Ou tombent les poteaux minces du telegraphe
Dont les fils ont failure etrange d'un paraphe.

(The scene behind the carriage window-panes
Goes flitting past in furious flight; whole plains
With streams and harvest-fields and trees and blue
Are swallowed by the whirlpool, whereinto The
telegraph's slim pillars topple o'er, Whose wires
look strangely like a music-score.)[29]

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29. Paul Verlaine, *Oeuvres poétiques complètes* **(Paris, 1951), p. 106. The cycle 'La bonne chanson' was written in the winter of 1869/70; transl. Gertrude Hall, in** *Baudelaire, Rimbaud, Verlaine: Selected Verse and Prose Poems,* **(New York, 1947).**

[3]
Railroad Space
and Railroad Time

Economically, the railways' operation . . . causes distances to
diminish . . . Lille suddenly finds itself transported to Louvres;
Calais to Pontoise; le Havre to Poissy; Rouen to Sevres or to
Asnieres; Reims to Pantin; Strasbourg to Meaux; Lyon to a place
half-way between Melun and Corbeil; Marseilles to Nemours;
Perpignan to Pithiviers; Bordeaux to Chartres or to Etampes;
Nantes to Arpajon, etc.
— Constantin Pecqueur, 1839

'Annihilation of space and time' was the early-nineteenth-century characterization of the effect of railroad travel. The concept was based on the speed that the new means of transport was able to achieve. A given spatial distance, traditionally covered in a fixed amount of travel time, could suddenly be dealt with in a fraction of that time; to put it another way, the same amount of time permitted one to cover the old spatial distance many times over. In terms of transport economics, this meant a shrinking of space: 'Distances practically diminish in the exact ratio of the speed of personal locomotion', Lardner says in his *Railway Economy.*[1]

The average traveling speed of the early railways in England was twenty to thirty miles an hour, or roughly three times the

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1. D. Lardner, *Railway Economy* **(London, 1850), p. 35.**

speed previously achieved by the stagecoaches.[2] Thus, any given distance was covered in one-third of the customary time: | temporally, that distance shrank to one-third of its former length. In early-nineteenth-century writings the temporal diminution is expressed mostly in terms of a shrinking of space. An] article published in the *Quarterly Review* in 1839 speaks of 'the gradual annihilation, approaching almost to the final extinction, of that space and of those distances which have hitherto been supposed unalterably to separate the various nations of the globe', and continues:

> For instance, supposing that railroads, even at our present simmering rate of travelling, were to be suddenly established all over England, the whole population of the country would, speaking metaphorically, at once advance *en masse,* and place their chairs nearer to the fireside of their metropolis by two-thirds of the time which now separates them from it; they would also sit nearer to one another by two-thirds of the time which now respectively alienates them. If the rate were to be sufficiently accelerated, this process would be repeated; our harbours, our dock-yards, our towns, the whole of our rural population, would again not only draw nearer to each other by two-thirds, but all would proportionally approach the national hearth. As distances were thus annihilated, the surface of our country would, as it were, shrivel in size until it became not much bigger than one immense city.[3]

The image of a temporal shrinkage seen as a spatial one appeared in an even more extravagant guise in the work of Constantin Pecqueur, the economist and Saint-Simonian, whose *Economie sociale* received a prize from the Institut de France in 1838. Here, the temporally shrunk transport space is a new geography of France, a geography based on the new conditions of speed, a condensed geography, as it were. The cities of France approached each other while simultaneously advancing on Paris. These changes in location, enumerated in

the epigraph to this chapter, are summarized in Pecqueur's statement that it had become possible to see 'the new France as fitting into the space of the *old* Ile-de-France, or its equivalent'. The diminution of transport distances seemed to create a new, reduced, geography, yet it did not actually alter the size of the spaces between the points connected by the new mode of transport. 'Yet by a sort of miracle,' says the *Quarterly Review* article, after describing the shrinking process, 'every man's field would be found not only *where* it always was, but *as large* as ever it was'. Pecqueur expressed the same notion in literary hyperbole: the diminished transport geography of France contained the true geography of France within it in a condensed form: 'Each bit of terrain, each field on this surface would still remain intact; so would every house in a village, the village itself, or the town; every territory with its village in the center would remain a province; on the map of the imagination, all of these would finally be reproduced and reduced down to the infinitely small! As for Louvres, or Pontoise, or Chartres, or Arpajon, etc., it is obvious that they will just get lost in some street of Paris or its suburbs'.[4]

The notion that a French town could fit into a Paris street demonstrates that the alteration of spatial relationships by the speed of the railway train was not simply a process that diminished space, but that it was a dual one: space was both diminished *and* expanded. The dialectic of this process states that this diminution of space (i.e., the shrinking of transport time) caused an expansion of transport space by incorporating new areas into the transport network. The nation's contraction into a metropolis, as described in the *Quarterly Review,* conversely appeared as an expansion of the metropolis: by establishing transport lines to ever more outlying areas, the metropolis tended to incorporate the entire nation. Thus the epoch of the suburbs, of the amoebic proliferation of the formerly contained cities into the surrounding countryside, began sual for persons whose place of business is in the al, to reside with their families at a distance of from

Economie sociale (Paris, 1839), vol. 1, p. 26.

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2. According to H. G. Lewin, *The Railway Mania and its Aftermath, 1845-52* (London, 1936), the average speed, up to 1845, was 'between 20 and 30 miles per hour' (p. 95). The Great Western Express, the fastest English train, reached a speed of 46 mph. Lardner says the speed of the stagecoaches was a little less than 8 mph *(Railway Economy, p.* 36), whereas Lewin claims that the fastest coaches achieved 10 mph. The actual speed of English trains in the 1840s, i.e., their top speed, was, according to Lardner, frequently 60 to 70 mph *(Railway Economy,* p. 170).
3. *Quarterly Review,* vol.' 63 (1839), p. 22.

with the rail-

fifteen to twenty miles from that centre. Nevertheless, they are able to arrive at their respective shops, counting-houses, or offices, at an early hour of the morning, and to return without inconvenience to their residence at the usual time in the evening. Hence in all directions round the metropolis in which railways are extended, habitations are multiplied, and a considerable part of the former population of London has been diffused in these quarters/

The notion that the railroad annihilated space and time was not related to that expansion of space that resulted from the incorporation of new spaces into the transport network. What was experienced as being annihilated was the traditional space - time continuum which characterized the old transport technology. Organically embedded in nature as it was, that technology, in its mimetic relationship to the space traversed, permitted the traveler to perceive that space as a living entity. What Bergson called the *duree* (duration, the time spent getting from one place to another on a road) is not an objective mathematical unit, but a subjective perception of space-time. The dependence of this perception on transport technology illustrates Durkheim's notion that a society's space-time perceptions are a function of its social rhythm and its territory.[6] 'What is decisive', says Erwin Straus, discussing the psychology of distances, 'is not the objectively measured distance, but the relation of such distance to potentiality.'[7] Transport technology is the material base of potentiality, and equally the material base of the traveler's space-time perception. If an essential element of a given sociocultural space-time continuum undergoes change, this will affect the entire structure; our perception of space-time will also lose its accustomed orientation. Sorokin, following Durkheim, distinguishes between sociocultural and physico-mathematical notions of space-time, and has described the hypothetical effects of a sudden replacement of customary sociocultural time measures with purely mathematical ones: 'If we try to replace sociocultural time by a purely quantitative time, time becomes devitalized. *It loses its reality, and we find ourselves in an exceedingly difficult position in our efforts to orient ourselves in the time process, to*

5. Op. cit., p. 36.
6. Emile Durkheim, *The Elementary Forms of the Religious Life* (Glencoe, Ill., 1947), pp. 10-11, 440.
7. Erwin Straus, *The Primary World of the Senses* (New York and London, 1963), p. 385.

find out "where we are" and where are the other social phenomena on "the bridge of time"'.[8] (Italics in original.)

Thus, the idea that the railroad annihilated space and time must be seen as the reaction of perceptive powers that, formed by a certain transport technology, find suddenly that technology has been replaced by an entirely new one. Compared to the eotechnical space-time relationship, the one created by the railroad appears abstract and disorientating, because the railroad — in realizing Newton's mechanics — negated all that characterized eotechnical traffic; the railroad did not appear embedded in the space of the landscape the way coach and highway are, but seemed to strike its way through it.

Heinrich Heine captured the disorientation experienced by the traditional space-time consciousness when confronted by the new technology; apropos the opening of railway lines from Paris to Rouen and Orleans in 1843, he wrote of the 'tremendous foreboding such as we always feel when there comes an enormous, an unheard-of event whose consequences are imponderable and incalculable', and called the railroad a 'providential event', comparable to the inventions of gunpowder and printing, 'which swings mankind in a new direction, and changes the color and shape of life'. Heine continues in this vein:

> What changes must now occur, in our way of looking at things, in our notions! Even the elementary concepts of time and space have begun to vacillate. Space is killed by the railways, and we are left with time alone. . . . Now you can travel to Orleans in four and a half hours, and it takes no longer to get to Rouen. Just imagine what will happen when the lines to Belgium and Germany are completed and connected up with their railways! I feel as if the mountains and forests of all countries were advancing on Paris. Even now, I can smell the German linden trees; the North Sea's breakers are rolling against my door.[9]

We have now clearly stated the two contradictory sides of the same process: on one hand, the railroad opened up new spaces that were not as easily accessible before; on the other, it did so by destroying space, namely the space between points. That in-between, or travel space, which it was possible to 'savor'

8. Pitrim A. Sorokin, *Sociocultural Causality, Space, and Time* (Durham, NC, 1943), p. 197.
9. Heine, *Lutezia*, pt 2, lvii, Elster ed., voi. 6, p. 360.

while using the slow, work-intensive eotechnical form of transport, disappeared on the railroads. The railroad knows only points of departure and destination. 'They [the railways] only serve the points of departure, the way-stations, and the terminals, which are mostly at great distances from each other', said a French author in 1840, 'they are of no use whatsoever for the intervening spaces, which they traverse with disdain and provide only with a useless spectacle'.[10]

As the space between the points — the traditional traveling space — was destroyed, those points moved into each other's immediate vicinity: one might say that they collided. They lost their old sense of local identity, formerly determined by the spaces between them. The isolation of localities, which was created by spatial distance, was the very essence of their identity, their self-assured and complacent individuality. Heine's vision of the North Sea breaking on his doorstep in Paris was tinged with 'tremendous foreboding' because both localities — Paris and the North Sea — were still presented in their mutually isolated state, 'worlds apart': thus their collision appeared unfathomable. Thirty years later, as an interlocking network of railroad lines connected all of Europe, that kind of consciousness was no longer realistic. Regardless of their geographical remoteness, the regions appeared as close and as easily accessible as the railways had made them. One generation after Heine, the more privileged inhabitants of Paris had the option of letting themselves be transported, in a matter of hours, to a region that was as distant from their city as Heine's North Sea. The Mediterranean does not extend its shores right up to Parisian thresholds, but it could be reached so much more quickly than before that the journey there was no longer experienced as such. The Parisians who migrated south in the winter saw nothing but blue skies and the sea. As Mallarmé wrote in the winter of 1874/5, in *La Derniere Mode,* the journal he edited, they are 'calm, self-absorbed people, paying no attention to the invisible landscapes of the journey. To leave Paris and to get to where the sky I is clear, that is their desire'." They were no longer travelers — rather, as Ruskin puts it, they were human parcels who dis-

10. Charles Dunoyer, *Esprit el méthodes comparés de l'Angleterre el de la Frame dans les entreprises de Travaux publics et en particulier des chemins de fer* (Paris, 1840), p. 104.

11. Stéphane Mallarmé, *Oeuvres complètes,* **Pleiade ed. (Paris, 1970), p. 843.**

patched themselves to their destination by means of the railway, arriving as they left, untouched by the space traversed.

Even though the railroad was incapable of bringing the remote regions physically to Paris, the speedy and comfortable accessibility of those regions created a consciousness of distance that approximated to Heine's vision of space, but without the sense of foreboding. The region that could be reached by train from Paris realized itself for the Parisians by means of the train. It then appeared as the product or appendage of the railroad, as in a phrase of Mallarme's: 'Normandy, which, like Brittany, is part of the Western Railway'.[12]

But if Normandy and Brittany, being its destinations, were part of the Western Railway, then the point of departure of that same railway, the station in Paris, became the entrance to those regions. This was a common enough notion in the nineteenth century: it is to be found in every one of Baedeker's travel guides that recommends a certain railroad station as the point of departure for each excursion.

The identification of the railroad station with the traveler's destination, and the relative insignificance of the journey itself, were expressed by Mallarme in *La Derniere Mode,* under the heading *Gazette et Programme de la Quinzaine;* the following subheadings represented equally important institutions for entertainment: *Les Librairies, Les Theatres, Les Gares* (the last sometimes replaced by *Les Voyages).* Thus a railroad journey appeared in no way different from a visit to the theater or the library — the purchase of a train ticket was equivalent to that of a theater ticket.

A generation after Mallarme, Marcel Proust, in *A la Recherche du temps perdu,* discussed the difference between a journey by train and one in a motorcar:

The journey was one that would now be made, probably, in a motor-car, which would be supposed to render it more interesting. We shall see too that, accomplished in such a way, it would even be in a sense more genuine, since one would be following more clearly, in a closer intimacy, the various contours by which the surface of the earth is wrinkled. But after all, the special attraction of the journey lies not in our being able to alight at places on the way and to stop

12. Op. cit., p. 774.

altogether as soon as we grow tired, but in its making the difference between departure and arrival not as imperceptible but as intense as possible, so that we are conscious of it in its totality, intact, as it existed in our mind when imagination bore us from the place in which we were living right to the very heart of a place we longed to see, in a single sweep which seemed miraculous to us not so much because it covered a certain distance as because it united two distinct individualities of the world, took us from one name to another name; and this difference is accentuated (more than in a form of locomotion in which, since one can stop and alight where one chooses, there can scarcely be said to be any point of arrival) by the mysterious opera- tion- that is performed in those peculiar places, railway stations, which do not constitute, so to speak, a part of the surrounding town but contain the essence of its personality just as upon their sign- boards they bear its painted name. '3

The fate wrought upon the outlaying regions by the railroads affected goods even sooner: as long as production and con- sumption were strictly regional — which they were until the beginning of modern transportation — goods remained part of the local identity of their place of production. Their route of circulation was to be perceived at a glance. Only when modern transportation created a definite spatial distance between the place of production and the place of consumption did the goods become uprooted commodities. In *Grundrisse,* Marx makes an observation about the relation between spatial distance and the nature of commodities; it tells us a good deal about how modern transportation has affected our perception of goods: 'This lo- cational movement — the bringing of the product to the market, which is a necessary condition of its circulation, except when the point of production is itself a market — could more precisely be regarded as the transformation of the product *into a commodity'*.14 (Italics in original.)

With the spatial distance that the product covered on its way from its place of production to the market, it also lost its local identity, its spatial presence. Its concretely sensual properties, which were experienced at the place of production as a result of

13. *Remembrance of Things Past,* vol. II, *Within a Budding Grove,* I; transl by C. K. Scott Moncrieff (New York, 1934, pp. 489-90).
14. Karl Marx, *Grundrisse, foundations of the Critique of Political Economy* (London, 1973), p. 534.

the labor process (or, in the case of the fruits of the land, as a **result of** natural growth), appeared quite different in the distant market-place. There the product, now a commodity, could realize its economic value and simultaneously gain new qualities as an object of consumption. No longer was it seen in the context of the original locality of its place of production but in the new locality of the market-place: cherries offered for sale in the Paris market were seen as products of that market, just as Normandy seemed to be a product of the railroad that takes you there. Pecqueur touches on the notion of the unity of the realization of economic value and the biological process, using the example of **the** ripening of fruit: 'For instance, economically speaking, and for the sake of freshness and price, the cherries of Montmorency really ripen on the uncultivated summits of the Quartier Lafayette; the roses of Fontenay burst into bloom and fragrance in the flower beds of the Jardin du Luxembourg; the peaches of Mon-treuil in the Parc de Monceaux, and the grapes of Fontainebleau, too, ripen on some hill closer to Paris than the one where the Surenes is still greening'.15

The regions, joined to each other and to the metropolis by the railways, and the goods that are torn out of their local relation by modern transportation, shared the fate of losing their in- herited place, their traditional spatial-temporal presence or, as Walter Benjamin sums it up in one word, their 'aura'.

The detaching of the remote region from its original isolation, its opening-up by the railroad, can well be defined as the 'loss of its aura', as Benjamin characterizes the aura and its loss in his essay 'The Work of Art in the Age of Mechanical Reproduction'. The notions of spatial-temporal presence and distance were integral parts of Benjamin's concept of the aura. He defined the 'aura of natural objects' as 'the unique phenomenon of a dis- tance, however close it may be'.16 The aura of a work of art is 'its unique existence at the place where it happens to be'.17 This spatial-temporal singularity, this 'happening-but-once-ness', this *genuineness* of the object, is, according to Benjamin, de- stroyed by reproduction. The situations into which the product of mechanical reproduction can be brought may not touch the

\l Walter Benjamin, *Illuminations,* (New York, 1973), p.

222. 17. Ibid., p. 220.

actual work of art, yet the quality of its presence is always depreciated.[18] It is tempting to apply this statement to the outlying regions that were made accessible by the railroad: while being opened up to tourism, they remained, initially at least, untouched in their physical actuality, but their easy, comfortable, and inexpensive accessibility robbed them of their previous value as remote and out-of-the-way places. 'The staple of the district is, in fact, its beauty and its character of seclusion and retirement', Wordsworth wrote in 1844, defending the Lake District against the intrusion of the railways.[19] The devaluation of outlying regions by their exploitation for mass tourism, by means of the railroad in the nineteenth century and air traffic in the twentieth, is a familiar occurrence. As soon as the railroad reached the seaside towns of southern England that had been strongholds of the aristocracy far into the nineteenth century, the middle classes took them over. Then the aristocracy retired to remote localities such as Scotland, Ireland, and the Lake District.[20] Contemporary air-line tourism is engaged in further devaluation of formerly exclusive, very remote regions.

The destruction of aura by means of reproduction, of which Benjamin speaks, is an expression of the same trend that brought the masses 'closer' to the outlying regions in the nineteenth century: 'The desire of contemporary masses to bring things "closer" spatially and humanly . . . is just as ardent as their bent toward overcoming the uniqueness of every reality by accepting its reproduction'.[21] The remote regions were made available to the masses by means of tourism: this was merely a prelude, a preparation for making any unique thing available by means of reproduction. When spatial distance is no longer experienced, the differences between original and reproduction diminish. In the filmic perception — i.e., the perception of *montage,* the juxtaposition of the most disparate images into one unit — the new reality of annihilated in-between spaces finds its clearest expression: the film brings things closer to the viewer as well as closer together. The regions lost their temporal identity in an entirely concrete

18. Ibid., p. 221.
19. William Wordsworth, *The Prose Works,* ed. A. B. Grosart, (London, 1876, vol. 2), p. 326.
20. J. A. R. Pimplott, *The Englishman's Holiday* (London, 1947), p. 118.
21. Benjamin, ibid., p. 223.

Sense: the railroads deprived them of their local time. As long as they remained isolated from each other, they had their individual times: London time ran four minutes ahead of time in Reading, seven minutes and thirty seconds ahead of Cirencester time, fourteen minutes ahead of Bridgwater time.[22] This patchwork of varying local times was no problem as long as traffic between the places was so slow that the slight temporal differences really did not matter; but the temporal foreshortening the distances that was effected by the trains forced the differing 'local times to confront each other. Under traditional circumstances, a supra-regional schedule would be impossible: times of departure and arrival are valid only for the place whose local time is being used. For the next station, with its own time, that previous time is no longer valid. Regular traffic needs standardized time; this is analogous to the way in which the machine ensemble constituted by rail and carriage undermined individual traffic and brought about the transportation monopoly.

In the 1840s, the individual English railway companies proceeded to standardize time, but did not coordinate their efforts; each company instituted a new time on its own line. The process was so novel that it was repeated daily, in the most cumbersome manner, as Bagwell describes, apropos of the Grand Junction Company's procedure: 'Each morning an Admiralty messenger carried a watch bearing the correct time to the guard on the down Irish Mail leaving Euston for Holyhead. On arrival at Holyhead the time was passed on to officials on the Kingston boat who carried it over to Dublin. On the return mail to Euston the watch was carried back to the Admiralty messenger at Euston once more'.[23]

When, after the establishment of the Railway Clearing House, the companies decided to cooperate and form a national railroad network, Greenwich Time was introduced as the standard time, valid on all the lines.[24] Yet railroad time was not accepted as

Philip S. Bagwell, *The Transportation Revolution from 1770* (London, 1974), p. 124. Op. cit., p. 125.
Greenwich time is the time kept at the Royal Observatory in Greenwich, founded in 1675. 'The precise standardization of time measurement dates from the foundation of the Royal Observatory in 1675' according to G. J. Whittow, *The Nature of Time* (London, 1972). Like the later standard time, the original Greenwich time was created to meet the needs of expanding traffic, i.e., shipping, in the seventeenth century. Vessels carried Greenwich time with them on their chronometers, as it was necessary for orientation and navigation. However, it was not used as a generalized norm for the division of the

anything but schedule time until late in the century. As the rail network grew denser, incorporating more and more regions, the retention of local times became untenable: in 1880, railroad time became general standard time in England. In Germany, official recognition came in 1893; as early as 1884, an international conference on time standards, held in Washington, DC, divided the world into time zones.

In the United States, the process was more complicated, as there was no cooperation whatsoever between the private railroad companies. Each company had its own time, in most cases the local time of the company's headquarters. In stations used by several different lines there were clocks showing different times: three of these in Buffalo, six in Pittsburgh.[25] In 1889, the United States was divided into four time zones, essentially unchanged to this day; officially, at first, the times within the zones were regarded only as railroad time; in practice, these became regional standard times, although they were not given legal recognition until 1918.

day: Greenwich time was still restricted to the walls of the cabinet that contained the chronometer during the voyage. 25. John Stover, *American Railroads* (Chicago, 1961), p. 157.

| *Excursus* The Space of Glass Architecture

The railroad reorganized space. In architecture, a similar reorganization occurred with the introduction of glass and steel as new building materials. The railroad machine ensemble multiplied speed and capacity of traffic; steel and glass multiplied the capacity of roofed structures. Both the railroad and the glass buildings were direct expressions of the multiplied productivity brought about by the industrial revolution. The railroad brought new quantities of goods into circulation; the edifices of glass architecture — railroad stations, market halls, exhibition palaces, arcades — served as places of transit and storage. The spatial capacity of glass architecture stands in a similar relation to the capacity of traditional architecture as the railroad's capacity stands to that of preindustrial transportation. This is due to the greater strength and resistance to stress characteristic of steel, the necessary complement to glass, compared to the previously utilized building materials. According to Alfred Gotthold Meyer, steel, in terms of stress resistance, is forty times as strong as stone, ten times as strong as wood.[1] The combination of steel as the carrier and glass as the filler led to a reappraisal of all previously recognized architectural principles; Meyer expresses it as follows:

(1) *The reappraisal of strength and mass.* By means *of* mathematical

1. **Alfred** Cotthold Meyer, *Eisenbauten: Ihre Geschichle und Asthetik* (Efilingen, 1907), p. 11.