamartine understands it.

Everyone knows that the government intends to buy back the shares of the canals, and to significantly reduce, if not completely abolish, as Mr. Humann thought, the rights of inland navigation. If this important financial measure were finally adopted, here is a preview of what would happen.

On the Burgundy Canal, pulling a boat from Saint-Jean-de-Losne to La Roche (24 km) is commonly done by men at the invariable price of 150 francs, which gives 51 thousandths per ton and kilometer. The navigation fee for wines, flours, etc., is 4 c. per ton and kilometer, Eight Times greater than the traction price. Today the average merchant price of the wine car from Mâcon to Bercy (57 (1 kilometer) is 7 francs 50 to 8 francs per piece, around 30 francs per ton. If the canal rights, after the repurchase of shares, were reduced by only three quarters, a saving of 1.90 francs per piece, or 7.60 francs per ton, would be made, and the transport from Mâcon to Bercy by the Saône, the canal, the Yonne and the Seine, would only cost commerce 4 cents per ton and kilometer. A similar result, which does not prevent the construction of railways where this execution is deemed necessary, must be desired by everyone, by the Parisians and the Mâconnais, by the residents of the Seine and the Yonne as much as by those of the Saône; and we will see that the city of Lyon is no less interested in it. The railway alone would perhaps gain nothing from it.

On the Rhône-Rhine canal we observe similar facts. The coal from the Loire that is consumed today in Mulhouse costs in transport, from the Perrache station (440 kilometers), according to the auction that was made in September 1844, all costs included, 1 fr . 40 per hectoliter, in other words 16 fr. 80 per ton, or 3 c. 8 per ton and kilometer. This sum includes the navigation rights on the canal, which are 9 c. 9 per ton and myriameter, would reduce, by their reduction to the rate of Saône duties (1 c. 5), the transport of coal to 2 c. 9, and, with the promised improvements for the Saône, the canal and the crossing of Lyon, at 2 c. 5.

The transport of goods for the same destination, according to the rates of various navigation services for the year 1844, costs approximately double, 32 to 36 francs per ton, trade price. But if we consider that the navigation rights, included in this figure of 32 to 36 francs, rise from 8 to 12 francs. 50 per ton for the entire distance from Lyon to Mulhouse; that it is up to the government to abolish them, then, by creating a lateral railway to the Rhône-Rhine canal, to force the valets to reduce their costs by concerting their efforts, as is on the eve of occurring for the transport of passengers on the Saône; finally if we take into account the other causes of reduction, we will agree that the price of 32 to 36 fr. is not the last word of the navigators, and that we can expect to see it fall to

20 or 24 fr., or 4 c. 5 per ton and kilometer, goods taken from store and delivered to port. — All entrepreneurs in navigation agree that this figure will soon be achievable.

On the Center Canal, the transport of coal is carried out at the current price of 20 c. the 100 kilos from the Blanzey mine to Châlons, all costs included, so approximately 3 c. 4 per ton and kilometer.

These are, in relation to the transport trade by the Saône and the canals that branch into it, the main facts that we had to collect in order to explain our judgment on the consequences that the establishment of the transport routes may have for the city of Lyon. In vain we make the eyes shine with fabulous celerity; nine-tenths of the materials transported cannot bear great costs and, for them, the regularity of arrivals is incomparably more essential than velocity. The whole philosophy of freight transport is in the intelligent compensation of these three things, which I state here in the order of their importance, price, accuracy, time. This is what I will strive to bring out in an increasingly vivid manner.

The railway project adopted by the Chamber of Deputies in the 1844 session, which should connect Paris to the Mediterranean, not only does not stop at Châlons-sur-Saône, it must also extend from Lyon to Avignon; then, by a branch from Dijon to Mulhouse, join the main line from Paris to Strasbourg; so that, from the Mediterranean to the Rhine, the railway will be, at all points, lateral and almost contiguous to the waterway. The most beautiful speeches have been given on this way of improving the waterways and making navigation more flourishing, on the immense advantage that Beaucaire, Lyon, Châlons, the whole of France, but above all the populations living on inland navigation and shipping. In the enthusiasm in which we have indulged ourselves, we went so far as to claim that this rivalry between the various modes of communication would increase transport tenfold, and would support and improve the canal and railway systems together. From a few particular examples we have made general theories, and from the general we have arrived straight away at the absolute. Looking at certain relationships, it seems that as soon as the railway network is completed, the French territory will have 300 million inhabitants.

Amidst this hubbub of hyperbole, let us try to maintain our composure.

There are currently six large farms on the Rhône: MM. Bonnardel brothers and Four, Compagnies des Papin, des Aigles, des Sirius, Générale, and Nouvelle Compagnie méridionale. These combined services have equipment of 32 steamboats with a capacity of 60 to 200 horsepower. Four boats currently under construction will form, added to the first, a total of 39 steam liners serving the entire Rhône line from Lyon to Avignon,

Beaucaire and Arles, and representing, with accessory equipment, a capital of nearly ten million.

It should be noted that the four liners currently under construction, which will each have a capacity of 200 horses, have been ordered from Le Creuzot since the railway from Lyon to Avignon was mentioned: which proves, either that the owning company does not fear competition from the railway, or that it thinks with so many others that the railway will double the quantity of transport. Anyway, let's give a general idea of the navigation of the Rhône.

First, unlike what happens on the Saône, the transport of passengers and goods is done, on the Rhône, by the same boats: hauling is zero. The basis of the loadings, the main object of speculation, is in the merchandise. The number of passengers, both going down and coming up, transported by steamboats, does not exceed an average of 300 per day.

From Lyon to Beaucaire, Avignon and Arles, the average journey time is 11 hours, and from the latter cities to Lyon, 32 hours.

The price of transport, which is the same for going up and down, falls, when there is competition, to 2 francs and 4 fr. per person, and 1 fr. 50 per 100 kilograms of merchandise; — when there is a coalition, it amounts to 15 and 20 francs per person, and 3 fr. 50 and 4 fr. per 100 kilograms.

Between these extremes, what is the normal price or cost price? Because, according to the same considerations that we developed above for the Saône, thanks also to the religious impassivity of power in the face of commercial struggles, thanks above all to the wisdom of the Chambers that buy at the price of hundreds of millions a reduction that they could obtain by a single act of their legislative will, we are almost certain that the main effect of the railway from Lyon to Avignon will be, like that of the railway from Lyon to Châlons-sur-Saône, to set the price of transport of passengers and goods at the normal price of navigation.

Boat staff: 1 captain, skipper, 1 mechanic, 4 boatmen, 4 drivers and 1 cabin boy, 1,730 francs per month, per trip:		290 fr.
Fuel: machine power, 120 horsepower, travel time, round trip, 50 hours; — at 6 kilos. per hour and horse strength; coal at 3 fr. per 100 kilograms:		1,080
Oil, tallow and ropes		150
Annual repairs:	8,000	
Capital interest 5 p. 100:	9,000	
Depreciation, 10 p. 100:	18,000	
General house expenses, 60,000 fr. per year, per boat:	10,000	
Damage, accidents and insurance, per year 30,000 francs. per boat:	5,000	
	50,000	
Total per year:		
Per trip, a 55 trips per year		900
		2,420 fr.
Total travel expenses:		2,420 fr.
This sum, spread over 170,000 kilos of goods, including 40,000 for the descent, and 130,000 for the ascent, gives per 100 kilo:		1 fr. 42 c.
Boarding and navigation rights:		1 fr. 25 c.
		1 fr. 67 c.
Total of the first returns per 100 kilos:		1 fr. 67 c.
For a boat of 200 horsepower, such as the <i>Mississippi</i> and the <i>Missouri</i> , belonging to Messrs. Bonnardel, and Talabut to the New Southern Company, add to the account on the other hand, here:		2,420 fr.
Coal, 80 horsepower:		720
Depreciation:		100
A man:		30
Miscellaneous disbursements:		50
	Total	3,320 fr.

A boat with the power of 200 horsepower will sail on average 1,000,000 kilometers. and will bring up 200,000, i.e. per 100 kilos 110 fr., and adding 25 c. for boarding and

navigation rights, 1 fr. 35.³ The distance from Lyon to Beaucaire being 250 kilometers, the cost price, broadly estimated, of the transport of goods would therefore be, per 120-horsepower boat, 6 c. 68, and by boat of 200 horses 5 c. 4 per ton per kilometer.

So assuming:

1. That the Rhône navigation services, acting in the general interest as much as in their own, instead of entering into fruitless competition, form a capital association, or just consult, according to a proportional reason which would be to be determined, their respective departures;

2. That with a view to facilitating this agreement and ensuring to the public the advantages that would infallibly result from it, the government grants to the established services the privilege of steam navigation on the Rhône for a time that the law would fix (and why not would it not make such a concession, always modifiable and renewable, as good and even better than that of a railway?) under the express condition that the rate of the concessionaires would be fixed at 7 c. per ton and kilometer during the first lease, and 3 to 4 fr. per person for the distance from Lyon to Beaucaire, and *vice versa*;

The combined Rhône navigation services would have to share each year: 1. on the transport of passengers, a tenth for the tax deducted, a minimum of 345,600 francs, gross product which, not having been included in the calculation of the cost price, happens to be entirely net product; — 2. on the transport of goods, landing and trucking not included, 7,480 francs, net product per boat of the force of 120 horses, 66,060 fr. per boat of 200 horses, and, assuming that their work is sufficient to constantly occupy two thirds of the equipment, a total sum of 7 to 800,000 fr.

But we have not taken into account the savings to be made on the general costs of buildings, material, repairs, insurance, depreciation, all of which, in the system of competition, increase, not because of the work to be done, but because of the capital involved and the risks incurred; savings that, without the slightest doubt, would increase the association's profits by half. Now, would a company that thus works under the protection of the State, and which by virtue of its privilege derives a normal interest of 10 to 12 percent from its capital, have any reason to complain? And would the public, who would be made to travel 60 leagues in one day for the sum of 3 francs, think that they were wronged? Let us therefore recognize it: if we do not have cheap transport from the Mediterranean to the Rhine, and if at the same time the entrepreneurs of this transport do

³ The entrepreneurs of the Rhône already admit that they can transport goods at a price of 75 cents. the 100 kilos. for the descent and 2 fr. for the ascent; which gives an overall average of 1 fr. 58 tbsp.

not all become rich, it is because the government does not want it. Let perish the nation rather than the principle of competition! It is the cry of furious agiotage; it is the refrain of our too good-natured ministers; it is the illusion of modern monarchies; but it is certainly not an aphorism of political economy.

Goods sent from Marseille to the Rhône take the sea route on lighter boats pushed by the wind or towed by steamboats, and enter the Rhône as far as Arles, where they are transferred into the liners of the Lyon companies. I find, from the price of a service from Lyon, that the difference in transport prices from Marseille to Lyon on that of Beaucairc is 50 c. per 100 kilos; so that the total transport costs from Marseille to Lyon (343 kilometers by the Avignon railway), loading, transfer and navigation rights included, would amount to 5 c. 30 to 6 t. 30, average 5 t. 80, per ton and kilometer.

When the railway from Avignon to Marseille is completed, part of the goods shipped today by water, and all of those entrusted to haulage, will follow the locomotive and will come to embark in Avignon, up to the day when the creation of a new railway line from the latter city to Lyon will allow them to run on the railway without breaking load to Le Havre.

We will say nothing about the navigation of the upper Rhône, a perilous navigation, interrupted at every moment, and also poorly supplied, except for the asphalts of Seyssel and the sick who, during the summer, go to the waters of Aix, but are hardly profitable. If it is true, as some claim, that the particular virtue of railways is to create transport, to give rise to exchanges and to excite a lively circulation of men and goods where previously only weak relations of commerce and industry existed, my opinion is that we must hasten to build a railway from Lyon to Geneva, with branches to Annecy, Belley, Chambéry and Mont-Blanc. Currently, the number of stagecoaches leaving each day from Lyon for Switzerland, and *vice versa*, is four, which barely supposes a daily circulation of fifty people between the two countries: it is time for a railway to come and, by the ardor of its locomotives, put an end to this lethargy. I only urge the French capitalists to come to an agreement with the Swiss and Savoyard governments, in order to obtain good concessions, good subsidies and long-term privileges for the completion of this line.

In summary, this is the future of water transport from the Mediterranean to the Rhine, as long as the government takes care of this navigation:

Travelers:

From Lyon to Châlons, 130 kilometers (distance from the river compared to that of the railway), 1 fr. 50 and 2 fr. 50 per person;

From Lyon to Beaucairc, 250 kilometers, 3 fr. and 4 fr.

Total from Châlons to Beaucairc, 380 kilometers, 4 fr. 50 and 6 fr. 50, or on average 1 cent, per i kilometer.

Goods :

From Marseille to Lyon	383 km.	6 cents.
From Lyon to Mulhouse	440	4
From Mulhouse to Strasbourg	100	3

Average for the entire distance from Marseille to Strasbourg, reduced to that of the road, which I suppose to have been at least equaled by the railways (793 kilometers), 4 cents 2.

From Lyon to Saint-Jean-de-Losne	216 kilometres.	2 cents. S.
From Saint-Jean-de-Losne to Bercy	441	4

Average for the entire distance from Lyon to Paris, compared to that of the railway (515 kilometers), 4 c. 4.

RAILROADS

Mr. Edmond Teisserenc, in the comparative table he published of railways and waterways, summarizes his opinion on these two modes of transport as follows:

Cost price with full load, per ton and kilometer.

Accelerated canal shipping	1 cent. $\frac{2}{3}$
Railways	1 $\frac{1}{3}$
Average market price:	
Inland navigation;	12
Railways	12

Whereupon Mr. Teisserenc makes this observation:

The difference between the cost price and the market price comes from the fact that departures are rarely made at full load and returns are too often empty; that the forwarding agents or the concessionaires of communication routes who act as them guarantee the conservation of the goods handed over to them, that they have personnel costs, correspondence costs, high rents to pay, that finally they pay toll fees on the roads that are encumbered by them.

I declare, for my part, that after reading Mr. Teisserenc's observation, his figures seem as incomprehensible to me as before. I ask every man of common sense: What is a cost price in which we have not taken into account the inequalities of loading, personnel,

house rent, office costs, insurance, tolls, and I don't know how many other things; a cost price that only expresses the smallest part of the cost price?

When I affirm that from Lyon to Saint-Jean-de-Losne, over a journey of 316 kilometers, the cost price of transport is less than 2c., goods received and delivered by boat, I am affirming a reasonable thing, and not a disappointing particularity, because I included in my figure all the costs that Mr. Teisserenc speaks of in his observation, and which he rejects from the cost price; and when I add that the average market price, except certain monopolies, does not exceed 3 cents, I say something of which I am sure, and which I defy anyone to deny, having myself manipulated and fiddled, God forgive me, these transports.

When I claim that the transport of travelers could very well be carried out from Lyon to Châlons at the price of 1 fr. 50 c. and even 1 fr. per person, and with profit, I prove what I put forward by breaking down the price, and I indicate to the reader the means of ensuring the truth of my calculation. Let him find out, from the captain of the *Hirondelle*, for example, if, when he has 400 travelers at 1 and 2 francs, he has not made a good profit.

When I then say that transport by water from Marseille to Beaucaire costs 5 fr. per ton, average market price, which makes 4 c. 8 per ton and kilometer, distance compared to that of the road, I am not implying anything and am not being equivocal, since I am speaking according to the circulars from the houses of Lyon.

When finally I calculate at 6 c. per ton and kilometer the price at which it would be easy to set transport from Marseille to Lyon, *house and disembarkation costs included*, I provide all the elements of my calculation, and am not afraid that I deviate from the truth of more than one or two thousandths of a franc.

Mr. Teisserenc, on the contrary: the cost price of accelerated shipping is 1 c. $\frac{2}{3}$, to which other incidental and INEVITABLE costs will have to be added. What, once again, is Mr. Teisserenc's cost price?

Let us also note the layout of Mr. Teisserenc's table:

<i>Cost price:</i>	Inland navigation,	1 cent $\frac{2}{3}$
	Railway,	1 $\frac{1}{3}$
<i>Retail price:</i>	Boats,	12
	Railway,	12

According to this, a man who reasons cannot fail to say to himself:

The cost price of a railway is to that of shipping as 4 is to 5; difference in favor of the railway, 1 fifth.

The market price of the railway is equal to that of the inland waterway; difference in favor of the railway, speed.

What adds to the cost of both systems is staff, rent, paperwork, insurance, loading and unloading, etc. Now, it is believed that the administration of a railway can achieve more savings on its general costs than the anarchy of inland navigation: difference in favor of the first, 3, 4, 5 c. per ton and kilometer. How many fish will get caught in this trap!

Is this the whole truth, nothing but the truth? Mr. Teisserenc is the author of numerous and voluminous works on railways; he has always shown himself to be unfavorable to navigation; he has just been appointed inspector general of the railways: his figures are suspect.

In my turn, I will note an observation which will be the focus of my criticism: it is that, from the moment that the State intervenes in commercial and industrial operations, as always happens with canals and railways, it must be a rule to deliver its services at the lowest possible price.

Indeed, according to the principles of political economy, the measure of value, or the law of commerce, is supply and demand. Under this principle, the seller overprices, the buyer undercuts; the height of business genius is knowing how to create, through often very profound combinations, the most favorable conditions either for buying or selling. To follow another path is, for a merchant, to be concerned with the general interest more than with his own; it is usurping the attributions of the State. This is why, in matters of buying and selling, as well as manufacturing and transport, reality, the knowledge of which is essential to determine the possible, is so rarely itself the expression of the possible: the merchant, who must not work for others, but for yourself; the merchant, who has nothing to insure against commercial oscillations and for whom it is so important to seize the opportunity, is paid a premium, often enormous: and nothing but competition has the power to reduce it. Whatever industry it may be, as long as the industrialist is a simple individual, his rule is, not precisely to achieve the greatest economy in production, but to obtain preference on the market, by any means whatsoever, and to constantly raise his selling price. Thus the canal and railway companies, being themselves nothing more than simple individuals competing with others, always tend to raise their prices, and only stop at the rolling limit.

But suppose that the State, the collection of citizens, becomes an entrepreneur, even if it still acts, for a time, through the companies: I say that then the law of commerce changes, and while the tendency to increase and competition are the right and the rule of individuals, the search for the lowest possible price is the duty and the rule of the State.

This is the principle that I took as a starting point and as a rule of conduct in this research: foreseeing the case where the State would take up the cause in inland navigation, as it did in the railways, I wanted to know, for a very special route, what could

be, in current working conditions, the lowest price of transport, and consequently what would be, on this given point, the most advantageous mode of communication for the State, the city of Lyon and other localities. I had to be all the less content with the necessarily abnormal prices of commerce, since in my opinion sooner or later private interest, forced by the natural progress of things, will seek its salvation in principles that at first seem made only for the state. This chance had to be foreseen. What would happen, in fact, if what seemed to be exclusively the law of the State became the law of individuals, while the government was conducted by the maxims of private interest? This is because social relations would be inverted; the government would be nothing more than a business house supporting immense competition: the official class, today so numerous, a joint stock company in collapse; and that a bankruptcy, that is to say a revolution, would be imminent.

It is regrettable that Mr. Teisserenc, undoubtedly inspired by the editorial staff of the newspaper *La Presse*, obeys other maxims, and that he took raw figures as certain elements of evaluation. But if Mr. Teisserenc's figures, considered as a whole, are, at least for the navigation line with which I am concerned, obviously inaccurate; if their opposition is already a trap, there is one number, among all these figures, that can be considered as true: it is the one that the table wanted to highlight, namely, the rate of 12 cents, per ton and kilometer, as the *average market price* of railways.

But what is the share of these 12 cents for personnel costs, rent, offices, etc.; that of the profit, first assuming the convoys at full load, then at half load, drew a third of load; what then is the quantity of transport that a railway can carry out; the minimum necessary for good exploitation; the maximum to hope for; the increase in costs compared to the increase in labor? Finally, it was necessary to provide proof of all these numbers. However, nothing of the sort was done by Mr. Teisserenc. I am ignoring everything concerning construction and operation, on which there would be many other questions to ask, and which will not be resolved for a long time. *We know nothing about commerce*, cried Napoleon with annoyance; despite everything that has been published on the subject, little more is known about railways.

TWELVE centimes per ton and kilometer, such is the average market price of the railways, that is to say the price closest to the cost, that is to say finally the last price. Let's try to explain this figure. I will cite hypotheses, official calculations, contradictory facts, and some results. When reasoning about the unknown, we must not neglect any probability.

Mr. de Lamartine, speaking through his newspaper *Le Bien public*, thus calculates the products of the iron line from Lyon to Cbâlons-sur-Saône. His account is soon made:

400,000 barrels of goods,	at 6 fr	3,400,000
600,000 travelers,	at 4 fr	2,400,000

Total proceeds	4,800,000
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The path from Châlons to Lyon will cost 30 million. Its annual expenses will be 1,500,000 francs. 3,300,000 francs remain, or 11 percent of interests to be shared with the shareholders. This is the hypothesis of M. de Lamartine.

Woe to the nation whose finances a poet would administer! It could say to the bankrupt: You are my sister; and to poverty: I marry you.

I find, from Mr. Teisserenc's table, that the 866 kilometers of French railways, currently completed or about to be completed, will have cost 286,600,000 francs, including equipment, or on average 330,946 francs per kilometer. According to this experience, Mr. de Lamartine's railway, having 130 kilometers, would cost 43,022,980 francs. (The railway from Strasbourg to Basel, built in the most favorable terrain conditions, cost 325,000 francs per kilometer; that from Paris to Orléans, 375,000; that from Saint-Etienne to Lyon, 380,000.) To the total of 43,022,980 fr., add, according to the engineers' estimate, 10 million, the portion relating to the Chemin de Châlons, on the costs of crossing Lyon according to the least expensive project, total 53,022,980 fr.

I find, on the other hand, according to a calculation of the transport costs on the road from Strasbourg to Basel, drawn up on authentic documents, that the expense of this road, during the year 1842, was 12,862 francs per kilometer for a transport of 42,000 tonnes, having traveled the distance from Strasbourg to Mulhouse. I don't know what the number of travelers was; according to Mr. Teisserenc's table, the annual average would be 180,000. 12,862 fr. per kilometer would give, for 130 kilometers, 1,662,000 francs. However, when we add to this sum only the traction costs for the 358,000 tonnes that the road from Châlons to Lyon would transport more than that from Strasbourg to Basel, costs which, according to Mr. Teisserenc, are 1 c. 1/3 per ton and kilometer; plus an equal sum for 220,000 travelers also in addition, we would arrive at a total of 2,913,107 fr. 80 c., annual expense. The average expenditure of the railway from Saint-Étienne to Lyon (56 kilometers), during the years 1832-33-34-35, was 1,293,447 fr. 57 c., and during these four years the expenses have always been increasing. The figure of 2,913,107 fr. 80 c. for a path of 130 kilometers is therefore nothing exaggerated. Add to this sum 1,590,687 francs, interest at 3 percent of 53,022,980 francs, 295,205 francs remain. 20 c., or 55 c. per 100, for depreciation, reserve and dividends; the cost price of transport, according to the calculation thus rectified by Mr. de Lamartine, being 4 cents, per ton and kilometer.

It is clear that in such conditions the railway could not survive, and that the price must be raised.

If we knew with certainty, or only approximately, what the annual tonnage of a railway will be, before it exists, and the number of passengers it will have to transport, we could definitively establish a cost price. But nothing is more disappointing than the probabilities according to which we decide in these kinds of matters. Thus Mr. de Lamartine brings to 600,000 the number of travelers who will take the railway between Lyon and Châlons-sur-Saône: however, it is certain that today, despite the convenience and the low price of steamboats, this number does not reach 270,000; and I do not believe, for reasons that I will deduce later, that it will ever much exceed 300,000. If it happened that I was right, and Mr. de Lamartine was utopian, the price of train tickets would have to be at least doubled, otherwise the costs would not be covered, which would increase the price travelers at 6 cents. 1 per person and kilometer. Sometimes the error has been in the opposite direction: everyone knows that the founders of the railway from Saint-Étienne to Lyon had not initially counted on the income from passengers; However, it has happened that it is the travelers who form the largest part of the income from this route. We are therefore forced, in the absence of theoretical certainty, to rely on the gropings of experience.

Of all the railway experiments, the most beautiful and complete that has ever been made is that of Belgium. There were transported on the railways of this country, during the year 1842, 188,813 tons of merchandise, which produced a movement of 13,123,670 tons per mile, the total length of the journey being 397 miles.

The expense for the transport of goods was 1,091,887 francs, or per ton of goods carried 1 kilometer, 8 cents. 31.

If we add to this sum the part attributable to goods in the annuity that was covered this year by the products of the railway, part which is 648,000, or per ton and kilometer, 4 cents. 93, we arrive at a total of 13 hundred. 25, exact cost price. However, the receipt having been 1,739,542 fr. for 1842, or per ton and kilometer 13 cents. 25, it turns out that on the railways of Belgium the revenue, for the transport of goods, has just equaled the cost price. The documents that I have in front of me at the moment do not talk about passenger transport.

It is on the basis of a certain number of similar facts that the following rates were adopted:

	TRAVELERS	GOODS	
		1 st class.	2 nd class.
Belgium	8 cents.	10	15
Strasbourg to Basel.....	4 c. 35 to 8 c. 55	10	14
Paris to Orléans...	5 c. to 7 c. 5	9c. 12	14 c.. 16
Paris to Saint-Germain.	7 c. 5		
Saint-Étienne in Lyon.	7 c. to 8	9 c. 9	

And to give a general idea of the effect of these tariffs, we will say that the Belgian railways, run by the State, constantly tend to reduce their commercial prices to cost prices, and that the ideal of cheapness that the administration of this country proposes, after the amortization of capital, is, for the *last places*, 3 cents, per head and kilometer, which brings the average to at least 4; that the road from Strasbourg to Basel, in the last half of 1844, gave 75 c. dividend to its shareholders; that the shares of the railways from Lyon to Saint-Étienne, issued at 5,000 francs, are listed today on the Stock Exchange at 8,000, which represents an interest of 8 per cent; that the line from Paris to Rouen, according to Mr. Teisserenc's table, gives a roughly similar result, since the capitalists' money placed on this line brought in 11 percent: the funds lent by the State, dividend understood, only yield 4; finally, that the railway from Paris to Versailles, right bank, transporting 1,080,000 passengers and 18,000 tons of goods, still according to the same authority, gives 1.67 percent to the shares, while that of the left bank, with 571,000 travelers, is in deficit.

In summary, the best supplied, and consequently the most productive, railway lines in France and Belgium, with prices varying from 5 to 8 c. per person and from 10 to 16 for goods, bear a maximum of 8 to 9 percent interest: the rest more or less covers its costs, or even constitutes a loss. And, it should be noted, the profits collected in railway companies do not relate to the totality of the capital involved; but only on industrial shares first, then on capital shares: there is generally only a low interest for the loan, which, provided most often by the State, forms a third or half of the capital .

Also, despite the saturnalia of the bankocracy, public opinion, while recognizing the immense usefulness of the railways, is beginning to doubt their financial and speculative value; and we wonder with concern if it is not the essence of these marvelous working instruments, to produce their full effect, to lend their service without remuneration. In vain some commercial carriers go down to 250,000 francs per kilometer, including equipment, the cost of a railway; we know that the 866 kilometers already completed required 286,600,000 francs, that is to say on average 330,946 francs per kilometer.

Engineers are the first to denounce the fallacious hypotheses of engineers: “The example of canals,” says Mr. Jules Séguin in a profound and substantial writing of forty-four pages, “is not worn out, however old it may be. The original estimate was 128 million. They have already cost more than 300, and are not finished. The official estimates for the Versailles railway contain no less serious errors: this work, estimated at around 4 million by the bridges and roads, will cost 12, if not more.” (Mr. Séguin wrote in 1838: the event exceeded his predictions. The road on the right bank will cost 18,500,000 francs; that on the left bank, 16 million.) “The evaluation of the construction expenses of the road to Saint-Germain had been increased to 3,900,000 francs, and this evaluation had been given by the minister as verified by the administration. However, the road to Saint-Germain is not finished, and well-educated people are already saying that it will cost 15 million.” (It cost 16.)

Statesmen use their authority to repress the charlatanism of companies and to calm the enthusiasm of small owners. We read in *Le Siècle* of February 20, 1845: “The Minister of Commerce believes that the Council of State would not be more disposed than the Chamber of Peers to sanction measures that would only be likely to overexcite public enthusiasm. Mr. Cunin-Gridaine, after refusing to present to the Council the request made by the administrators of the line from Orléans to Bordeaux to be authorized to distribute dividends, if necessary, after the operation of the section from Orléans to Tours, and without waiting for the complete completion of the entire route, has just notified the administrators of the Chemin de Rouen that it could no longer propose the admission of new shares which would have been given at par to the holders of the original shares, whose price has more than doubled. The company will have to provide by borrowing the need of 9 million that it has noted.” All the newspapers of the day repeated this news.

The populations themselves become suspicious. A company patronized by the most illustrious names having been formed for the execution of the road from Dijon to Mulhouse, through the Doubs valley, with a capital of 63 million, the inhabitants of Besançon, the most interested in this line, formed a subscription of 1,500,000 francs. It is the forty-second, and after the completion of the path barely the sixtieth of what it will have cost. A populous, commercial and rich city, which makes every effort to ensure that the railway from Dijon to Mulhouse passes within its walls, and which offers to contribute a sixtieth part of it! What food for thought! It is true that the line from Dijon to Mulhouse via Besançon would be lateral to the Rhône-Rhine canal, and that the France-Comtois are considered to be the Normans of the East: they are counting on the enthusiasm of the capitalists and on the complacency of the State.

Is it therefore the condemnation of the railways that we wanted to bring out from these facts and these testimonies? Certainly not. If this were our thinking, it would *a priori* be false and absurd, because it would concern canals, rivers and roads as well as railways. The imagination of speculators had raised colossal fortunes on the future products of the canals; we know what the reality was after the dream. The Rhône-Rhine canal cost 30 million; it barely produces 400,000 francs. in addition to its administration and maintenance costs, 1 fr. 33c. For 100% interest. The foregoing research, which it would be so easy for us to extend, aims only to arrive at this conclusion, namely: that it will be the case with railways, in general, as it has been canals; consequently, that all these major works of public utility must be, both in their execution and in their exploitation, subject to an economic regime quite different from that of other commercial speculations.

Before moving on to new considerations, let us compare the prices determined above for the navigation of the Saône and Rhône basins and those found and generally adopted for the railways:

SERVICE BY WATER.

<i>Travelers.</i>	From Lyon to Châlons and vice versa, 1 fr. 50 and 2 fr. 50; or 1 c. 15 and 1 c. 92 per person per kilometer.
---	From Lyon to Avignon and vice versa, 3 fr. and 5 francs; 1 C. 2 and 2 c.
<i>Goods.</i>	From Lyon to Châlons, 3 fr. 25 to 3 fr. 90; — 2 c. 5 to 3 per ton per kilometer.
---	From Châlons to Lyon, 2 fr. 50; — 1 e. 92.
---	From Lyon to Avignon and vice versa, 13 fr. 02 to 15 fr. 89; — 6 to 7 cents per ton per kilometer.
---	From Lyon to Marseille and vice versa, 19 fr. 59; 6 centimes.

SERVICE BY RAIL

<i>Travelers,</i> 5 and 7 c. per person and kilometer. —	From Lyon to Châlons and return, 6 fr. 50 and 9 fr. 10.
---	From Lyon to Avignon and return, 11 fr. 35 and 15 fr. 89.
<i>Goods,</i> 12 c.	From Lyon to Châlons and return, 15 fr. 60.
---	From Lyon to Avignon 27 fr. 24.
---	From Lyon to Marseille 39 fr. 16.

In all these figures, the distances by waterways have been reduced to the distances provided for the railway, the costs of unloading and trucking left aside.

Thus the transport of passengers on the entire navigable line that extends from Châlons to Arles (415 kilometers) can vary, depending on the place, from 1 to 2 centimes per person and kilometer, and leave entrepreneurs with a profit, while the railway fare is three, four and five times higher.

From Châlons, and if we wanted to go further up, from Saint-Jean-de-Losne to Lyon, the transport of goods is three, four and five times more expensive by rail than by navigation, and from Lyon to Marseille and vice versa, once again.

It is a question, according to these data, of predicting what will happen when the railway and the waterway, running side by side, find themselves in competition. And first of all, will there be competition between the two vehicles? Will labor abandon navigation and turn to the railway, or will the mass of transport remain attached to the former? In a word, are the reasons or pretexts alleged for the establishment of railways lateral to the Rhône and the Saône sufficient to justify the enterprise?

IMPOSSIBILITY FOR THE RAILWAY FROM CHÂLONS TO AVIGNON TO SUPPORT COMPETITION WITH THE WATERWAY.

We have spoke about unemployment, interruptions, and first of all drought. As for the Saône, if the engineers responsible for the work on this river judged it appropriate to bring to the court of opinion the contingent of their knowledge, they would say that for two years this cause of insecurity and irregularity has disappeared. Formerly, during the months of June, July, August and September, the Saône only offered boats, at a multitude of points, a depth of 18 to 22 inches. So it was only really navigable at intervals, at the time of floods, which had the effect of locks on it. Today all the difficult passages are improved and when the Saône reaches low water, we still load at 36 inches. Where the skippers expected to stumble, they were surprised to find 1 meter 10 to 1 meter 20 on the probe, sufficient depth for good navigation.

On the Rhône, interruptions due to drought persist and will persist for a long time to come, as long as the government does not take more effective action to make navigation regular. According to a learned memoir by a young engineer, Mr. Surrell, who seems to have been particularly concerned with the study of the Rhône, and whose work Mr. Rlanqui cited with praise in a session of the Academy of Moral and Political Sciences, it is not only through dredging and roadworks that it is appropriate to combat and discipline the Rhône, it is above all through the reforestation of the mountains whose denudation has

changed the tributaries of the Rhône into periodic and devastating torrents. Now, we know that an interest even more powerful than that of navigation, the very interest of soil and climate, imperatively requires the recreation of forests; thus, by the natural sequence of causes, we cannot work on the improvement of the territory without working at the same time on that of navigation, and consequently without favoring the competition of waterways against railways.

Here a reflection naturally arises. The inconveniences that transport entrepreneurs experience in using waterways due to flooding, drought, etc., may well cause them to suspend work, but would not stop their competition, these interruptions being so much better foreseen, commerce adapts to them and directs itself, so to speak, like harvests and sowing, to the progress of the seasons. During the entire summer of 1844, the Saône between Lyon and Verdun had nowhere less than 1 meter 10 of anchorage; the coal boats are constantly going upstream with the load of 115 at 220 tons. At the same time, the Rhône, swollen by the melting of the snow, presented the most favorable circumstances for infra-Lyonnais navigation, and yet, throughout this period, transport was rare on the Saône and expeditions scarce. Would the carriage industry be like agriculture? And, apart from certain extractive or manufactured products, would the transport of goods be generally subject to a law of periodicity?...

But, without engaging in such a difficult question, it is at least certain that commerce only supplies and ships in fragments and as demand arises; that deliveries are neither continuous nor of equal importance; that this continuity is not at all necessary, and that the merchant is always able to take advantage of the cheaper opportunities offered to him. It is therefore not a question of knowing whether the continuity of the work of a railway is preferable to the possible interruptions of the waterways (the question thus posed cannot leave any doubt), but whether the work of navigation, interrupted as it may be, it will not make that of the railways vain or at least extremely onerous. This is what we will examine later, when we arrive at the very fact of competition.

After the drought, whose action, as we have just said, is now imperceptible on the Saône, and must one day and infallibly be lessened for the Rhône, the supporters even of the railway blame the high waters. High waters could be a formidable obstacle when hauling was carried out by horses; but we no longer use horses. And what does it matter to the Rhône liners that the towpaths are covered? What does it matter to the tugboats of the Saône that the banks are flooded as long as, when they go upstream, their relays can follow them to Saint-Bernard? The high waters for steam are rather a favorable circumstance than a harmful one, except perhaps when the liquid surface having reached 6 meters above low water, it is no longer possible for tugboats to pass under the bridges.

Now, before there was any question of railways, the bridge and road engineers had anticipated this inconvenience, and last year they began to raise the arches of the pier bridges and to raise the deck of the suspension bridges. A few hundred thousand francs will be enough to carry out this repair throughout the Saône. However, I would agree that if the railway from Châlons to Lyon is built, such an expense would be a pure loss for the State.

So let us leave the bridges if we want, since, in the event of flooding, we will have a supplement; let us not touch their arks or their aprons. Will navigation be interrupted as a result? Not at all. In November 1842, the Saône was so high for almost two weeks that tugboats no longer passed the Mâcon and Châlons bridges. What happened? Tugboats and passenger boats connected on either side of the bridges; and as where liners with their chimneys and their large drums cannot pass, flat boats loaded with coal and goods would pass ten times; as travelers transfer themselves and in the blink of an eye, we see during this extraordinary and prolonged flood the movement of people and goods, between Lyon and Verdun, more urgent and faster than it ever existed.

It is true that this maneuver requires a little agreement between the entrepreneurs; but in the absence of good will, could the government not, in the case of emergency and for a few minutes, impose on them what it practices so well with the English, the *entente cordiale*?

But the fogs?... When the fogs are thick enough to stop the steamboats from Mâcon to Lyon, prudence will dictate suspending the convoys on the railway, running in the same valley as the Saône and almost at the same level. The same observation applies to nighttime. Since the invention of steamboats, the movement of crews has no longer been interrupted, except by complete darkness, something that cannot yet be said absolutely about railways. There is talk, it is true, of making the railways passable at all hours of the night by lighting them with headlights. If this is so, what prevents us from illuminating the river in the same way? But we will rather ask what is the point of this night work, unless the homeland is in danger and it involves transporting 50,000 men from one end of the kingdom to the other in twenty-four hours?

The general prejudice about railways is such that instead of seeing in them above all a means of rapprochement and frequent communications between men, we only see in them a means of covering the longest distances like a bird in flight and without the slightest interruption. It seems that the ideal of the genre would be a rail going around the globe following exactly a parallel of the zodiac or the meridian. It was under the impression of this idea that one of our deputies said from the tribune (June 21, 1844): "According to a

high economy, everything must go to find the railways, while they themselves do not go to seek anyone.”

Our neighbors the Germans understand it in a completely different way: “The enthusiasm of the Germans for the railways,” says Mr. Teisserenc, “draws its source rather from considerations of a political order, from the hopes of an ardent patriotism, only in a serious need for speed. Here speed is especially appreciated as a supplement to well-being, as a means of avoiding the fatigue of night trips. For the great mass of Austrians, time is only valuable insofar as it facilitates the satisfaction of material needs...”

The railways already go too fast for the Germans, and still too slow for us. This is why, by dint of seeking the straight line, the mass of our travelers will be obliged to walk several leagues on foot to find the railway, then to get to their destination: “The railway”, say our legislators, “*does not must go seeking anyone.*” You will also see that for the convenience of a few individuals having to travel a long distance, we will maintain replacement personnel who will operate the locomotives all night.

Another complaint comes from freezes. During the last four winters, the total number of days of unemployment resulting from this cause was 35 days on the Saône, including haulage and ice breakup, which gives an average of 9 days per year. On the Rhône, this figure must be lower, and in the canals higher. It is indisputable that, during this interval, the railways regain all their advantages. But, as we said above, it is not a monopoly of 9 days per year that can support them, and nothing proves that trade, while taking advantage of the railway for the bare necessities, will ensure to the companies, out of gratitude, its transports all year round. But 9 days of product will never pay for the work of 365 days; 9 days of convenience will not make you give up 11 months of cheapness. The inconvenience of ice is therefore no more sufficient than the previous ones to completely reassure about the future of the railways.

The real, capital inferiority of waterways compared to railways, comes from the slowness and inequality of their progress. To fully appreciate the advantage that the company of the railroad from Châlons-sur-Saône to Lyon and Avignon can hope for, we must distinguish, as we have already done so many times, between travelers and goods.

1. *Travelers.* — From Châlons to Lyon, the journey is made every day, by steamboat, in 7 hours and often in 6; from Lyon to Avignon, in 10 and 11. The railway will employ at least 4 in the first case and 8 in the second. Because if it is true that a locomotive launched at full speed can reach up to 40 kilometers per hour, it is also certain that by the necessity of the stations, this speed is often reduced to 25, and on this point we can say that the most official announcements are full of charlatanism and lies. The printed price of the Alsace railway marks 3 hours 35 minutes for the journey from Strasbourg to Mulhouse

(100 kilometers). Everyone knows that this trip never lasts less than 4 hours. Now, if there is something miraculous to be done, in 4 or 5 hours, for the sum of 6 fr. 50 cents, a journey of 32 and a half leagues, which would require three days of walking by the best route, plus the expense of meals and sleeping accommodations, it is incontestably even more advantageous for the poor pedestrian to cross the same space in 6 or 7 hours for thirty cents. Likewise, after having tasted the pleasure of doing 60 leagues in 9 hours for 12 francs, he will not miss the opportunity to do 60 more in 12 hours for 4 francs.

Celerity, like everything else, is estimated by the vulgar measure of values, which is money; but it is obvious to everyone that a saving of two thirds of a day is more expensive at 6 francs. 50 than the saving of half a day at 1 fr. 50, like three quarters of a day sacrificed by spending 12 francs, leaves less benefit than the day sacrificed by spending only 3 francs. Exceptional cases may arise; but, as we said earlier about the interruptions caused by ice, the particular exception cannot be the subject of a foundation of general utility: we do not spend 140 million for the pleasure of a few my lords.

On the way down, therefore, the railway must rely little on passengers. Let's see what he can hope for when he comes back.

From Lyon to Châlons, the journey by steamboat takes 9 to 9 and a half hours. The duration of the same journey by rail and the price of seats by the two modes of transport remaining the same, we are left with this proposition: the working day being assumed to be 12 hours and the duration of the journey 4 and 9, 8 hours will be saved by the railway for the sum of 6 fr. 50, and 3 hours only by water, for 1 fr. 50; setting at 3 fr. the working day, we will find, by adding the value of the time lost with the price of the places, that the total expenditure per train is 7 fr. 50, while by water it is only 3 fr. 75, just half. Here again, competition in the terms in which we have placed it is impossible.

From Avignon to Lyon, the difference is much smaller. We said the travel time today was 32 hours. To be more comfortable, consider these 32 hours as equivalent to a loss of two days of work. The total expense of the trip will therefore be 10 fr. by water and 15 fr. by rail; but boredom being an evil from which we readily redeem ourselves, there will be competition. Assuming an annual circulation of 100,000 travelers covering the entire distance from Lyon to Avignon, half would be carried by *décise* steamboats; the other half would be shared according to a proportion that is impossible to determine today. But whatever the share in the railway, it will never produce a million in revenue, that is to say not a quarter of the capital that will be invested in this line.

We should note here the most formidable disadvantage that the entrepreneurs of the railway from Lyon to Avignon will have to overcome. No doubt their intention is not to lead their line on the deserted plateaus, as a result of this famous principle of high

economy that *everything must go to find the railways, and that they themselves do not go to seek anyone*, but many rally all the important and populous points. However, most of the localities that the railway is called upon to serve are located on the Rhône, sometimes on the right, sometimes on the left: so that the railway will be obliged either to perpetually follow the course of the river, or to multiply the branches, or to omit important localities, and thereby make competition against it easier. This topographical arrangement is the boulevard of the navigation of the Rhône: with the modest price at which it can go down and an organization of special and general services on the entire line, it can kill the railway with which it is threatened even before the first rail has been applied.

I will not dwell on the objection that was made on the lack of coincidence that there would be between the arrival at Châlons, by rail, of passengers bound for Lyon, and the departure of the steamboats, and vice versa between the time and the arrival of the return boats and the departure from Châlons of the first road convoys. This coincidence will exist if we want it and will not exist if we do not want it: it will depend on the intelligence that water transport entrepreneurs will use to accommodate their services to the arrival and departure times of the railway.

However, one insists. Travelers leaving Paris in the morning and arriving in Châlons in the evening would be forced to waste a night at the inn while waiting for the liners to depart, while by rail they would arrive in Lyon without stationing. There will therefore be savings for the public and for the State in removing this navigation from Châlons-sur-Saône and continuing the railway.

The railway from Paris to Châlons will be no less than 515 to 530 kilometers, which requires at least 10 to 20 hours of walking, allowing for no roadside stationing. Add 4 hours from Châlons to Lyon; a total of 22 to 24 hours for the journey from Paris to Lyon. Assume the speed of the trains at 40 kilometers per hour, the total journey time would still be 16 hours; and since it is a question of going from Paris to Marseille in 24 hours, we therefore assume that there will be no interruptions for the night. That being said, what is stopping travelers heading for Lyon from Paris by the 4-hour convoy, or if you prefer, by the 8-hour convoy? By this means they would just arrive in Châlons at 9 or 10 in the morning, and in Lyon at 4 or 5 in the evening, and the stop-over in Châlons would be avoided.

But we are only pushing back the difficulty. The night that we would have gained in Châlons, we would infallibly lose in Lyon, the boats from the Rhône not leaving until the morning. Moreover, such complacency for the interests of the public and navigators should not be expected from railway companies.

Here we are, advocates of the waterway, forced into an impasse, and, despite all the combinations, forced to agree that a traveler going from Paris to Marseille: 1. by the railway from Paris to Châlons, 2. by the Saône, 3. by the Rhône, 4. by the railway from Avignon to Marseille, would be obliged to spend one night in a hotel during his trip, and perhaps two. How are we to escape this difficulty?

Let us go back to our calculations. From Châlons to Avignon, by steamboat, the descent will cost 5 fr. 50, plus one night, which we will rate as equivalent to a day's work; by rail, it will cost 19 francs. There will be a profit of 11 fr. 50 for the traveler to relax in Lyon for an evening and a night. On the way back, the prices on both sides remaining the same, with one day more that we will rate, food and time, at 5 francs, the benefit for the traveler will still be 8 fr. 50. It is true that we will have little to count on the goodwill of the railway for the recovery. But if the service experiences no interruption either night or day, our travelers are sure of never missing the time of departure; if, on the contrary, the railway eliminates night work, the objection falls by itself.

But who runs like this in one breath from Paris to Marseille? Out of a convoy of 100 travelers, how many go more than twenty leagues? Consult the registers of railway companies and navigation services, and you will see that on a journey of 30 leagues, a convoy renews itself ten times and does not retain identically on arrival half of the individuals it had at the departure. For this mass of people who embark between the extreme points of a line, the question of night and day is almost irrelevant; and if it may sometimes suit them to leave early in the morning, we can say that in general it would not suit them at all to arrive at midnight, as would happen for travelers going down to Lyon by rail. It is therefore mainly on the day's work that the competition will focus. In this regard, the demonstration has been made, and we have nothing more to say.

2. *Goods.* — We seem to rely a lot, for the railway from Châlons to Lyon, on the transport of precious goods, fabrics, silks, jewelry, millinery, hardware, etc. It is certain that if the railway could obtain, from its beginning, a specialty of some importance, it would by that alone be more able to compete with other parties; and conversely if the navigation services have transport of their own, they will have to find in this type of monopoly a means of attacking the railway more vigorously.

The most exaggerated calculations put the movement of goods that takes place annually on the Lyon square at 700,000 tons. Of this quantity, 500,000 tons enter or leave by water; 200,000 are expected to follow dirt or iron roads. Coal arriving from Saint-Étienne and Rive-de-Gier for city consumption (40,000 tons) is excluded from this assessment. Seven main roads, radiating from Lyon as well as from their center, serve, with the Rhône and the Saône, for imports and exports. Dividing by 7 the figure of

200,000 tons, which is believed to represent the importance of the haulage, we find, for the share of the railway from Châlons to Lyon, 28,571, or if we want 30,000, representing 16 centimes, a gross product of 654,000 francs, about a quarter of operating costs. To achieve profits, it is necessary, in the absence of a comfortable income from travelers, to increase at least tenfold the quantity of goods, that is to say, it is necessary to raise the tonnage to the figure of 300,000 tons for 130 kilometers. Let us see what there is to hope for.

According to official reports, out of the 500,000 tons of which Lyon's cabotage consists of, entries and exits, three quarters take place from the North and a quarter from the South. The share of the Saône, which the railway must make up, would therefore be 375,000 tons, based on the total journey from Lyon to Châlons and vice versa. Of this figure, the same official reports note that two thirds belong to the descent and a third at most to the ascent. In 1843, the Serin navigation office noted the departure of 1,040 boats, together weighing 45,000 tons, from September 22 to December 22, that is to say during the most abundant quarter; while the previous year, the Mâcon office had noted a circulation of 500,000 tons, forming approximately 5,000 loaded boats, including 3,000 on the way down and 2,000 on the way up, and among the latter a very large number loaded with wine for Paris in intermediate ports.

Thus of the 385,000 tons traveling each year along the Saône between Lyon and Châlons, two thirds, or 250,000, can go down to Lyon at the price of 1 c. 92 per ton and kilometer, goods delivered to port, all costs included, with profit for the company, the current trade price hardly rising above 2 c. This descent is carried out by oar in an average time of 60 hours, and by steam hauler in 12. Returns by steam take two days, and by horse four. In the latter case, the price varies by 2 c. 5 to 3 c. per ton and kilometer. The question is whether or not the interest on securities carried by a shipping service for two and four days, added to the amount of the carriage, will exceed the railway rate, increased by the relevant interest.

The loading of a tugboat leaving Lyon on the way back, being estimated at 100,000 francs. (goods, 250 tons, 80,000 francs; coal, 400 tons, 20,000 francs), the interest, at 5 per 100 per year, will give 8 c. per barrel of goods for two days, and 1 c. 36 thousandths for a barrel of coal. This sum, added to the transport price for 130 kilometers, according to the rates determined on both sides, gives rise to the following relationships:

Water transport, interest included: distance, 130 kilometers (*back*). — Goods, 3 fr. 98 per ton; coal, 3 fr. 26 c. 36.

Transportation by rail, interest included, one day. — Goods, 15 fr. 64; coal (9 c. per ton and kilometer), 11 fr. 77.

Interest being the only way to evaluate the time lost by the goods on the way, as the working day is the only way of evaluating the time lost by the traveler, it is evident from the above that if the navigation service runs in a passable manner only for eight months each year, the advantage of celerity by the way of rail would change the enormous disproportion in the price of carriages so little that we can dispense with paying attention to it.

However, we will go even further into this consideration of celerity; it deserves it in all respects, both for the risks from which it frees itself and for the hands it is supposed to occupy less. It is not, moreover, an appreciable speed per hour and minute and for packages weighing 50 kilograms that the trade demands; it is a speed that saves weeks and months on masses of 10 and 100,000 tons. Nor is it for the greater glory of a few manufacturers of luxury objects, the use of which the people have not yet learned, that we want easy and rapid communications; it is above all to put the things of basic necessity within the reach of the poor and to make things of basic necessity less expensive for everyone, if possible. The useful first; the rich and the luxurious will come later.

Let us therefore know whether a river like the Saône or a railway can best fulfill these conditions of popular economy, since in all this we seem to be so concerned with the interests of the people.

When the Chamber of Commerce of Châlons, in its address to the Minister of Public Works, said that the towed goods took 36 to 40 hours to get from Lyon to Châlons, it forgot to remind him at the same time that these goods arrived by convoys from 500 to 1,000 tons, and that with the equipment of eight tugs such arrivals could be renewed twice a day: a double circumstance that was not at all unimportant. How long would it take a railroad to do the same job?

When, on a railway, we only send a single locomotive for a goods train, we are hardly in the habit of giving it more than 12 to 15 wagons, or 45 to 50,000 kilograms of useful weight. Some authors claim that we can go up to 110,000, but this load is roughly the same as the speed of 50 kilometers per hour: this is a prediction which has not yet been realized. In any case, a convoy of 1,000 tons dragged on the Saône by a tugboat with the force of 60 to 80 horses and delivered to its destination in three days, would amount to 50,000 kilos by train, Twenty convoys on the railway, and at 100,000, TEN. Now, as in good administration it is imprudent to launch on a railway, in the same day and in the same direction, more than *three* convoys of passengers and *three* of goods, it turns out, in fact, that the loading of two tugboats dispatched every day by a general navigation service, would take 12 days in ordinary circumstances, and 6 in the most favorable conditions, to cover, by rail, the same journey that it often crosses by water in 40 hours. M. de

Lamartine, whose imagination adds to the very power of steam, instead of six convoys per day on the railway, sends out 12. So be it. M. de Lamartine arrives at the same time as the inland waterway, and if the press demands the departure of a third tugboat, he will soon be overtaken.

The public, whom the newspapers were careful not to inform of these details, has formed such strange illusions about the railways that it takes a sort of violence to disabuse them. The most tenacious type of superstition is that which believes itself to be based on figures, so I would not be surprised if the comparative evaluations that we have just read did not appear completely chimerical to minds seduced by the most fabulous calculations. Let us cite facts.

The official printed tariff of the railway from Strasbourg to Basel requires *three days* to deliver goods whose journey must be more than 60 kilometers to their destination: instead of three days, I would not be unfair to say, because I have witnessed that the railway takes *eight*. In the same period of time, the boatmen of the *Union* traveled the same distance on the canal three times; also their service, despite the reductions attempted by the railway administration, is generally preferred.

The city of Colmar was so aware of these inconveniences that it requested authorization to dig a 12-kilometer branch to the Rhône-Rhine canal, for its own service, and for this purpose took out a loan of 800,000 francs. The city of Colmar, whose walls are leveled by the railway, finds that this mode of communication, after having spread the solitude around it, makes bread dear and life hard: it returns to the canals!... I have seen six weeks spent by the Alsace railway to transport the load of a coal boat from the Mulhouse station to the Colmar pier. Certainly, the fault was not with the locomotives, since they make the journey in an hour and a half; but what is speed that requires such long preparations?

During the year 1843, the total transport from Strasbourg to Basel (138 kilometers) and back, by the same route, amounted to at most 60,000 tons; during the same campaign, two tugboats transported an equal quantity on the Saône, from Lyon to Verdun (173 kilometers), although they did not always leave with a full load.

According to all these facts, which all confirm the figures, or better said which are the very expression of the figures, we can affirm, without fear of error, that the ADVANTAGE OF SPEED COMBINED WITH MASS remains definitively with navigation.

Undoubtedly the Alsace railway did not produce all that it could produce: in 1841, the Belgian railway, over a length of 387 kilometers, had a movement of 2,635,000 people and 183,441 tons. Now, supposing that a third of these quantities, which is saying a lot, expresses the same movement taken over the entire journey, we would still find that the

Belgian railway, the busiest in Europe, barely represents the work of four tugboats and twelve liners. And what a huge difference in costs! An oak boat, costing 2,000 francs, carries the load of 40 wagons, and can last ten years; each wagon alone costs 2,000 francs, and repairs are renewed at least once every fifteen years. A 60-horsepower tugboat costs 120,000 francs, and drags the load of 10 to 12 locomotives, each of which costs 50,000 francs. In 1842, the Belgian minister declared that with 122 locomotives, 108 tenders, 528 passenger carriages, 673 freight wagons, 136 service wagons, this railway was barely sufficient to meet the needs of traffic.

What else? The railway was promised the transport of Mâconnais wines, all of which today take the route of the Burgundy Canal. Now, unless arithmetic deceives us and the nature of things changes, it is easy to prove that not a ton of wine will be shipped by rail. The quantity of wines loaded annually for Paris in the various ports of the Saône can reach 25,000 tons. These expeditions are never made in winter because of the cold, nor in summer because of the heat; they take place mainly in spring and autumn, the most favorable time for racking and packaging wines. A quantity, at least equal to that which ships on the Saône, arrives at the various ports of the canal, so that we can bring the total loads to 50,000 tons per year. Can we imagine at two specific times of the year, 25,000 tons of wine, in 100,000 barrels, arriving at the railway piers? With this, irons, madder, flour, goods; three quarters of the wagons on the way, all the entrepreneurs simultaneously asking to leave and not wanting their shipments to be divided, the cries of the pickers hoisting the barrels onto the wagons, the confusion, the hubbub? To ship 25,000 tons by rail, it would require, at 100,000 kilos per train, 4,000 wagons and 12 departures per day, to load 6,250 wagons, to send out 250 locomotives, all in 21 days. Well! By canal and rivers, all this mass is transported in 25 days. And it is for an advantage of 4 days that the wine car, instead of the 32 fr. per ton, average merchant price, that it costs today, would cost 54! Competition is impossible for the railway.

During the famine of 1817, potatoes were abundant and cheap throughout Alsace and the Rhine provinces, while they were lacking in Burgundy, Franche-Comté and the lower departments. If, at that time, water communications had been established as they are today, a hectoliter of potatoes would have cost only 1 fr. 20 c., to transport from Strasbourg to Lyon, even paying the navigation rights as they are now established; while by a railway, the same hectoliter, at the rate of the vilest material, 9 c. per ton and kilometer, would have cost 3 fr. 45, twice the value of the edible purchased on the premises. When will the people, instead of feasting on sermons on fraternity, solidarity and sensitivity, seek their salvation in a true understanding of the public economy? But what can we say to men who imagine that what today costs 3 fr. 48 c., with the fraternity would cost nothing?

One of the favorite arguments of supporters of the railway from Châlons to Avignon is the advantage of avoiding transfer. First of all, it is clear that this motive is of no value for goods that take the water route; and we have seen that these goods form three-quarters or four-fifths of the commercial movement of Lyon. The argument therefore only concerns goods that, shipped from Lyon today by road, should take the railway to Châlons. In this regard, if the characters I speak of sought more the real advantage of trade than the satisfaction of their fantasy, I could offer them, if not a direct solution, at least a compensation; 30,000 tons forming, according to the highest probabilities, the importance of haulage over land between Châlons-sur-Saône and Lyon, would pay in this first city, at 10 c. per 100 kilos, 30,000 fr. transfer. This sum, added to the transport costs by land hauling, costs that we will set here at a minimum of 3 fr. for 100 kilos, for the journey from Lyon to Châlons, forms the total of 930,000, or 31 fr. per ton. The question is whether navigation could not be applied to this type of transport with great advantage and economy. I want to talk about the use of passenger boats.

Why do the steamboats serving travelers on the Saône, whose admirable packaging would present the most complete safety, not transport goods as well as the boats on the Rhône? This is because a compromise, tacit or avowed, exists between freight services and those of travelers, and that by virtue of this treaty, one must never encroach on the specialty of the other. Passenger boats, to maintain their monopoly, having so far abstained from any other loading; expensive goods, for which the major navigation services cannot accommodate, are forced to resort to haulage. But such a state of affairs cannot last; and MM. Bonnardel, who began to revolutionize the service of passenger boats, will undoubtedly complete their work by taking on board goods with people. And what could be more beautiful than such a service? Seven hours of march on the way down, nine on the way up, the merchandise squeezed into stores hermetically sealed like living rooms, and a whole afternoon for boarding and disembarking! I am surprised that this combination has not yet tempted some speculator, and that it is still to be understood that all land transport, from Lyon to the North, must do its loading in Châlons. Correspondence exists, for travelers, between steamboats and couriers: the same thing must take place for goods.

Thirty million kilograms, forming the presumed share of haulage between Lyon and Châlons, would give each day, for departures from the two cities, 82 tonnes, which, distributed between 4 liners, at 50 c. per 100 kilos, would provide each person with an initial revenue of 100 francs, just half of the boat's costs, and would not add more than 10 centimeters to the draft. To this sum of 50 c. for the carriage, add 15 c. of embarkation, 20 for trucking, 15 for transfer and 50 of commission, offices, etc., and you arrive at a total of

15 fr., not half of what the haulage takes. As for the railway, on goods of this nature and delivered in small quantities, its rate could not be less than 16 c., which, with incidental costs, would bring the price, per ton, to 26 fr. 80c.

Now suppose that the railway exists, is it not possible, according to these data, that speculation uses it against itself? That with the faculty of delivering as well as receiving the goods in Châlons, some commission agent, in return for a bonus given to the senders of 11 fr. 80 c. per ton, will have all goods destined for the North consigned to Lyon, and vice versa? Thus, thanks to the railway from Châlons to Paris, shippers, by avoiding that from Châlons to Lyon, would collect a superb agio, profitable to all trade, which would immediately take away from the concessionary company a revenue of 654,000 francs, that is to say the entire revenue from the courier items that were to be the specialty of the route. The company would therefore still be obliged to reduce its price; but then what happens to the financial value of the company with this system of reductions?

Should I now respond to this great transit mystification? Whether it is to Lyonnais, and to Lyonnais as enlightened as Mr. Durillon, that we must show what transit is, and what an enormous contradiction it would be to build a railway to recall us to transit?

“Trieste,” cries Mr. Barillon, “Trieste, eighty years ago, barely received a few puny boats; in 1827, this port received 2,906 ships; in 1832, this number rose to 4,838.”

How this number of 4,838 ships must ring in the ears of the Lyonnais, who are made to understand that the goods with which these ships were loaded could have passed through their hands! But take a look at the map and say whether, after the completion of a European network of railways and waterways, the line from Antwerp to Trieste, today a rival to that from Marseille to Le Havre, is not the shortest for the imports and exports of Austria, Bohemia, Bavaria, Saxony, and all the Rhine provinces? Is there any wonder then that the progress of industry and commerce among our neighbors the Germans taught them that they had, to leave their home as well as to enter it, a route shorter than ours? Blame nature and progress, if you like, for the loss you have made of transit; but do not think of bringing it back, because such an enterprise would be absurd.

“France should be for the trade of England, Holland and Western Germany, the main road to Spain, Italy, the Orient, Constantinople and Smyrna. It should and could be: it is not.”

How could this be and should it be, and how can we claim it, when we know that the coasters from the north come to take goods from the south of France at Cette and Marseille itself, and transport them by counter-car via Gibraltar to Dunkirk, Rotterdam, etc., at the price of 12 fr. per ton? To sustain this competition, have we found the secret of

making goods travel on the railways, at one or two centimes per ton and kilometer? Let us hasten to say it: France and Europe will be grateful.

“Of the 60,000 bales of cotton that Switzerland receives annually, 20,000 pass through Trieste, because, in the current state of our communication routes, the long journey from Trieste to Zurich and Basel often offers savings on the river route. Likewise, the commerce of the coast of Spain passes largely past Marseille, on its way to Genoa; and spirits of wine from Catalonia have been seen arriving from this direction to Geneva, on the very banks of the Rhône.” The economist's calculations will never prevail against patriotic sentiment. So I will not try to change the universal belief: let me only explain until the end the reasons for my unbelief.

One of two things must be true: either it came from the exorbitant prices asked by the Rhône navigation entrepreneurs, and, in this case, the Lyonnais would only have themselves to complain about; or the Italians and the Swiss have found a way to drive by land, at less than 7 or 8 c. per kilometer; and then how do you intend to remedy this evil with rates of 12 and 14?

But what's the point of bickering against phantoms? Instead, let us get back to reality. Apparently the purpose of the railway line from Marseille to Le Havre is not to bring goods coming via the Mediterranean out via the Ocean or the Channel, nor to transport goods coming via the Ocean into the Mediterranean. The simplest and least expensive option, in this case, would be to tour Spain. For the same reason, goods destined for the interior of the continent must prefer ports that allow them to travel, by land, the shortest distance, and this, along with the motive of national interest, explains the success of certain ports in competition with ours. From now on, transit for us is limited to Switzerland, the Duchy of Baden and a few other countries of the Germanic Confederation.

Now, the Chamber of Commerce of Besançon, which, in a writing published on the occasion of the railway project from Dijon to Mulhouse, dealing with the question of transit in a very special way, noted that the goods shipped from Marseille to the East, and vice versa, during the years 1838, 39, 40, 41 and 42, had not exceeded 28,328 tons, that is to say on average 5,665 per year, approximately the hundredth part of the transport that takes place on the Saône. Do we hope to double, triple, increase this quantity tenfold by reducing car costs? Let us put a little order into navigation, and we will be able to offer merchants from across the Rhine transport at 3 cents. per ton and kilometer; but let us not turn to the railway, which would make us pay 12.

When the application of an idea fails on an essential point, it fails at the same time on all points, and nothing can justify it. Thus we went so far as to praise the strategic

importance of a railway from Lyon to Châlons. If it is only a question of transporting soldiers and war material, the advantage would be entirely in navigation, because, in such cases, it is above all a question of uniting speed and mass. According to Mr. Teisserenc's calculations, with 66 locomotives and 2,037 wagons, we would transport 35 leagues, in 28 hours, 22,000 infantrymen, 2,400 cavalrymen, 1,400 artillerymen and pontooners, and 2,650 horses. It is clear that Mr. Teisserenc only reasons here by multiplications, and outside of experience. The services of the railways in times of war have not yet been proven by a sufficient number of facts, any more than those of river navigation: I will therefore oppose to Mr. Teisserenc's possibility another possibility. The large Saône boats, called *savoyardes*, load per *décise* up to 225 and 250 tons. Let us limit ourselves to 150: one of these boats would be equivalent to 50 wagons. Ten tugs, each dragging four coupled boats, would therefore be sufficient to transport an army of 25,800 men, in 12 hours, from Châlons to Lyon; and, if it were a question of going up the river, twenty, both tugboats and passenger boats, would easily make the same journey in 24 hours with the same load.

But, say the clever, an abundance of means cannot harm. France, rich and industrious, will no sooner have completed its railways than it will see an increase in its products, its commerce, its population, and the volume of its business. Its fields and vineyards will redouble in fertility, its workshops will no longer be idle; its roads, canals and railways will be covered with travelers and goods.

Another would perhaps find this reasoning as weak as all those previously refuted; but I have no doubt, for my part, that it will produce more effect on the public mind than all my reasons. It is the argument of national vanity, the argument of faith, hope and love; and the calculations of the economist will never prevail against the patriotic sentiment. So I will not try to change the universal belief: let me simply be permitted to explain to the end the reasons for my incredulity.

First of all, as far as the population is concerned, I beg the friends of the people and the railways not to be distressed; wherever two people can find a place to live, said Fénelon, a marriage takes place; often even, — alas! — there are four. This then is the law of nature: the nest for the brood, not the brood for the nest. Guarantee of subsistence is the prerequisite of the household. — But, according to the same principle, it seems that the roads must also be for commerce, not commerce for the roads; that circulation follows production logically and physically, that it is a consequence of it, or, as the academics say, a postulate; that the perfection of the circulatory instruments does not *create* the productive force, although it contributes to *developing* it; that it is a question, finally, instead of starting with the construction of a railway, with the idea that the mass of

circulating products will be able to increase, of asking production itself to what extent point it asks for a new vehicle.

I therefore say that all the evaluations and conjectures have been made under the influence of this pitiful inversion of ideas; the administrative figures were complicit in popular prejudice, and that is why I deny everything, until I see it or it is proven to me. The prefect of Lyon, in his report to the general council, estimates the movement in navigation of the Saône, entries and exits, during 1843, at 34,922 boats, and that of the Rhône at 10,557, for a total of 45,479. I deny the accuracy of this figure, because it is absurd. It is well known that the tonnage of navigation, both from the Rhône and from the Saône to Lyon, does not exceed 500,000 tons, which, at 100 tons per boat, brings the number of shipments and arrivals to 5,000, and adding half for boats returning or returning empty, 7,250. So what did the prefect mean by his movement of 45,479 boats?

Mr. de Lamartine predicts 600,000 passengers and 400,000 tons for the Châlons-Laon railway. I deny the accuracy of this figure, because five tenths of the goods are transported today even by river at 89 per cent cheaper than they would by road; because circulation is now about as convenient and as inexpensive as it can ever become, and yet it does not reach, for persons, the figure of 270,000; because in general the number of those who move decreases as the distance increases, and the railways from Châlons to Paris and Mulhouse would not add a quarter to the current number; because finally the circulation of foodstuffs becomes regularized little by little and necessarily by water, land and rail, the number of business travelers will gradually become less.

From all sides we support the demands of the railways with the most misleading calculations: it is the Chamber of Commerce of Troyes that promises its wines, its flours, its irons, its coals, its stones, its slabs, some hundred thousand barrels at 20 c. per kilometer, more than 400,000 travelers; — it is the Chamber of Besançon that announces for the line from Dijon to Mulhouse, on the condition that it will pass through its walls, with 69,350 tons of goods, a figure that is not at all irrational, 569,400 travelers; — it is who knows what other maker of plans who goes up to 876,000. I deny all these figures, because they are all interested and therefore unworthy of belief. Do we want proof of this? The Chamber of Commerce of Besançon, evaluating the number of passengers it can give to the railway based on the number of stagecoaches, begins by counting the *places* for *people*; then multiplying the figure obtained by 2 because of the returns, without thinking that it does double duty for all the travelers who are only passing through; then tripling the product, under the pretext that every railway triples the movements of men on the line it covers, it arrives at the figure of 569,400. Isn't that ridiculous?

But if these hyperbolic numbers were true, what would they prove in favor of a railway attached along its entire length to a navigation line like the Rhône and the Saône, assisted by canals like those of Burgundy and from the Rhône to the Rhine? The more you increase the work, the more you cause the navigators to drop prices, the more you encourage competition. A singular thing! It would be more advantageous for the railway from Châlons to Avignon to transport from these two points, each year, only 100,000 tonnes of goods divided into 10,000 shipments, than to see this quantity increased tenfold. Draw the conclusion from this fact: For the railways bordering the canals and rivers to survive, navigation must be prohibited and the former must be guaranteed a monopoly; and this is also what railway speculators will soon be asking for. I don't say anything unless I prove it.

In its issue of February 20, 1845, the newspaper *La Presse* treats the idea of free travel applied to canals like roads as an *unfortunate and completely inappropriate idea*. "The moment," he said, "is not well chosen to expropriate canal shareholders. It is not when we concede railways with tariffs of 14, 16 and 18 centimes that it is appropriate to abolish the canal tariffs, fifteen and twenty times lower than those of the railways."

And in its issue of March 13, the same newspaper inserts, covering it with its approval, an article communicated by a person from Alsace, an article in which it is requested that the Nancy canal be abolished, and that of the Sarre not started, for the reason that these canals would compete with the railway, and that even in the absence of such a neighborhood, and according to the broadest hypotheses, the said railway will never return 7 percent of its capital.

"With a branch from Saarbrücken to the railway," says the rich and enlightened Alsatian to whom the *La Presse* does the honors, "we had the transport of Prussian coal at 9 centimes on average, or, for 300,000 tons and 72 kilometers, 4 million in receipts... With this situation, we will find ten companies willing to exempt the Treasury from 100 million. But if the Nancy canal is completed, if the Chamber does not require serious tariffs to be imposed on this waterway, which is more costly to establish than a railway; if Saarbrücken is joined to the Marne-Rhine canal by the Sarre canal, the rail route will become a mediocre affair... It is therefore not 15 to 20 million that the completion of the canal will cost the Treasury, but 115 to 120 million. The Treasury will lose and Alsace will wait, habits will take hold outside, and transit will be forever fixed on foreign railways."

Where are we? the state will lose 120 million, if instead of 9 c. for the transport of fuel, the people of Lorraine and the Alsatians only pay 3! The interests of the State are therefore opposed to those of the citizens and it is to create this opposition that we begin

by asking for the ban on a canal! But the Stock Exchange is not the Public Treasury, the companies are not the country, and it may be that from a certain point of view the correspondent of *La Presse* is not wrong.

Finally, the *Journal des Débats* of the same day, March 13, contains a long article full of strong discontent against the Minister of Public Works, who took it into his head, at the height of the railway fever, to request a credit of 80 million for the improvement of inland navigation. I am beginning to believe that the government is not in France what is most hostile to general interests, and that it can happen that a council of ministers sees further than 459 deputies. The railways are no longer, for a portion of the bourgeoisie, an instrument of national wealth and progress; they are an opportunity, a means, an element of agiotage. How can we be surprised that to bring to reason this annoying, greedy and stupid race, which only knows how to confuse the simplest ideas, and to defile everything it touches, some appeal to despotism and others to dictatorship?

This is the place to explain the economic reason for two principles to which I have already alluded more than once, namely: 1. that any provision of services on the part of the State must be free; 2. that there are circumstances where the State must intervene in private industry, and derogate from the law of free competition. The considerations that we are going to read, and which I believe I have not encountered anywhere, will provide an answer to the much debated and little clarified question of the execution of the railways by the State. I therefore draw the reader's attention to this point.

OF THE GRATUITY OF WORKS OF PUBLIC UTILITY, AND OF STATE INTERVENTION IN PRIVATE INDUSTRY.

We have already recognized that any public service must be delivered as cheaply as possible, because if it were otherwise, there would be competition between individuals and the State, which implies a contradiction. If therefore the State must deliver its services at the cheapest possible price, that is to say at the price closest to the cost, the question to be resolved is the following: What is the cost price of the services provided by the State? But this question presupposes another: By what sign do we recognize that a service must be provided by the State rather than by individuals?

Here appears a recurrence, if I dare say so, between ideas: since the State must provide its services at the lowest possible price, in other words, since it implies contradiction if the State engages in speculation and trafficking of its services (which is the very principle of competition), the services of the State must be free, and the works that fall under its

charge are *all those whose market price is necessarily* BELOW *the cost price*. It remains to be seen whether work of this type exists in society.

It is an incontestable principle of economics, and one that the *Journal des Économistes* recalled in the introductory article of its fourth year, that all work must leave a surplus. This principle is for me universal, absolute, without exception. But the application varies, depending on whether the producer is a simple individual, or whether this producer is the State.

Everyone knows that the cost price of a commodity is calculated according to the wages of the working days and according to the values consumed in production, which values still represent wages, and include part of what we call overheads. Thus Watt having calculated that a fixed machine with the power of 20 horsepower could provide more constant and more regular services than a stream falling on a water wheel, and would cost no more to establish and apply than the natural force, the cost price of the products of the new engine had to consist of: 1. all the salaries paid to the workers; 2. the general costs of the establishment; 3. The interest and depreciation of the capital employed in the machine. But, and this is above all what is important to note, the cost price goes down all the more as the machine experiences less friction; hence the continual effort of entrepreneurs to obtain orders and to obtain sustained work. It is like this in all industries. So that we can lay down this rule: In all things, the normal, ideal cost price is that which results from the uninterrupted use of the instruments of production.

Now there are very numerous cases where production can obey this law; then competition is the condition of exchanges, because it is for the consumer the surest guarantee of a good market. — There are other cases where neither the interest nor the amortization of the capital invested can commercially be found; and it is then that the market price of the service falls below the cost price. In other words, while for certain services the market value, by its indefinite tendency to level with the cost price, is realized more and more, for certain other services the market value, following the same law, tends to disappear.

I place in this second category all monuments of public utility: churches, theaters, town halls, colleges, halls, fountains, museums, libraries, bridges, quays, dykes, towpaths, roads, canals and railways. The anti-commercial nature of these great instruments of labor, or better said of well-being, comes, I reason in the sphere of economic ideas, from the fact that being endowed with a power of indefinite utility, that is to say a power that immensely exceeds the human means of alimentation, the slightest salary that is demanded is always disproportionate, always exorbitant, and nevertheless always insufficient. Let us explain this in more detail.

A weaver knows what he needs to live, how many pieces he makes in a year, what his job costs, what it will last him; he can, consequently, determine the cost price of his work; and, if he has competitors, his salary will approach this price more and more. Also an engineer can calculate what a road will cost; and how many men, animals and carriages could pass there in a day: but, if it is a question of establishing a toll, he will not base its rate on the millions of heads which could, in a time given, pass on the road, but over the few thousand or the few hundred that will probably pass there; a system which is in every way the opposite of that which competition aims to achieve. In the theory of commerce, the normal tariff for a toll road would be that which would require from each passenger only the proportional fraction of a revenue that, being equal to the depreciation and the interest on the capital, would have to be paid by an infinite number of taxpayers. Any other price is arbitrary, and, as you will see, will soon appear exorbitant.

A village of five hundred fires is cut by a stream that the peasants cross, wetting their feet and muddying their shoes, using a few stones thrown into the mud: it is useful for the commune to contain this stream, to raise a roadway, to build a bridge. These works will cost 20,000 francs. To cover this expense, establish a toll of 5 centimes per person and 25 centimes per carriage; the peasants will take a detour rather than pay. Suppose they pay, which will happen to them as little as possible, the revenue will not rise to 6 francs. per day: there will be no collection costs. What a pitiful placement! Raise the price, it's a prohibition; reduce it, it is an abandonment of capital.

It is therefore true to say that, from the point of view of exchange, and contrary to the fundamental aphorism of science, works of public utility are never worth what they cost. This is what happens for the Rhône-Rhine canal, which has already cost thirty million, and does not produce, with a price that we still find too high, 400,000 francs of net. But do we want to know what this rate should be, to produce only the interest on the capital at 5 percent, in perpetual annuity? Because there can be no question of amortization here. Five cents per ton and kilometer, on average, that is to say without distinction of goods. The transport of coal from the Loire, which today is 16 fr. 80 c. per ton, navigation rights and all costs included, from Perrache station to Mulhouse, would be increased by 11 fr. 20 c. And if we added the interest on the sums spent, since 1830, on the improvement of the Saône, which amount to 21,700,000 francs, the total costs of transporting a barrel of coal from Lyon would amount to at 35 francs. 67 c., in all 8 c. 1, per ton and kilometer. At this rate, the duty would be prohibitive, and communications intercepted.

But, it will be said, the railways do not fit into the category. The railways having to compensate for haulage and stagecoaches, with a reduction of a quarter or a fifth on prices,

thus offering the advantage of speed combined with cheapness, cannot be onerous to anyone.

I answer without hesitation that if, at the beginning, the railways are not expensive, they will become so through use, infallibly. This is in the force of things, which I do not suppose, but which I explain. It is with two provinces, before the establishment of a road, a canal, or a railway, as with two towns that would be located opposite each other, on each side of a river, and whose inhabitants, maintaining only rare relationships, would communicate together by means of a ferry. If a bridge is then built across the river and joins the two stations, if the toll for this bridge is not more expensive than the ferry, it will not appear too onerous to passengers; but it will be insufficient for the entrepreneur. Now suppose that the two towns become a large city, the frequency of relations will make the price unbearable, the people will shout, the municipality will be forced to buy back the toll: which, for it, will precisely amount to free construction.

This is how things happen in society. We have never seen two geographical points, such as Tarascon and Beaucaire, Lyon and la Guillotière, Paris north and Paris south, develop suddenly and suddenly pass from solitude to a great industrial movement, without having previously started in relation by any means of communication; because, if the instrument of junction is not the principle of development, it is one of its essential conditions. Now I repeat that, in all cases, the toll is irrational; first, because from the point of view of theory, it is necessarily and will remain eternally abnormal; then, because, in practice, it will be either insufficient for the company, or onerous for the people. Likewise, after the railways have created new habits and relationships, and perhaps contributed to doubling the population, its activity and its needs, the government will find itself in the necessity of expropriating the concessionaires and reducing the tariffs based solely on operating costs, an operation that will amount to a sacrifice for the State. So much so that after starting with the mercantile system of companies, we will have to, willy-nilly, end with the socialist system of free travel, and thus enter into theory. There is no one in France who does not expect this result; and if we could still have some doubt, I would beg to explain why the State, advancing part of the capital used in the creation of the railways, is satisfied with the least interest, and then most often does not participate in the profit; why, finally, are its concessions only for thirty-five or forty years?

We would not imagine, if we had not witnessed it, how far the universal effort goes to get rid of the slightest servitude in the enjoyment of objects of public utility. For a long time the railway from Saint-Étienne to Lyon encountered serious competition from wagoners, who provided goods service, cheaper and in less time than the locomotive. It is only since the coal monopoly, for Lyon's consumption, was organized that the wagoners,

having lost their counter-car, saw themselves forced to give up a trade that had until then been very important for them. lucrative. After the wagoners, another competition exercised the patience of the railway administration: it was that of the Givors canal, which we were only able to overcome by reaching an agreement with it, and making it a share of the locomotive's proceeds. Very recently, finally, the inhabitants of this last town having experienced some harassment from the railway, a stagecoach was immediately organized; and three times a day, at the same time as the road, you can see a long, wide carriage leaving from Quai Saint-Antoine, crowded with travelers who prefer the road to the railway. And it is said that this enterprise, whose prices are below those of the railway, is an excellent speculation.

It is facts of this nature that made one of our ministers say: "The slightest economy is enough to change the direction of transit and warehouse goods."

In principle therefore, it is the case with railways as with all objects of public utility: not being able to be the object of an investment, but rather of a sacrifice, they do not belong to the domain of private speculation, and are the responsibility of the State. In order to accomplish its work, the State appeals to capitalists, borrows the help of private industry, opens fixed-price tenders, and frees itself either by a contribution or by a series of annuities paid to lenders, but this is only a way of achieving common utility, which in no way affects the principle. The essential condition is that the route is free and gratuitous, except for the operating and maintenance costs which, in one form or another, the public will always have to bear, since it is an incessantly renewed consumption: as for capital of establishment, it cannot and must not play any role in the calculation of the rate.

This fundamental distinction between the work of human industry considered from the point of view of the productivity of capital being once admitted, — and how could it not be admitted? — I will take the liberty of addressing economists with the following questions:

1. Is political economy, as we learned from Adam Smith and Say, able to appreciate, in a theoretical and demonstrative way, the excess value that must be returned after their creation by works of general utility whose enjoyment costs individuals nothing?

2. What is the common principle that governs these two divergent orders of facts: concurrent production with profit and collective production with sacrifices?

Whatever the answer to this curious problem, which should not concern us here, the facts being relevant and proven, I will draw the immediate conclusion: it is that the State having to make a sacrifice, it is its duty, as in our interest, to prefer the least sacrifice.

Now, to appreciate the extent of the sacrifice that the State will have to bear in building the Avignon and Châlonssur-Saône railway, let us first consider that this line, in

order to survive, urgently demands a monopoly. Indeed, without a monopoly, the railway will not obtain, over 380 kilometers of route, half a quarter of the passengers, except at ruinous and unsustainable prices; because, even deducting from the tariff the centimes for interest and depreciation, the rate would still remain three and four times above that of navigation. — Without a monopoly, there are no coals, flours, madders, worked metals, large groceries, etc., forming seven-eighths of the materials transportable between Avignon and SaintJean-de-Losne. — Without a monopoly, there is no certainty of acquiring expensive goods, which could become the object of lucrative speculation in the navigation service, advantageous to commerce, and offering, to a higher degree, security, regularity and promptness. — Without a monopoly, a boat with four *modères* will always be enough to keep companies formed with capital of fifty and eighty million in check. — Without a monopoly, finally, the railway will only be the subordinate and temporary auxiliary of navigation. The concession of the transport monopoly is the essential corollary of the railway concession.

On the other hand, with the monopoly, the State suffers the dead loss of twenty million spent over the past fifteen years on improving the river; in order to ensure the interest of the capital swallowed up in the railway, and to cover the excess of the costs of the railway over those of navigation, it hits national consumption with a tax of several millions, at the same time it chases the transit; finally, it annihilated the commission, abolished the warehouse, destroyed the existences created by the maritime industry, and changed the entire economy of the populations. Let us only stop at this last point of view.

Reflecting on the general and physiognomic characteristics of railways, compared to roads and waterways, I find that the railway, like most modern inventions, is above all humanitarian, cosmopolitan and decentralizing, qualities that it takes precisely from the permanence and rapidity of its action.

The railway calls for the man for whom time is even more than money, because it is life, much more than it serves goods, to which the speed of steam very often only adds an unnecessary luxury. The railway, eliminating intervals, makes men everywhere present in each other's homes; thanks to it, we will be able to say of a State what Pascal said of the universe: The center is everywhere, the circumference nowhere. Thus, just as the railway escapes the periodicity of the seasons which is everywhere visible in commerce as well as in the extractive and agricultural industries, so it erases and levels all the inequalities of position and climate, and makes no distinction between the hamlet lost in the plain and the manufacturing center majestically seated on the rivers. It will be up to the railway to completely realize this aphorism: The more the lines of communication become perfect, that is to say, the more easily the merchandise becomes able to move in all directions from

the place of production to the place of consumption, the less the producer and the consumer need intermediaries, the less the goods will seek the warehouse.

It is the warehouse, not the transit itself, which, from ancient times, has brought prosperity to commercial cities: Babylon, Nineveh, Jerusalem, Palmyra, Tyre, Alexandria, Corinth, Athens, Carthage, Syracuse, Taranto, Marseille, Barcelona, Venice, Genoa, the coastal towns, etc. In times of eternal war, the workshop was located in a citadel; the warehouse was established next to the workshop, the merchandise traveled from fortress to fortress, from which it then spread timidly, by hawking on the backs of mules and on the backs of men, in small towns, castles and villages. Follow history and you will see that times of prosperity for large warehouses and industrial centers correspond to times of anarchy and war.

But when on all sides of the roads, canals pass and intersect; when, by the elastic force of steam, the boat slides on the waves with the speed of an arrow, and in a few hours crosses three degrees of the meridian; when thirty carts in a row run along a rail like an electric flame along a lightning rod; when, finally, 28,000 square leagues of country form nothing more than a workshop, a garden, a market, — then, the warehouse decreases, constantly decreases; the merchandise passes, that is to say, *transits*, for everyone, and only stops at the consumer; the warehouseman with his store, the shopkeeper at the corner of his street, the commission agent and the broker in their counter, become more and more parasitic instruments, and give way to the carter. With the speed of communications, the population disintegrates and disperses; the workshop, like the home, is fixed indifferently everywhere; the fair is at all points permanently; Paris and Yvetot, when it comes to buying and selling, are equal before the railway; there is no longer any reason to pile up in hundreds of thousands in the marshes of Perrache, any more than on the rocks of Croix-Rousse and Fourvières; and if, for some time to come, the agglomeration maintains itself, it is by tradition and as a *fait accompli*. The railway, with its slopes of one or two millimeters, with its bridges, its tunnels, its vast radius curves, recalls the prophecy of Isaiah: *Omnis vallis implebitur, et omnis mens humiliabitur, et erunt prava in directo*; and the social movement continuing below this gigantic level, the revolutionary idea having found its armor, a transformation at short notice is inevitable. Come the railway with all its consequences, and this mass of dark and unhealthy dwellings that we call Lyon will disappear like fog in the breeze.

In this regard, I applaud the creation of the railways; I will even applaud the suppression of the Saône and the Rhône, or, if you like, their availability in the hands of the companies, and the sacrifice of a twenty million inland waterway, provided that it is understood, officially announced, published, that Lyon and Châlons have ceased to be the

crossroads of commerce, that their boatmen only have to return to the fields, and their workers to leave expensive, unpleasant residences, now without guarantee.

But the government would not dare to follow, with this ruthless logic, a principle that is contrary to the law of *liberum mare*, of the liberty of the river. Things will take their course, one hundred and forty million will be buried to create double employment, and since, according to all the data of calculation and economics, the waterway cannot be defeated, despite the railway, Lyon and Châlons will continue to prosper as centers of commerce and warehousing.

But what! Will the misfortune of possessing the most beautiful navigation in Europe deprive two large cities, the second capital of the kingdom, of the benefit of the railways? And while the network will extend throughout France, will Lyon alone be *disinherited*?

If I understand anything about commerce and the theory of exchange, it seems to me that it is not the railway, although an instrument of circulation, that is the representative sign of values, but money; consequently, that Lyon's true *heritage* is the system that promises to make it the most money. I therefore find, unless there is better advice, that the Lyon question is no longer at the gate or within the walls of Lyon, that it is on the entire line of which it is the center; that the main point is to create, by rail or otherwise, new tributaries, to make established relationships more and more necessary and to preserve them from any attack.

On the Burgundy and Center canals, the rights, whatever has been said, are exorbitant, since they represent *eight times* the value of the traction price: Lyonnais and Burgundians must relentlessly pursue the repurchase of shares and the lowering rates. Three centimes per ton and kilometer, reduced on the transit of goods, would increase the tonnage of these canals by a quarter and perhaps a third, and this additional work would benefit the entire navy as well as shippers.

The Minister of Public Works asks for eighty million for inland navigation; a large sum will be allocated to the improvement of the Yonne. To go to Paris, the coals of the Loire could one day take this route. It is necessary, through an address, to thank the minister for his great foresight, and to request, through a special law, a credit for the Rhône.

The coals of the Loire flow today, delivered to Mulhouse, 26 fr. per ton; with the help of a reduction in duties and some improvements in the track, they could only come down to 22 francs. However, after the construction of the Sarre canal, coal from Saarbrücken will be able to arrive in the Haut-Rhin at approximately the same price: the interest of the French shipping industry, of French miners, as well as that of Alsatian consumers, requires that nothing is neglected to ward off a defeat. To demand the abolition of the

Sarre canal would be absurd: we must, through an effort of intelligence, seek an increase in traffic on the Rhône-Rhine canal; it is in the interest of Lyon as much as of Saint-Étienne.

There is talk of a canal joining the Saône to the Marne: Lyon, Cbâlons, Gray, are equally interested in this project; it is a new waterfall in the basin. Let us begin studies, and continue, if necessary, the execution.

A railway must be built from Dijon to Mulhouse: two routes are planned, one through the Doubs valley, lateral to the canal; the other by the Haute-Saône, parallel to the river. It is important for Lyon's trade to know which of these two lines is the most advantageous for it, the one which, passing through Gray and Vesoul, finds itself in competition with the Saône, far from the large population center, and through regions essentially agricultural; or that which, for four months of the year, would replace a canal closed by high water and ice, serving Besançon, this outlet for Lyon's trade, and would reach Switzerland more closely, via the cantons of Vaud and Neufchâtel. In a word, does the Besançon road need the reinforcement of a railway more than that of Gray? This is, for shippers from the Rhône to the Rhine, the question of the railway from Dijon to Mulhouse.

Wines from Provence only arrive in Paris via the Mediterranean and the Ocean: a large part is even consumed at low prices locally, due to lack of communication. For the Lyonnais, it is a question of a canal branching off the Rhône, and of incessant improvements in the river, and of the reconstruction of the Nemours bridge, and finally of the reduction of rights on the Burgundy canal and the development of the Yonne, to transport these wines, 50,000 barrels perhaps, through the Rhône.

In general, the duties imposed on drinks, sugar, tobacco, salt are too strong: to increase circulation, consumption must be increased, costs must be reduced. Let the Lyon deputation, so influential, insist to those in power to obtain relief; 2 cents less per liter and kilogram will benefit the city more than a 140 million railway line.

Let us therefore accustom ourselves to the idea that nothing that happens around us can be indifferent to us; that our interest is always more or less affected; and that from now on the supreme law of commerce, like the salvation of the people, is cheapness. A little philosophy in business leads to sacrificing the general interest to selfishness, a lot of philosophy identifies one with the other.

But, it will be said, how can we achieve this cheap utopia in the state of antagonism and anarchy in which we find ourselves? How to establish order without compromising liberty?

To answer this last question, we must, as with the previous one, go back to principles.

The moral goal of competition is liberty; its economic goal is the progressive reduction of the market price. Now, by a phenomenon analogous to that which we described earlier, competition, by the virtue specific to it, sometimes achieves cheapness, sometimes shows itself radically powerless to produce it, especially to fix it. The reason is that, in the latter case, the minimum cost price can only be obtained by a large operation with guaranteed work, and that it is precisely the essence of competition, on the one hand, to prevent this guarantee, on the other hand, that the more an operation grows, the more competition grips it. It is with factories as with machines: everything is proportionate to human nature, so that beyond a certain limit, the mechanic is powerless to make his machine move, and the industrialist to supply his establishment and to reduce overhead costs. Thus, a navigation capital of 10,000 francs fighting against a capital of 500,000 francs, the small entrepreneur suffers an infinitely less loss than the large one, since the reduction that hits the first as 10,000, hits the second as 500,000. In this regard, I would note that to confront the industrial feudalism that threatens us, and which is the necessary end of our development, one of the means would be to restart the series of this development on the smallest scale.

How can we make competition more effective? How can we return commerce to its normal condition?

We have seen above that competition being prohibited to the State vis-à-vis individuals, any industrial enterprise, producing a profit in exchange, is thereby prohibited to it. The State cannot therefore intervene here as a producer. But the State, creator or supplier of the waterway, thereby associated with the work of navigation, the State can intervene as an interested third party, and make its reservations. I therefore say that between the State, author and overlord of the waterway, and the carriers who travel along it, there is the same relationship as between a landowner and the peasants who request his land for lease. The State, proprietor, neither cultivates nor exploits; it leases. It does not compete with anyone; it excites competition, and makes its profit from it. It is true that in exchange for the best deal it must obtain, it guarantees the exclusive use of the thing; it is a monopoly that it concedes, but a negative monopoly, that is to say a monopoly created for the greatest advantage of all, as opposed to the positive monopoly, created only for the increase.

These principles admitted, and I defy anything solid to be opposed to them, I ask what would be contrary to the constitutional order, to liberty, to national and local interests, to economic science, and, to put it bluntly, to the very principle of competition, in a bill conceived approximately in the following terms:

LAW ON NAVIGATION

Art 1. The Saône, until now given over to the common use of boatmen, returns to the domain of the State.

Art. 2. A company will be authorized to operate this line, and the transport of passengers and goods will be carried out under the supervision of the authority, under the following conditions:

Art. 3. The price of tickets from Châlons to Lyon, and vice versa, is 2 francs. 50c. the first, and 1 fr. 50 c. seconds. — Soldiers on leave, settlers heading to Africa, destitute workers who have received the subsidy of 15 c. per league, will be admitted free of charge.

Travelers' baggage will be received without charge, up to 75 kilograms.

Art. 4. Departures will take place from the two cities twice a day, and three times if necessary, at times prescribed by the season and railway connections, by liners in perfect condition. — Two boats will be constantly in reserve, to go to discovery in the event of an accident, and to supply those that need repairs.

Art. 5. During overflows, a connection will be established between the liners, from one deck to another, so that the service does not suffer any interruption.

In the event of freezes, the Company is liable, for a surcharge of 8 francs. and 5 fr. per person, to send by stagecoach travelers who present themselves at its offices.

Art. 6. As rental price, the Company will pay each year to the administration a sum of 100,000 francs.

Art. 7. For goods, the same company will haul from Lyon to Verdun all those destined either for Châlons and the railway, or for the Burgundy canals and from the Rhône to the Rhine, or finally to Haute-Saône, at the fixed prices of 3 fr. 20 c. for coal and asphalt, and 5 fr. for goods, navigation rights and insurance included. The duration of the trip, there and back, with good navigation, will be at most five days.

Art. 8. This service will be organized by daily departures, and more frequent, if necessary, and served by at least four tugs, each with a capacity of 60 horsepower.

Art. 9. The decision will be made at the price of 2 fr. 50 c. per ton: however the route will remain free for descending goods that will prefer not to use the hauler.

Art. 10. The award of the Saône service will take place every five years at public auction and at a discount, on sealed bids, and under justifiable security of 100,000 francs.

Art. 11. Compensation will be granted to current owners of tugboats, transport contractors and carriers, whose appraised equipment will be acquired by the Concession Company, and who will have privileged entry, either as agents or as sponsors.

Art. 12. The Company prohibits any solicitation of goods, and any loading, commission, sale or purchase business; its specialty must remain limited to transport. Any discount and bonus on the price fixed by the auction is also prohibited.

Art. 13. A special law will subsequently establish the conditions for navigation of the Rhône.

I do not know if there are other facts or considerations that militate in favor of extending the railway below Châlons-sur-Saône. As for me, sure of what I put forward, certain of proving the error of all the denials, I attest that the above market conditions would no sooner be proposed than they would be accepted.

I implore progress-loving economists and their countries, who have had the courage to read this article, to share their thoughts with me. In the meantime, I congratulate the minister who, notwithstanding the law of 1842, will have relieved the State of the earthworks and engineering of the road from Châlons to Avignon, and put everything at the expense of the companies.

P.-J. PROUDHON.