

Journey to the Centre of Europe

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La pluralité des centres
Ordonnée aux rouages
Des multiples systèmes
Contrarie en nous
Un leurre
Fascination
D'un possible seul Centre
Pivot de tous les autres
(André Verdet, L'obscur et l'ouvert)

1. Wrong directions

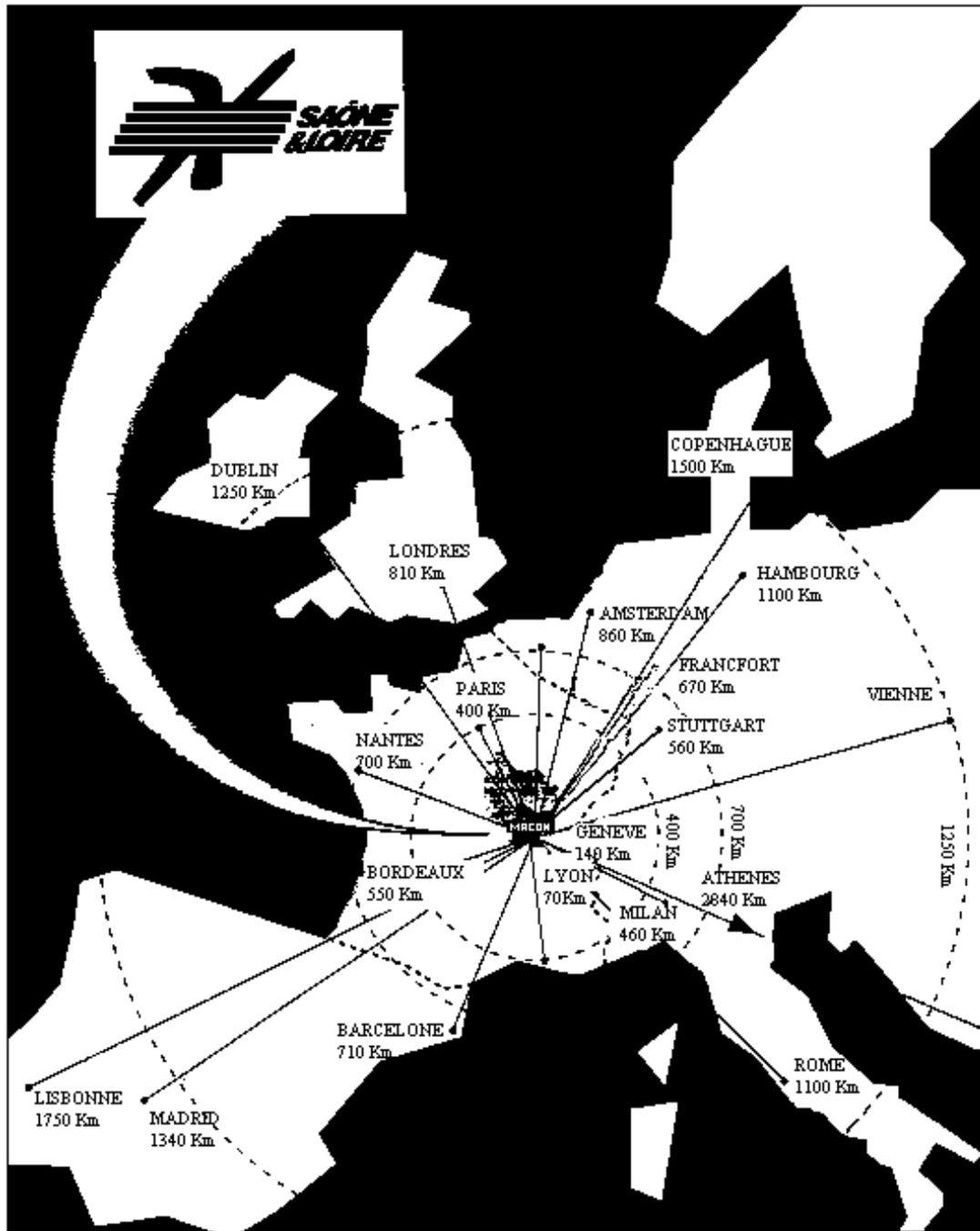
Here are two maps showing the centre of Europe. Each one seems self-evident at first sight. But comparison shows they are absolutely meaningless. It seems that two European regions, although in different locations, are both claiming to be the centre of Europe and so in an enhanced position ! (Maps 1 & 2).

The idea underlying these maps is a highly intuitive one. It is based on analogy between the geographical centre that is sought and the geometric centre of the circle. What could be easier than drawing a circle around the chosen area and deciding that the centre of the area is the centre of the circle ? The circle-centre couple is certainly the most *convincing* one too. Yet it is a very peculiar and very narrow view of an idea that is both much richer and much more elusive. Quite whether it is meaningful to represent a geographical area by the circle-centre pairing depends on whether the area is homogeneous and isotropic and on whether Euclidean distance can be used, three hypotheses that become invalid when we switch from abstract geometry to the actual economic space and its transport networks.

If we reason in terms of Euclidean distance, the idea of equidistance, which strongly influences our mental picture of the centre, is only found in the circle-centre pairing. In a square, we can only define a centre of symmetry, and in a random figure, like the shape of Europe, there is usually no geometric centre.

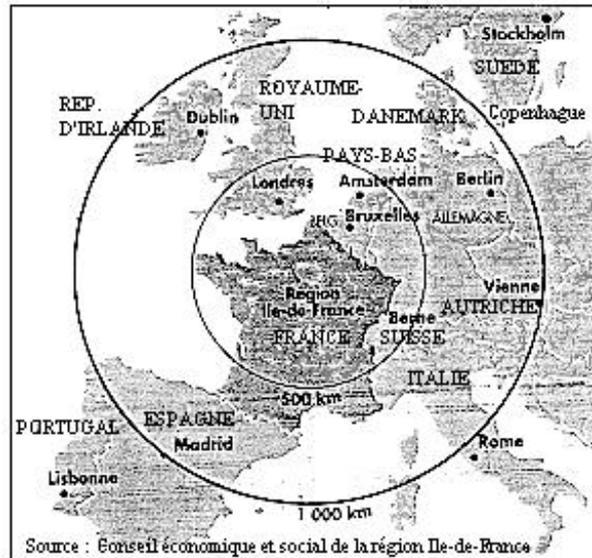
When Jules Verne takes us on a *Journey to the Centre of the Earth*, no readers wonder where the centre might be, no-one is mistaken, even though no-one clearly sees how to get there. But when speaking of the "centre of Europe", it is those who believe they know what they are talking about who most risk being misled, or risk misleading others. The expression "the centre of Europe" is meaningless unless we specify just what of, and how, why and for whom we are looking for the centre. The centre is the result of combining an a priori conception of the causes and forms of spatial structure with technical instrumentation, both components being taken from a vast range of possibilities that we will need to run through.

*Map 1: The Saône et Loire region in the centre of Europe
(Source : Conseil Général de Saône et Loire)*



The Saône-et-Loire region is highly favoured in terms of geography. The area is right in the centre of the map of Europe, has very varied landscape and tremendous natural assets.

*Map 2: The Paris region in the centre of Europe
(Le Monde, 2.7.1995)*



Beforehand, we shall lay down a few general principles that seem to validate the emergence of a centre within this domain as a whole. We shall end by questioning whether analysis in terms of centre is currently worthwhile. Our journey shall thus lead us from the emergence of the centre to its dilution.

2. The emergence of the centre

In a given sub-space, the centre *is* not at any specific point. First, because the concept of centre is a construction of the mind and this construction can be made in many ways and cover a wide range of real situations. Then, because once we know which real situation we are seeking to apprehend, it is the organisation of the economy and of society which determines the shape and location of this reality : the centre is therefore an intellectual, economic and social construction. The centre, if there is one, emerges at the junction between an attempt to conceptualise it and a process of spatial organisation. It depends as much on advances in the one as on the ups-and-downs of the other.

There is however a minimum consensus about the idea of centre. Whenever the idea of the centre arises in economics or in geography, we must bear in mind five inescapable principles.

The principle of accessibility (p_1)

This involves the distances between the different places of the reference area.

In an area formed by a set of points, the centre can first be defined as a point with an advantageous relative position within the set. The centre is then the point that minimizes the maximum distance between it and the other points (e.g. the centre of the Euclidean circle, or the centre of a graph) or the sum of the distances to the other points, or more generally any non-decreasing function of these distances. It is therefore usually defined by a minimum function.

This principle can be applied when a point represents a geographical place¹ and the distance used represents a geographical distance measured in units of distance, time or money -transport cost- (Huriot & Perreur, 1990, 1994). The position of the central place then depends entirely on the type of distance considered.

By replacing the minimum function, which determines the centre, by a maximum function, we define the periphery.

Identifying a centre or a periphery by distance alone is usually insufficient or meaningless for correctly identifying an economic or social centre.

The principle of concentration (p2)

The centre is also a place of *concentration* of population, jobs, the supply of goods and services, wealth, knowledge, information, culture, the capacity for economic, scientific and cultural innovation, but also for the resources for action, power and political, legal and economic decision-making (Polydorides, 1983 ; Reynaud, 1992).

The centre as a place of concentration is a priori different from the centre of accessibility, defined by its topological position alone. In this way, Paris is far from being the geometric centre of France. There is, however, an a posteriori link: there are often good reasons for concentrating activities in a topologically well-sited place. These two principles of accessibility and concentration can be combined to provide a general integrated measurement of centrality (Huriot & Perreur, 1994).

An important consequence of this principle is that the centre is a favoured place for action and interaction, encounters and confrontations. It is the privileged arena for the interplay of positive (agglomeration economies) or negative (pollution, congestion) externalities.

The theoretical literature in geography and regional economics uses the concepts of *central place*, *centre-city* and *urban centre* or *central business district* (CBD). All these centres are places of concentration.

The principle of inequality (p3)

The idea of the centre is the source of the dichotomy between what is central and what is not, all of which can be lumped under the heading of periphery. The centre-periphery pairing evokes asymmetry, spatial inequality, sometimes with an ideological connotation.

The centre groups everything that is attractive, prestigious, rich, developed, new, etc. The periphery is defined negatively by comparison with the centre. It appears to be marginal, deserted, abandoned, underdeveloped, devoid of independent decision-making capability, dominated or even colonised and exploited (Reynaud, 1992).

But the principle of inequality is distinct from the previous two. Dominated places, backwardness and poverty are sometimes encountered within a zone that overall has the characteristics of a centre (in terms of accessibility and/or concentration) of an area. Think of the marginality found in New York, in the heart of Manhattan, the islands of poverty in all cities of international standing, of the less developed areas of the wealthiest and most powerful countries in the world.

The centre maintains with the other places asymmetric relations of complementarity and conflict (Lacour, 1980), sources of flow. It is a place that attracts and/or diffuses human, material or immaterial flows in an asymmetrical pattern. It attracts people and activities. It diffuses knowledge, information and decisions. Attraction enhances concentration. Attraction

¹ A place is a spatial unit that is non-decomposable by nature or by convention within a geographic space (Beguin & Thisse, 1979).

and diffusion are connected with the idea of polarisation or of domination as an asymmetric relationship (Perroux, 1964).

In Marxist inspired literature, spatial inequality inherent in the centre-periphery dualism is asserted more clearly and more explicitly as domination, or even exploitation. This can be noted in the historical analysis of "world-economies" by Braudel (Braudel, 1979) as in the analysis of the spatial division of labour (Aydalot, 1976).

The principle of relativity (p4)

The centre is a relative reality, in space and time.

It is misleading to speak of *the* centre. Each level of the spatial scale can have its centre (district, city, region, nation, etc.). Each urban function can have its centre. Do we not speak of leisure centres, shopping centres, administrative centres? These places may be spatially separate, or even remote. Everyday language reflects this relativity clearly. Even so, these different functional centres are often found together or very close to each other. It is the specific role of the city to act as multifunctional centre.

Even for a specific function, an area seldom has a single centre. There is usually one (or several) main centre(s) and centres of lesser importance.

The integration of several centres of unequal importance is the first step from the centre-periphery dichotomy towards a continuous scale of centrality: each place of a set E is characterised by a degree of centrality, as in the theory of central places.

A centre *changes* and moves. A place may lose its central properties (desertification) or recover them (rehabilitation). A centre may be the scene of different activities as relative capacities for bidding for occupation of ground space change. A centre can be created from scratch, deliberately, as for example with the building of shopping centres. Thus a centre may be the result of spontaneous development, self-organisation or a decision from outside.

The principle of subjectivity (p5)

Implicitly, when we speak of a centre, we imagine it surrounded by a circular area, because its geometry is more evocative, more directly representable than complex spatial structures.

The centre is enhanced and enhancing, objectively and subjectively. The mental picture of it has a high value of historical, cultural or economic prestige, as a place of power and responsibility, for the emotional attachment it elicits. This enhancement is especially related to symbolic or mythical representations.

The centre-periphery pairing has a very rich *symbolic content* (see Huriot, 1994a, 1994b). The centre-periphery pairing is a symbol of hierarchy, control, domination or even transcendence.

In this sense, being at the centre gives the feeling of being better located. Too bad if the centre corresponds to a criterion with only a distant link with the one we are really trying to optimise.

The realm of imagination has an important role, which means that talk about the centre, even if it aims to be scientific and objective, is never entirely neutral.

Principles of centrality versus principles of spatial analysis

Although they were determined independently, these five principles seem to fit in perfectly with the five principles of spatial analysis dear to Jean Paelinck (e.g. Paelinck, 1985), viz.:

*P*₁ Spatial models should be based on spatial interdependence.

*P*₂ These relations of spatial interdependence are probably asymmetrical.

P_3 By the principle of allotopy, phenomena located in one place are often explained by causes located elsewhere.

P_4 Ex post interaction is different from ex ante interaction.

P_5 Two-dimensional containing space should appear explicitly.

The following links can be drawn between the two series of principles, illustrated by table 1:

P_1 is achieved through p_1 and p_3 ;

P_2 is satisfied by p_2 and p_3 ;

P_3 is guaranteed by p_1, p_2 and p_3 ;

P_4 is part of the temporal aspect of p_4 ;

P_5 is inherent in the definition of the area whose centre is sought. It is guaranteed specifically by the way accessibility is defined in principle p_1 .

Principle p_5 brings out an imaginary dimension we think is intimately related to spatial representations, but which does not necessarily occur in every spatial analysis.

Table 1: from Paelinck's principles to centrality principles

| | P_1 | P_2 | P_3 | P_4 | P_5 |
|-------|-------|-------|-------|-------|-------|
| p_1 | ◆ | | ◆ | | ◆ |
| p_2 | | ◆ | ◆ | | |
| p_3 | | ◆ | ◆ | | |
| p_4 | ◆ | | | ◆ | |
| p_5 | | | | | |

3. The centre of what ?

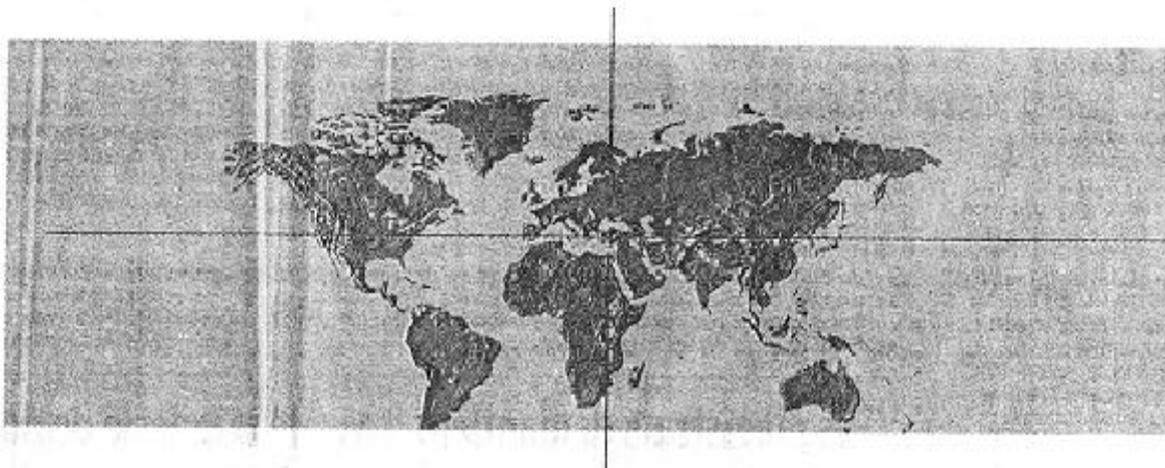
Of course, first of all we must define a sub-space of which to seek the centre.

This is not a trivial point, since the two dimensional space of the earth's surface has no centre (thus on map 3, Turkey appears at the centre of the world only as a consequence of an entirely arbitrary representation of the world).

Nor is it as simple as might be thought, and the problem is not solved by saying we are looking for the centre of Europe. The first, commonplace, difficulty is that Europe has no single hard and fast definition. Even if we restrict ourselves to the EU, the border is constantly expanding. To avoid multiplying such difficulties, we shall assume that the area of Europe is defined unambiguously at a given instant. If we use the principle of accessibility, combined or not with that of concentration, Europe must be reduced again to a finite set of points (inset 1). How can this set be defined ? We might use the set of European regions, each being marked by its capital, or its centre ... which only puts off the problem. We might use only the cities whose population exceeds a certain level, which means we lose part of the information about the spatial distribution of population and we do not necessarily dispose of a meaningful centre from the point of view of European economics: e.g. the influence of international functions is not related exclusively to the size of cities (Équipe Paris, 1993). The different ways of defining the set of places inevitably leads to different locations of the centre.

Map 3 : Turkey, centre of the world !
(*Le Monde*, 2.21.1995)

La Turquie n'est pas le
centre du monde
...elle y est située,
tout simplement.



Inset 1: Discrete space

To define a centre, we may need to reduce the study area to a finite number of points, or to reduce the number of places considered for convenience of computation. Aggregations must therefore be made, which are never neutral. The effects of aggregation on spatial models have been investigated by numerous authors (Openshaw, 1984 ; Fotheringham & Wong, 1991 ; Ruhigira, 1994). Arbia (1989) and Putman & Chung (1989) claim that variation in results stems from two sources: (1) variation in the number of elementary units (places) used for collecting information (regardless of the shape and dimensions of such places) and (2) variation due to the procedure which produced the shape and dimensions of the places. Errors caused by aggregation may have a sizeable impact on how the centre is determined.

4. The centre - how ?

Starting with a discrete area (inset 1), there are several techniques for determining a centre. Inset 2 quotes some, with their main properties.

Inset 2: Determining a centre from bivariate statistics

Let us suppose the area under consideration is composed of a finite number of places, elementary spatial units, on which a distribution of a variable is defined. Several types of centre can be determined, displaying different properties.

The centre of gravity. This is an arithmetic mean. It is the point that minimizes the sum of the squares of weighted distances to all other points. The main limitation with it is that it may lie outside the study area if the area is not convex. Knowing this centre provides no socio-economic indication about the place where it is located, which may be completely deserted. Its position is very sensitive to any variation in spatial distribution. Because the squares of distances are used, extreme locations have a relatively important weighting.

The median centre. This minimizes the sum of distances to all other points. Its position is only independent of the direction of the axes if the distance is Euclidean. It involves the first two limitations of the centre of gravity. It is less affected by extreme locations. Its insensitivity to certain changes in position limits its ability to account for temporal changes.

The modal centre. This is the areal unit where the density of the study variable is maximum. There may be several non-contiguous modal centres. By definition, the modal centre is always located within the study area and provides information on the areal unit where it is located. But it is insensitive to movements in distribution until a greater concentration appears. By definition again, it only includes one value of the distribution and therefore overlooks a sizeable amount of information. Choice of the modal centre may differ with the study variable. Values of the variables are sometimes distributed by classes. For "international urban functions", Paris and London usually appear in the modal class.

The centre, harmonic mean. This is the solution of $\min_j \frac{P}{\sum_i P_i/d_{ij}}$ where P_i is the value of the study variable in place i , $P = \sum_i P_i$ et d_{ij} is the distance from unit i to unit j , or, in an equivalent way, the solution of $\max_j \sum_i P_i/d_{ij}$, where the maximized expression is Stewart's location potential if P_i is a population. It is located in the study area and is not very sensitive to population movements. It often coincides with the modal centre, but unlike the modal centre, it includes all available information. Isopotential curves are often associated with it.

Other centres. Other methods of computation are available: the geometric mean centre, for which the logarithm of distance reduces the role of remote places, the centre which minimizes the variance of the distribution, or again the minimax centre which minimizes the greatest distance from any place to that place, and which is used for example in the theory of location of public services.

Like any indicator of centrality in statistics, the centre provides no information about the dispersion of the study variable. The use of non Euclidean distances changes the relative positions of places (Huriot & Perreur, 1990), as does the inclusion of movements over a network.

Representing the economic centre by the centre of a circle, as we have said, supposes homogeneity, isotropy and Euclidean distance. Reality differs from this ideal picture for three series of reasons. Places, in addition to their different locations, are not all alike. They contain variable densities of attributes. Movement takes place along networks (transport is not ubiquitous). The important thing is often not as much the length of the journey as its cost or duration. These reasons partly overlap. Each underlies a choice for representation of the centre.

Non-homogeneity

Having precisely defined the set of places of which we want to find the centre, we must choose which factor we are seeking: accessibility, concentration or a combination of the two ? In the latter two cases, which are the most common, what attribute or group of attributes of places are to be given priority ? These attributes may be the population size, the value of production, the importance of command functions, political or administrative influence, cultural importance, etc. Location of the centre can be very sensitive to such choices. For example, if we consider concentration alone and select as the centre the mode of spatial distribution, it can be seen that Paris is the centre of Europe for the number of registered offices of major European businesses, but is dominated by London for the number of registered offices of subsidiaries of these businesses (PARIS, 1993, 38-39).

Non-Euclidean

There is no homothety between the length, cost and duration of journeys. Functional distances cannot be represented by a Euclidean distance. We know that the choice of a mathematical function representing the relation of distance is decisive for the properties of the space represented (Huriot & Perreur, 1990).

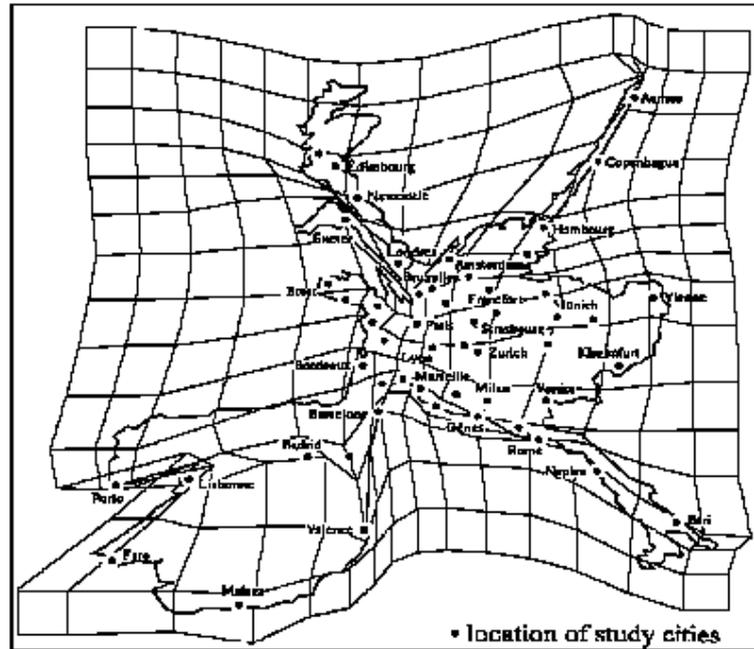
Non-isotropy

Journeys are invariably constrained by specific transport networks which introduce distortions compared with the hypothesis of isotropy. Determining the centre depends on the characteristics of the network or group of networks chosen to evaluate accessibility. All these characteristics are sources of distortion.

The nature of the network is related to the mode of transport chosen, the type of link desired and the speed desired. Rail or road travel is chosen ; depending on the size of the places of departure and destination and the speed required, travellers will take ordinary trains or high speed trains, roads or motorways. We need only look how a map where distances represent access times by high speed train is deformed (by anamorphosis) to understand the consequences of non-isotropy (map4).

Accessibility of the network and the connection between networks also play an important role in determining the centre. Some networks are only accessible at a very limited number of places like airports, stations and toll gates. This is the cause of the famous "tunnel effect" which eliminates from a whole network of relations a number of places through which high speed trains or motorways pass with no possibility of stopping. Thus it may be much faster to go from *A* to *B* than from *A* to *a*, even though the first journey is longer than the second. Different networks related to the same overall means of transport can then be more or less well connected, which can cause breaks and irregularities in the relationship between the length and the duration of journeys.

Map 4: TGV 2015
(Cauvin, Martin et Reymond, 1993)



The shape of the network itself can create or *reproduce* a centrality which may be partly fictitious. Thus the radial form around Paris of the French rail network means many journeys must cross Paris, which reinforces the centrality-accessibility of Paris, which in turn reinforces its centrality-concentration. The radial picture is besides partly misleading as Paris at the centre is in part a simple compulsory point of transit. It is a special demonstration of the "hubs and spokes" model or the radial network, of which the principle can be applied for rationalising freight transport: it is more economical to link n places to a central place (n links) than to link all the places to each other ($n^2 - n$ links). In such a conception of a network, the centre (hub) may be located in a place remote from any concentration of population and activity, as is often the case for lorry transport. But it may also coincide with a major city (Paris, in the previous example, or the large American cities for air transport in North America).

Congestion of the network, by its geographical and temporal variability, is another factor of non homothety between length and time.

5. The centre - why ?

For what or for whom is it useful to determine the centre ? What are we trying to understand through knowledge of the centre? What are we trying to say ? What are we trying to do ?

Understanding

The search for the centre first of all has an intellectual interest that involves a whole series of questions on the role of a centre in an area like Europe, and more generally on the meaning

of inequality that is covered by the hierarchy that underlies the idea of centrality. Inequality is the unequal spatial distribution of activities and of power over these activities. The question of the formation of centres comes back to that of the origin of agglomerations of people and activities and that of interaction between places where people live and work. This is therefore the first problem of spatial theory, which must explain the heterogeneity of space. There are several paths available. We can suppose an unequal endowment in natural factors, or the existence of nodes of communication, i.e. an a priori central position (in terms of accessibility) on a network, which supposes the problem is partly resolved. If we reject this attitude, we evoke the important role of agglomeration externalities, or proximity effects in the optimal organisation of inter-individual and inter-firm relations which are not all of the market type.

Saying

What do we mean when we establish that a place is a centre ? What message do we want to get over, apart from the simple knowledge of existing spatial inequality ? Beyond knowledge, there is a symbolic factor. The place raised to the rank of centre is enhanced. From inequality, we make a value judgement from more to better. It is easy to see the meaning that this hierarchy can take on in a society that is beset by rankings and records. This symbolic dimension, which appeals to the imagination, inevitably appeals to rhetoric. The desire to persuade may jeopardise the serious scientific endeavour of seeking out the centre. The choice of approach to the centre or of a method for determining it may then be justified only by what we want to say. The problem is back to front: given a place, how can we show it is central ? Maps 1 and 2 in section one are a naïve illustration of this procedure.

Doing

Knowledge of the centre, or rhetoric about the centre, leads to action whether warranted or not.

From the viewpoint of the private sector decision-maker, the business leader, a centre seems a priori to be a good location with all the chances of maximizing possibilities for interaction on the spot (centre-concentration) and with the outside (centre-accessibility). From the point of view of the job-seeker, the centre offers the guarantee of greater employment because of the wider range of opportunities. Likewise, it provides those supplying jobs with a better match between employees and jobs. All that makes for "fully comprehensive insurance" centres (Veltz, 1993 ; Sallez & Vérot, 1993). Such behaviour relative to the centre reproduces and amplifies centrality.

From the standpoint of the public decision-maker, the question is one of regional development and management of regional inequalities. Should they be maintained or reduced ? The notion of balance is a slippery one here. Spatial equilibrium can of course accommodate inequalities. Which inequalities are desirable ? Should we oppose hyper-centralisation of the French type ? If so, how ? The policy of compulsory relocation of some institutions, even if it may serve as a signal, remains modest compared with the hierarchy that is to be overturned. A few measures cannot change a system that has been rooted in geography and in minds for centuries, especially as the systems tends to be self-perpetuating, even self-amplifying.

Combating overall centrality that is judged excessive involves creating or favouring centres at a smaller geographical scale. Then we can use the fiction of geometric centrality or ready access to encourage and develop a concentration of activity. That is the objective of the designers of maps 1 and 2 in section one.

6. Dilution of the centre

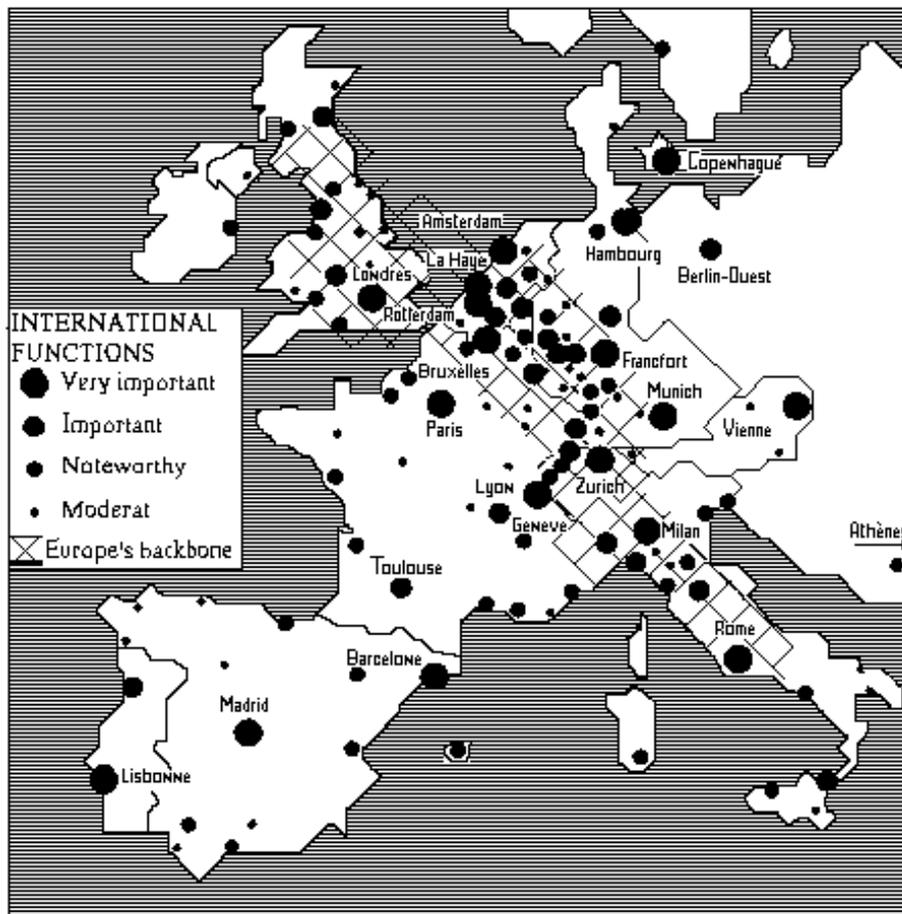
Nowadays, the centre is all or nothing. Michel Serre refers to urban diffusion over the entire planet: "the world is becoming a single city ...", which he names Newtown, "an invisible city, whose centre is everywhere and edge nowhere" (Serre, 1993). Do the density of links and the proximity of concentrations in Europe remove all value from the idea of centre ? There are several reasons for contesting the value of the classical idea of centre.

- Centrality is a diffuse phenomenon which cannot be reduced to a centre-periphery dichotomy, where the periphery is the collection of all places that are not the centre. Each place in a given area has a certain concentration of population and activities, and is more or less well situated compared with other places. Thus we move from the idea of centre to that of degree of centrality, and from a dichotomy to a hierarchy, a quasi-continuum, with places being ranked as more or less central. The structure of an area is then characterised not only by the location and characteristics of its centre, but by the form of the hierarchy of centrality its exhibits.

A good illustration of this phenomenon is the difficulty in visually interpreting the concentration of activities in Europe, from map 5, made by R. Brunet, who ranks towns with more than 200,000 inhabitants by an indicator combining criteria of international influence. R. Brunet sees a backbone arise, which he calls by the surrealist name of "blue banana". Apart from the fact that the "banana" oddly leaves aside one or two towns that are at the top of the rank order (Paris), the shape of the European zone of high concentration only looks like a banana for certain geographic methods of representation, and we could equally see in it a "magic circle" !

This difficulty appears even more clearly if we compare this map with map 6 based on the principle of iso-potential lines. The potentials are calculated from the gross domestic product of the regions and distances evaluated by average road transport costs between regions (Keeble, Owens & Thomson, 1982). The greatest potential appears in the Rhineland-Palatinate region and generally in the "golden triangle" whose corners are Stuttgart, Hamburg and Lille. Other peaks occur in Paris and less so in London and Berlin. On this basis it can be shown that successive widening of the European Community has not disrupted the golden triangle but has sometimes increased potential disparities (enlargement to 12 members).

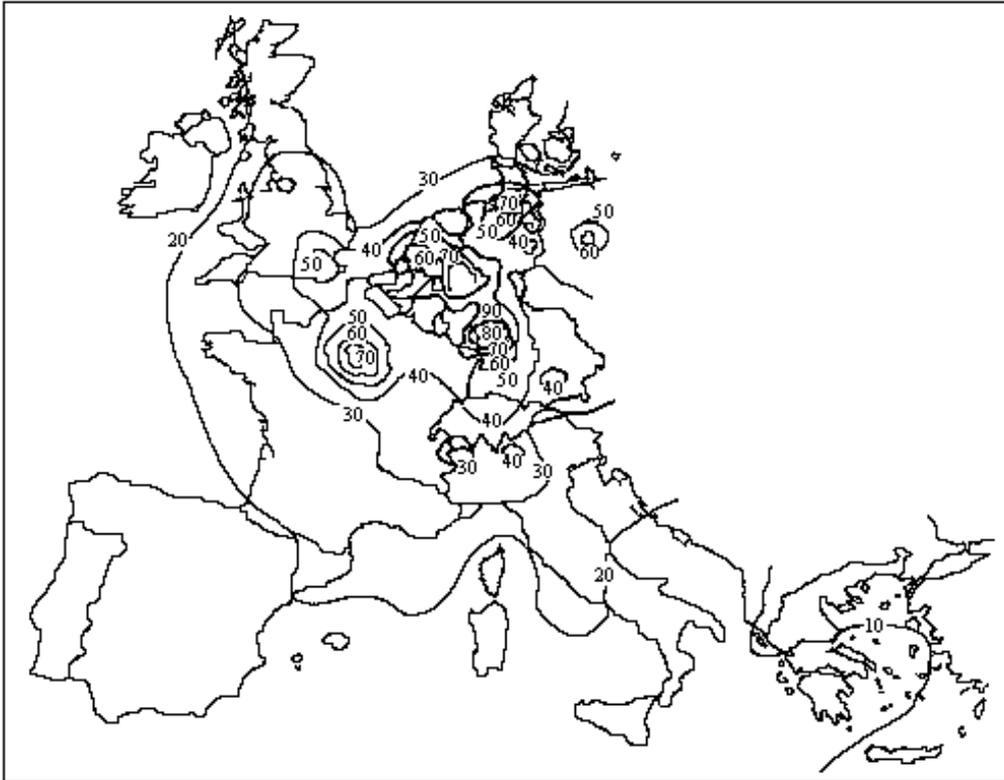
*Map 5 : International urban functions and the "blue banana"
(Le Moniteur, juin 1989)*



- Europe is a patchwork of *partial systems of centrality* which have very different characteristics. The "Parisian" model exhibits a very marked hierarchy with the strong domination of a large centre over a not very dense territory. This structure occurs in France, but also around London, Copenhagen, Vienna, Madrid, Dublin and Athens. The "Rhine" model displays much less inequality between places and links towns of almost equal size, as in the Rhineland, Flanders and to a lesser extent in North-East Italy (PARIS, 1993). It is difficult, even rash, to try to synthesise these different structures into a single hierarchy of centrality.

- Europe is covered by hierarchical networks which mean there is not much point looking for a central *place*. Rather than a Christallerian type hierarchy of places, we should perhaps concentrate on a hierarchy of networks. Large cities spaced throughout Europe exhibit both a strong concentration and high geographical proximity because of rapid transport services of the high speed train or airline type. Such networks of cities dominate the secondary networks of the smallest cities, also spread throughout Europe, and less well linked to each other than to cities of the first type, notably because of the tunnel effect described above. We thus see appearing a series of spatially superposed networks. If there is a centre, it is relative to the highest placed network in the hierarchy and covers all the territory. R. Camagni distinguishes three networks: one of world-status cities, one of specialised national cities and one of specialised regional cities (Camagni, 1993).

*Map 6: Regional economic potential in 12-nation EC
(Keeble, Owens & Thompson, 1982)*



7. Conclusion

The image of the centre is widely used by regional leaders for its symbolic content. They endeavour to convince their partners that their region occupies a preferential location relative to a value-enhancing economic area within the world economy. Europe is widely viewed as a symbol of drive, progress, the future, etc. However, regional leaders fail to question the relevance of the idea of centre on which their reasoning is based. Quite apart from the difficulties of definition developed in this paper, this simple concept related to the centre-periphery dichotomy seems ever less relevant in a area as complex as Europe.

The idea of attributing a rank order to places independently of each other, in the Christallerian way, has perhaps become meaningless. The centre becomes a set of places that is superposed and coexists with the periphery. The idea of the centre may persist, but void of its traditional geographical meaning. The important thing, rather than focusing on the idea of changing centres is to seek out the changes in the idea of the centre.

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Map 1

The Saône-et-Loire region is highly favoured in terms of geography. The area is right in the centre of the map of Europe, has very varied landscape and tremendous natural assets.

Map 2

L'Ile-de-France: a central position in Europe

Le Monde • Saturday 7th January 1995

Map 3

• location of study cities

(Data: symmetrical matrix of travel times)

Author: C. Cauvin ; drawing: A. Maurer (Programme Darcy, designed by W. Tobler and adapted by A. Serradj and D. Badariotti).

Map 4

INTERNATIONAL FUNCTIONS

Very important

Important

Noteworthy

Moderate

Europe's backbone

Fragile France: the "major axis" of development, Europe's backbone, hardly crosses France. Only Lyon, Toulouse, Strasbourg and Paris are important in terms of international attraction and influence. Cause for concern as competition to attract American and Japanese businesses is hotting up.

Map 5

Weber's works on industrial location are often presented in highly simplified form as a reference that can be forgotten because no longer relevant. In this paper, the authors review the basic model and show that in its basic version it is richer than summary versions suggest. They then expand on the way it has been developed with regard to the representations of space and the exploration of the notion of enterprise, including public services. They conclude that, by showing distance to be a synthetic factor of location, the basic model accounts for industrial organisation if we accept to broaden the impact of the weightings (mass of products to be transported) assigned to different sites.

Key words

Industrial location, Weber, minimum transport point, labour cost, agglomeration savings, distance, location of public services.