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Socio-economic change in a system of cities

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Among all the urban innovations, the changes in society and in population are mostly analysed, by geographers, insofar as the internal structure of metropolitan areas is transformed. But the spatial differentiation of social groups does not only exist inside the city. The social evolution produces also large differences, from one city to another; in the social and demographic composition of the population. Powerful processes of spatial differentiation and even of segregation do also occur at the upper geographical level of the whole system of cities.

This interurban social differentiation is depending upon the functional specialization of cities: central places are more likely to be towns of the bourgeoisie, whereas centres of industrial production lead to a more proletarian society (Chatelain, 1956). Analysing the recent socio-economic changes at a regional level, P. Aydalot (1976) suggested to apply a theory of the spatial division of labour to this segregational process. According to him, during the sixties-seventies, there was a shift from a branch-oriented regional specialization in economic activities toward an increasing spatial separation of the various functional levels inside each branch: decision and management, research, production and trade are more and more located in different units of each firm and in different places. As a result, the spatial segregation of population between the cities should increase.

After the pioneer works like those of Moser and Scott (1961), Carrière and Pinchemel (1963) and Berry (1972), several studies have identified the nature and measured the amplitude of the main components of social differentiation, which are obviously related to the economic ones, among a set of cities. Most of them have used factor analysis, in order to produce significant "latent dimensions" of an urban system (Berry, Kasarda, 1977, Parr, Reiner, 1980). But very few have tried to analyse the evolution of such classifications of cities (for instance, King, 1966, Pumain, Saint-Julien, 1978, Spence et al., 1981). The main reasons are practical (difficulty of obtaining data, and insufficient development of the methodology for the study of spatio-temporal change) but also theoretical: at the geographical scale of a whole urban system are only available weak extensions of approaches by urban ecology, or a better developed version of the theory of the spatial diffusion of innovations (Pred, 1977). However, empirical analysis of innovation diffusion through urban systems have been conducted for technical or entrepreneurial innovations (for instance, Pred 1966 and 1973, Robson, 1972) but less frequently for social changes.

This presentation summarizes the results of a study of growth and socio-economic changes of 100 to 400 largest French towns for the last 40 years. The relevant geographical framework for the study of urban change is the level of the agglomerations, which delimits at each census date (1954, 1962, 1968, 1975 and 1982) consistent urban areas on morphological and if necessary functional criteria. Calculations concerning demographic growth

have been made in constant geographical limits (avoiding to compute as a growth the annexed population of neighbouring communes), whereas the composition of population and labour force has been studied in proportion only, to allow for comparisons over time. Many characteristics of urban population have been considered: age structure, type of jobs according to the branch of economic activity, skill level and social status, income and salary levels, composition of migratory flows to and from the cities, as well as housing characteristics (Pumain, Saint-Julien, 1989).

Like the observations made on the long-term evolution of the population of cities (Pumain, 1982), the analysis reveals important regularities in the evolution of the qualitative structure of an urban network. Modes of regulation (i.e., generality of changes, reduction of inequalities, maintenance of the general structure) and modes of adaptive behaviour (i.e., structural reorganization, through the amplification of small fluctuations) lead to an interpretation in the framework of self-organized systems theory, where the interactions between the cities produce the structural evolution of the whole urban system.

1- A CYCLE OF URBAN GROWTH, 1950-1990

1-1 Urbanization and deconcentration

France was until recently a rather rural country. The urbanization rate remained for a long time lower than in other industrialized European countries: it surpassed the 50% threshold only in the 1930ies. But, after the second world war, urban growth was very rapid (1,8 % per year) and the urbanization rate jumped from less than 60 % to about 71 % between 1954 and 1968. Then urban growth slowed down, gradually until 1975 and more abruptly afterwards.

This sudden break in urban growth was only partially produced by general demographic changes. The decline in fertility and the cut-off of foreign in-migration reduced by less than a half the growth rate of the total French population between 1968-75 and 1975-82, from 0,8 to 0,46 %. More effective was the change in the migratory behaviour of population: from 1975 on, there is a positive net migration rate for rural areas (that is, communes with less than 2 000 inhabitants), and a negative one for the cities, especially for those largest than 10 000 inhabitants. However, most of the moves were directed towards rural communes located in the close surroundings of the largest cities. The "deep" rural continued to lose population, but at a lower rate than before.

This urban deconcentration process occurred rather late in France, in comparison with other countries of northern and western Europe. It cannot be interpreted as a stage of urban decline. It proceeded according to a "filtering down process" through the urban hierarchy, which started at the beginning of the sixties in the largest cities and which occurs nowadays in most towns larger than 50 000 inhabitants. But, even if most of the city centres experimented a net loss in their population, they were very often, at the same time, planning large renewal operations for their central areas. The local deconcentration of

the population around each city with the lowering of urban central densities are in fact mainly related to the development of individual housing ownership.

1-2 Urbanization as a spatial diffusion process

As in many other industrialized countries, this forty years period in France was a stage of urban concentration followed by a decentralization, not only at the level of each urban metropolitan area, but also at the scale of the whole urban system and of the national territory (Vining, Pallone, 1982). Between 1954 and 1962, mean growth rates were higher and higher when ascending in the hierarchy of urban sizes (from 0.9% for towns having between 2,000 and 5,000 inhabitants to 2.5% for those having between 100,000 and 200,000). The reasons were essentially the increasing values of net migration rates and of the natural growth with town size. In cities with more than 200,000 inhabitants, both rates had lower values. Nevertheless, those largest cities have taken a big share in the urban growth. Almost a quarter of the newly urban people were gathered by Paris agglomeration alone at that time.

In contrast, the 1962-68 period showed a clear reduction of inequalities in growth and net migration rates with city size. The smallest towns (up to 50,000 inhabitants) had accelerated growth rates (more than 1% per year), whereas the growth rates of agglomerations with 50,000 to 200,000 inhabitants, although still growing at the fastest rate, decelerated (less than 2% per year). Between 1968 and 1975, amplification of these tendencies led to new modes of growth repartition in the urban hierarchy. Except for the Paris agglomeration, whose growth rate was very low (0.5% per year), every level of urban hierarchy developed at about the same rate (between 1.1% and 1.6%). The abrupt decrease in the growth rate of urban population between 1975 and 1982 was perceptible in the same proportion (reduction of about one-half) in every town size class. Medium-sized metropolitan areas (100,000-400,000 inhabitants) remained the most dynamic.

This wave of urban development was also marked by a context of policies leading to the decentralization of first the industrial and then the tertiary activities, the choice of eight "metropoles d'équilibre" (1964), the decision to create new towns in the Paris region (1965) and later in the vicinity of Lille, Lyon, and Rouen, the contracts for the development of medium-sized towns from 1972 and for small districts from 1975 ("contrats de pays"), are major features of a general policy for the reequilibration of the national territory.

One may wonder if the evolution of the relationship between growth and city size is the expected result of those policies, or if it simply reflects the stages of a classical cycle of hierarchical diffusion of innovations in the urban system (Robson, 1972), which it recalls irresistibly.

1-3 Increasing selectivity of growth

However, when compared with previous periods, the recent process of urban growth has two main characteristics. First, it is more selective: one observes a rather large persistence of the values of the growth rates of individual urban units from one period to another (correlation of 0.46 between 1954-62 and 1962-

68, 0.57 between 1962-68 and 1968-75, and 0.60 between 1968-75 and 1975-82 for the 409 urban units having more than 10,000 inhabitants). It is also more spatially concentrated: cities belonging to a few regions, like the periphery of Ile-de-France, the eastern part of Rhône-Alpes, and the mediterranean coast had persistent higher growth rate values than those of the rest of France.

Meanwhile, migration is no longer the main source of urban growth. The share of net migration in urban growth fell dramatically during the last four census intervals: 58% in 1954-62, 54% in 1962-68, 32% in 1968-75, and has become negative since 1975: the loss of population due to migration takes out of the cities an amount of population equivalent to half of their natural growth. However, migration keeps a significant role in the dynamics of cities, since its effects are more and more discriminant: the statistical dispersion of net migration rates is higher than the one of natural growth rates; moreover, net migration rates are becoming more and more unequal, whereas on the contrary natural growth rates tend to equalize their values among cities. Finally, there is also a growing tendency towards a persistency of low or high net migration rates in the same cities: the correlation between their values measured on successive census intervals has increased from about 0.3 to 0.7 during the last thirty years. It seems then that migration could reveal more than before about the selective aspects of change in the urban system.

The period is however not long enough for allowing that this differential growth perceptibly alters the relative position of cities in the size hierarchy. If one does not limit the observations to the repartition of demographic growth, but if more detailed and qualitative changes are considered, the significance of this evolution become clearer.

2- PROCESSES OF CHANGE IN THE URBAN SYSTEM

2-1 Persistence of socio-economic differentiation

When factor analysis or multivariate classifications are made upon the cities, as described by their social and economic profiles, the most striking fact is the stability of results over time. Still in the nineteen eighties, the main differentiating factor of the French cities, according to the social or to the economic composition of their labour force, or both, and even when other indicators concerning the age structure or the income levels are added, is an inheritance of the strong unevennesses created by the first Industrial Revolution. Figure 1 shows one version of this first latent dimension of the french urban system. It was called "image de marque" (brand image) (Pumain, Saint-Julien, 1978), because the ordering of cities along this axis was a rather good reflection of their quality in the mental representations of the mid-seventies (figure 2).

The "image de marque" opposes then, in 1982 as in 1954 (and probably before), at both extremes, urban agglomerations where tertiary activities are associated with favoured social groups, which are wealthy, rapidly growing and very attractive, with high costs of dwellings (e.g. Cannes, Aix-en-Provence, Nice, Montpellier) and urban agglomerations marked by heavy industries, which are associated with many blue collar workers, a low

standard of living, stagnated population growth, and unbalanced migrations (e.g. Lens, Denain, Forbach, Montceau-les-Mines). The position of cities has remain very stable along such an axis, since the correlation between their scores in 1954 and 1982 (for the 100 largest) is of 0.8.

It is noticeable that the age structure is also correlated with this dimension. The cities with a good "image", which are mainly located in the southern part of France, have oldest age profiles than the cities with a bad image, where children and young people have a larger weight in the total population, and which are mainly located in the northern part. This regional fertility differential, which has a long story, is not only a consequence of the differences in social composition between the two types of cities, since it remains as a residual after a structural-residual analysis. Highly correlated with a differential in education, it is interpreted by some scientists as a local response to the long-term state of the labour market. Actually, before the first Industrial Revolution, the situation was exactly the reverse, with lower fertility and higher education levels in the North (cf. Chartier, 1978; for some, this latter fact is a partial explanation of why the industrial revolution was so highly concentrated in those regions).

This analysis is in contradiction with Berry and Kasarda (1977), who pretend that, in modern societies and in advanced urban systems, the socio-economic and the demographic factor should appear as two distinct latent dimensions. However, it demonstrates the strength and long duration of the major principles of socio-economic differentiation in a system of cities, which are deeply rooted not only in economic traditions but also in social behaviour.

2-2 Ubiquity of changes

In its amplitude and generality, the tertiarization of the activities and of the social profiles of French towns has been the main recent process of urban change. Amplitude can be expressed by the large variation of the average proportion of tertiary activities in the urban labour force (from 55% in 1954 to almost 65% in 1982). The ubiquity of this trend appears in the similarity of the trajectories of most of the towns along the first axis of a factorial analysis of their economic or social profiles, when taken at various points in time simultaneously (figure 3). Since the former factor is mainly an indicator of the unequal degree of industrialization in the urban system, the upward oriented arrows show a change in the labour force composition towards an increasing share of tertiary jobs. Though it began as early as 1954 in some towns, this move has become general since 1962 and was especially intense until 1968. After a relative slowing down between 1968 and 1975, it is again the most marked tendency of urban change.

Another change which was common to all cities is a substitution of growing economic activities (metallurgy, chemistry, many services like administration, finance, services to the firms) and social categories (waged persons, unskilled workers until 1975, then skilled ones, managers) to declining ones (textile and food industries, retail trade, artisans, skilled workers and unskilled ones after 1975).

The important fact is that both changes affected more or less every town, so that their main effect was a general translation of the urban system as a whole. This translation of the whole set of cities corresponds to a transition of towns toward new modes of production and exchange, for which the services become the most determinant activities. It also reflects the contemporary mutation in urban labour and urban society.

2-3 Differential evolution: toward a structural reorganization

In comparison with common changes, whose generality explain the persistence of main disparities, the differential changes observed during the same period are very limited in magnitude. Moreover, most of them can be taken as "random" fluctuations, in the sense that they do not persist for a long time in the same cities. But they are not different in kind of the common changes: they keep the same variables associated, they are only temporary delays or accelerations in the general speed of diffusion of changes in particular cities of the urban system.

Only a little part of those differential changes have been sufficiently persistent over time to alter the structure of the urban system. The first ones lead to a decrease in the main interurban disparities: the largest specializations in industry have been reduced, whereas the same cities encountered an amelioration of their equipment in service activities, which were underdeveloped (most of those cities are located in the North, or in Lorraine, or at the eastern edge of Massif central); in the same time, there was a diffusion of some labour-oriented industries southwards and westernwards from Paris, towards medium-sized towns which were under-industrialized. The effect of that differential change was then to reduce the intensity of the main socio-economic differentiation among cities, although without obliterating this ordering on an "image de marque" basis.

The reason is that in the same time, the functional specialization of the more tertiarized cities has been reinforced. Most of them are located in the southern part, and the resort activities have been completed by others, with as a consequence an increase in the average level of wealth and a growth in the proportion of executive staff in the various occupational statuses.

Other differential changes have combined themselves. They have contributed to the progressive emergence (from 1968 on) and reinforcement of a second factor of differentiation of cities. On figures 1 and 2, this factor appears as a result of the unequal diffusion of economic modernity and integration in the urban system. It did not exist before (figure 4). It shows the relative concentration in a few "central" cities of the fastest growing activities and social groups of the period (technicians, managerial staff, executives) and the relative relegation in "peripheral" cities of the declining activities and social groups (manual workers, foremen, salesmen and tradesmen). Whereas the "image de marque" axis is correlated with the indicator of total wealth of the cities, the "modernity axis is correlated with the level of the wages. This axis is also correlated with the unemployment level, which is higher in the "peripheral" towns, and with the level of wages, which is higher in the cities which have more benefited of the economic progress and of the social changes of the last forty years. That is why this second latent

dimension of the French urban system has been called "technical modernity".

The emergence of such a new factor of differentiation, this structural change in the urban system, can be interpreted as a manifestation of self-organization in the system, since they result of the amplification of small fluctuations, which have produced a new "form" of organization, without the intervention of new processes but on the contrary with the same evolutionary processes as for the whole urban system.

2-4 Recent shift in attractivity

During the period 1975-82, new trends of evolution appeared in the french urban system, with a reorientation of urban attractiveness from cities combining central functions, services activities and industries of high technicity, associated to a local society of waged persons (civil servants, office workers, managers and technicians), where salaries are high, towards cities of retailing and trade, with well-developped functions of tourism and recreation, and a local society dominated by entrepreneurs, and which are wealthier. In other words, as shown on figure 1, the net migration rates of the 1968-75 period were better correlated with modernity level, whereas those of 1975-82 were more depending upon the image of the cities.

This displacement of attractivity is not however a dramatic one: the coefficient of correlation between both rates is 0.59. But there has been an interesting qualitative shift in the bundle of variables which are tied to urban attractivity: the unemployment level (either for total population or for young people) is no longer dissuasive for migrations. The housing prices (purchasing and renting), which are usually pulled upward by a rapid urban development, are both correlated to the net migration rates of the two periods.

Besides those changes in the distribution of attractiveness among cities, the qualitative transformations of the labour force of that period have also diffused in the urban system in a way slightly different from before. On figure 5 have been drawned up the more frequent trajectories of the cities between 1975 and 1982, in the socio-economic structure as defined on figure 1. All follow with various intensities a combination of two main directions: parallel to the modernity factor (modernization) and parrallel to the image factor (tertiarization or desindustrialization). There is no trajectory in the reverse directions. This illustrates again the large diffusion of common changes in urban structures. However, the trajectories differ slightly in their orientations, and those varieties of orientations are more systematically distributed than during the preceding periods according to the position of the cities in the structure of the urban system. Most of the tertiary cities, with a good image, tend to change their social and economic composition toward more "modern" structures, whereas most industrial cities tend to substitute tertiary activities to their declining industries, but without a decisive progress for the future dynamics of their industrial mix.

There is then a stronger tendency than before to the existence of a link between the position of a city in the urban system and its further evolution. This heavier weight of the

urban situations (in terms of comparative economic and social structures) upon the destinies of the cities, the decrease in randomness in their evolutions, may be interpreted as a narrowing of the range of the possibilities offered to the future of each town because of the economic crisis. But it may also mean that the recent cycle of urban innovations (tied for instance to the new forms of the integration of information and communication in economic activity) is entering a stage of geographical concentration, perhaps not so marked but analogous to those of the previous industrial "revolutions". This latter interpretation is reinforced, when the size of the cities is considered.

2-5 Metropolitization

In this analysis of change, we let aside until now the size of cities, which remains however the most important factor of differentiation in an urban system. Indeed, a few aspects of the recent socio-economic changes can be related to urban size. With their complex social structures and diversified functions, large cities have better assimilated the successive effects of thirty years of economic growth. They also made the proof of their better ability to resist the economic crisis than the other towns. During this process, there was also a surprising convergence of their evolutions toward very similar socio-economic structures.

In this evolution, the economic, social and demographic primacy of Paris was preserved. The attraction exerted by the capital upon the labour force lasted long, the net migration of the working population remained positive until 1975, well after the net migration rate for the total population became negative. Moreover, the qualitative evolution is quite in contradiction with the apparent demographic stagnation of the population in Paris agglomeration (+0.06% from 1975 to 1982). Highly skilled functions continue to concentrate there while mass production and repetitive tertiary operations have begun to relocate elsewhere.

As early as 1964, eight cities were chosen to counterbalance the growth of Paris. In fact, those "métropoles d'équilibre" did not grow very rapidly. The most striking feature of their evolution has been the convergence of their socio-economic structures. The most highly tertiarized cities (Bordeaux, Nancy, Strasbourg, Toulouse) have industrialized and the most industrial (Lille, Lyon) have strongly tertiarized. In the spatial division of labour, their functions in production and transit remained more important than their activities as central places. They have also captured a growing share of the most highly skilled jobs, generally in the tertiary sector.

The 12 other capitals of region improved their relative position in the urban network in terms of "modernity" and attractiveness. As this group of towns is more heterogeneous than the previous one, the similarities in the evolutions of its agglomerations is remarkable. This level of the French urban hierarchy emerged for its ability to attract a large part of the recent economic growth. As for the large metropolitan areas, all agglomerations larger than 200 000 inhabitants, and especially among them the capitals of the regions, increased relatively their concentration of the high-skilled labour force, during a period of general transition toward higher qualifications, as shown for instance in 1975-80 on figure 3.

This reinforcement of the interurban segregation of populations upon a basis of qualification of labour is a confirmation of Aydalot's hypothesis about the new rules of spatial labour division. It also confirms the view that the social environment is as important as the physical one, for instance in explaining the "shift to the south" in urban attractivities. Finally, by enhancing the role of the size of cities, it also strengthens our hypothesis about the "normal" evolution of an urban system (see section 1), with the advantage given to the largest by the shrinking space.

One may also predict a further increasing role of large cities in the urban system, with the growing relationships between various national urban systems, for instance in the European framework. In the competition for developing communication networks at this level and for attracting international functions, the large cities have already better advantages that they certainly will consolidate in the near future. In this innovative process of elaborating an integrated urban system at the European scale, the upper level of each national urban hierarchy will be first primarily concerned. One may then expect a prolongation and a possible aggravation of the tendencies which have been described above.

One way for improving the provisions would be to build multi-level models of the processes of change in urban systems. Such models would require a better knowledge of the various interactions between cities, whose importance in the evolution and regulation of the system has been suggested by the observations but not yet measured. Information about the interactions are however difficult to find. First elements of description can be obtained from migration flows.

3- QUALITATIVE EFFECTS OF MIGRATORY FLOWS

Since migrations are the main factor of differentiation in the quantitative growth of the population of the cities, one may also consider which kind of qualitative selections occur in migration flows to and from cities, and how they contribute to the changes in the socio-economic structure of the urban system. The composition of the total flow of in- and out-migrants to and from each city has been studied by age (9 age groups) and by social status (7 socio-professional categories).

If the demographic and social composition of migratory flows which enter in a city or leave it are very similar, and resemble the composition of the non-migrant population, the main effect of migration would be to reproduce the demographic and social structure of the city. On the contrary, differences mean on the long term that this structure will be transformed. The reproduction process maintains identical the relative positions of the cities and the structure of the urban system remains stable, whereas differences allow its transformation by changing the relative positions of cities.

Between 1975 and 1982, as for previous periods (Pumain, 1980) for French cities, and as demonstrated in other countries (Stone, 1979, Shaw, 1985), one of the well-known "law of migration" by Ravenstein is verified, even for sub-populations: each flow generates a counter-flow. The correlation coefficient between

the number of in-migrants which entered in a city and the number of out-migrants which left it is larger than 0.9 for each age group or social categorie. Of course this high correlation level could be only a reflection of the large unequalities in population sizes, since the magnitude of migratory flows is roughly proportional to the size of the cities (however, a tendency towards a decrease in in-migration or out-migration rates with increasing size categories of cities can be observed).

In order to make comparisons, all things being equal regarding the size of cities, we computed the proportions of each age group or each social categorie in each subpopulation of inmigrants, outmigrants, and non-migrants. It appears that the effects of migrations are not the same on the age structure and on the social composition of urban populations.

3-1- Migrations reproduce the spatial division of labour

There is a high degree of resemblance between the proportions of each social group in the in-migrants and out-migrants subpopulations, and the composition of those migration flows is also very similar to the composition of the non-migrant population of cities. Correlation coefficients are always positive and highly significant, with most values of about 0.7 or 0.8. It means for instance that larger proportions of workers are entering and leaving industrial cities, whereas more senior executives are also coming to or going out of cities which already had more of this category.

The spatial structure of social groups in migratory flows almost entirely follows the spatial pattern of social categories in urban agglomerations. A multivariate analysis of the composition of the three subpopulations shows those similarities in a striking way (figure 6). The social composition of migratory flows entering or leaving a city is then to a large extent predictable from the social profile of the city. Migrations contribute then to maintain the existing pattern of the spatial division of labour and to the conservation of the interurban social segregations.

This result is not only valuable for the 1975-82 period, but was already verified for the previous period (1968-75). Comparaison is difficult because the definition of the social categories has changed, but correlations seem even to be higher now than they used to be before.

3-2 Migrations reinforce the segregation by age

The results for the comparison of age structure between the three subpopulations are slightly different. Because of the rather large incertitude about the age at which the migration occurred, they are given here merely as first indications, to be completed by more detailed investigations. Correlations are systematically positive for all age groups of less than 20 or more than 40 years old; for groups of 40 and more, correlations increase regularly with the age. The higher is the age of the population in a city, and more the aged persons tend to be numerous in the in- and out-migration flows of this city. In that case, migration contribute to maintain the level of aging in the urban populations.

Regarding the age groups of young adults, between 20 and 40 years, correlations are sometimes slightly positive, but in most of the cases they are zero or negative. The geographical selection, inducing new urban segregations, concerns those age groups mainly (figure 7). Cities which receive the highest proportions of migrants aged 20 to 30 are mostly large university cities, or smallest towns in their vicinity. Cities which loss by out-migration the highest proportions of young adults are mainly characterized by a deep and durable crisis of their economy, but are maintaining rather high fertility levels (for example: Béthune, Lens, Douai, in the northern mining region). Geographical selections for the 30-40 years group are different: the cities where this group is important in the out-migration flow, are the ones which also have a large inmigration of younger adults in the age groups just below (the cities with universities); the group of 30-40 has high proportions in the in-migrant flows for smaller or medium-sized towns.

3-3- Migration differentials and changes in urban structures

The differences between in- and out-migration rates, or net migration rates, when measured for each category of population, depends heavily on the total net migration rate: when cities are attractive, they generally attract more of all type of populations. To evaluate the specific aspect of selective migrations on the age and social structure of urban populations, one has to measure a migration differential, all things being equal as regarding the global attractivity level of cities. The coefficient of migration differential for one category of population is computed by dividing the ratio: number of inmigrants of one group upon the number of out-migrants of the same group by the ratio between the total number of in- and out-migrants.

Migration differentials by age group have a higher probability of transforming the structure of the urban system than those by social groups: the values of the coefficients for the age groups are very different from one city to another, whereas there is a rather little statistical dispersion of the proportions of age groups in resident populations of cities.

Cities have been classified, according to their coefficients of migration differentials, in homogeneous classes. The pattern of interurban segregation by age selection in migrations is clear. Migrations induce a selection of aged persons in about thirty cities, which are almost all located in the northern region, or along the mediterranean coast. Migrations then tend to reinforce the aging of those cities. Whereas the aging process due to migration differentials is a regional process, the rejuvenating process concerns more dispersed nodes of the urban network. The tendency to retain young populations, children with adults on one hand and young adults on the other hand, benefits to two types of cities. The first type is made of 14 medium-sized towns, dispersed over all the territory, from Agen to Tarbes, Arles to Macon, Forbach to Armentières. The second type is made of about twenty large cities whose university functions attract young adults and often keep them during the stage of their first job. All other cities have less specific migration differential and do not select migrants on an age basis.

Effects of migration are less sensible on the social

segregation, but they reveal a few aspects of the functioning of the system of cities. Coefficients of migration differential are used to classify the cities. This classification confirms cities of the mediterranean coast in their function of rest-centers for retired people; there is no longer high migratory differentials for workers, except in two old mining cities (Forbach and Montceau-les-Mines); cities of the West, of the Paris Basin, of the northern Alps and of the Rhône valley tend to retain the executives and the employees. Almost all large cities reject executives: this is an expression of their function of production of this high skill group of population.

There is apparently very few relationships between those social migration differentials and the relative social change which has been observed in cities during the same period. For instance, we have shown that the largest cities have increased their relative concentration of highly skilled population. The correlations between the partial migration differentials (or even partial migration rates) and the changes in proportions of the corresponding social groups in the resident population of cities are very low. Despite of some selective aspects, migrations appear then more as a passive than an active process in urban socio-economic change and more as a regulating factor than as a transforming one in the evolution of the urban system. This conclusion however has to be modulated by all the approximations regarding the accuracy of the source and the indirect way of measuring the effects of migration on urban change.

In future research, individual data instead of aggregated ones should be used to for the study of the relationship between changes in residence and professions at the micro-level and changes in the urban social and economic structure at the meso-level.

4- SUMMARY AND CONCLUSION

The social and demographic interurban disparities are mainly correlated with the uneven concentrations of economic activities. Economic development and social change, when geographically concentrated, create differences among cities, which, when combining many aspects of urban life, appear as latent dimensions of the urban system. Interurban social differentiation is in tight interaction with the spatial division of labour and the functional specialization of cities. The main features of interurban differentiation remain surprisingly stable, over time. This can be explained by the way socio-economic changes proceed through the urban system: they are common to all cities, due to the very quick diffusion of economic innovations and of new types of social behaviour. Only a few of the many fluctuations occurring during that diffusion process are amplified sufficiently and durably enough to produce a slow restructuration of the urban system.

During the 1950-1990 period, many changes have occurred in the socio-economic characteristics of the cities. There is also a major shift in the interaction process between social differentiation and the spatial division of labour. More and more is the second depending upon the first, whereas it has been the reverse in former times. In that process, the own "logic" of the urban system, as a hierarchical structure, has become more and more important in the evolution of urban society and for the

future of cities.

This analysis of change in the French urban system has shown the existence of regulation processes which seem to be exerted by the macro-geographical level, that is, the system of cities, on the meso-level of individual cities. Those regulations prevent isolation and exceptionality in the evolution of a city. Actually, such regulations come through the structure of the numerous networks which link the cities together, and by their exchanges in material, people, and information. They are also produced by the interurban competition process. The anticipating and imitating behaviours of urban actors introduce non-linearities in the evolution of the system and allow for structural reorganizations (Allen, 1978). That is why we suggested possible formalizations by the means of open, hierarchical, self-organizing systems.

Interurban competition is a major process in the evolution of urban systems. It explains together the very quick adoption of technological, economic and social innovations in a whole set of cities and the delays and inequalities stemming from the fluctuations in the spread of diffusion. Whereas it is most of the time hierarchical, this "filtering down" diffusion of innovations is not merely an exogeneous process which would be received passively from up to below by the various levels of an urban hierarchy. On the contrary, a most active competition is to be observed among the cities. This process becomes conscious and is recognized of importance when conflicts arise, for instance between two cities competing for the same equipments or infrastructure. It is also apparent, nowadays, in the advertizing campaigns and in urban marketing policies supported by local authorities.

Perhaps less consciously, but also efficiently, all the other urban actors, households and entrepreneurs, do contribute to the interurban competition process, by choosing their location or place of residence and by their decisions of adopting or not the available innovations, and also by being themselves innovative. A better insight in individual spatial behaviour, at this interurban scale, would greatly improve our understanding of the processes of change in urban systems. This is of course a plea for multi-level dynamic urban models. From a first aggregated approach, it has been suggested that the interurban migrations could be a regulating as well as a transforming factor in the socio-demographic evolution of the cities.

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FIGURE 1 STRUCTURE OF THE URBAN SYSTEM IN 1982

VARIABLES

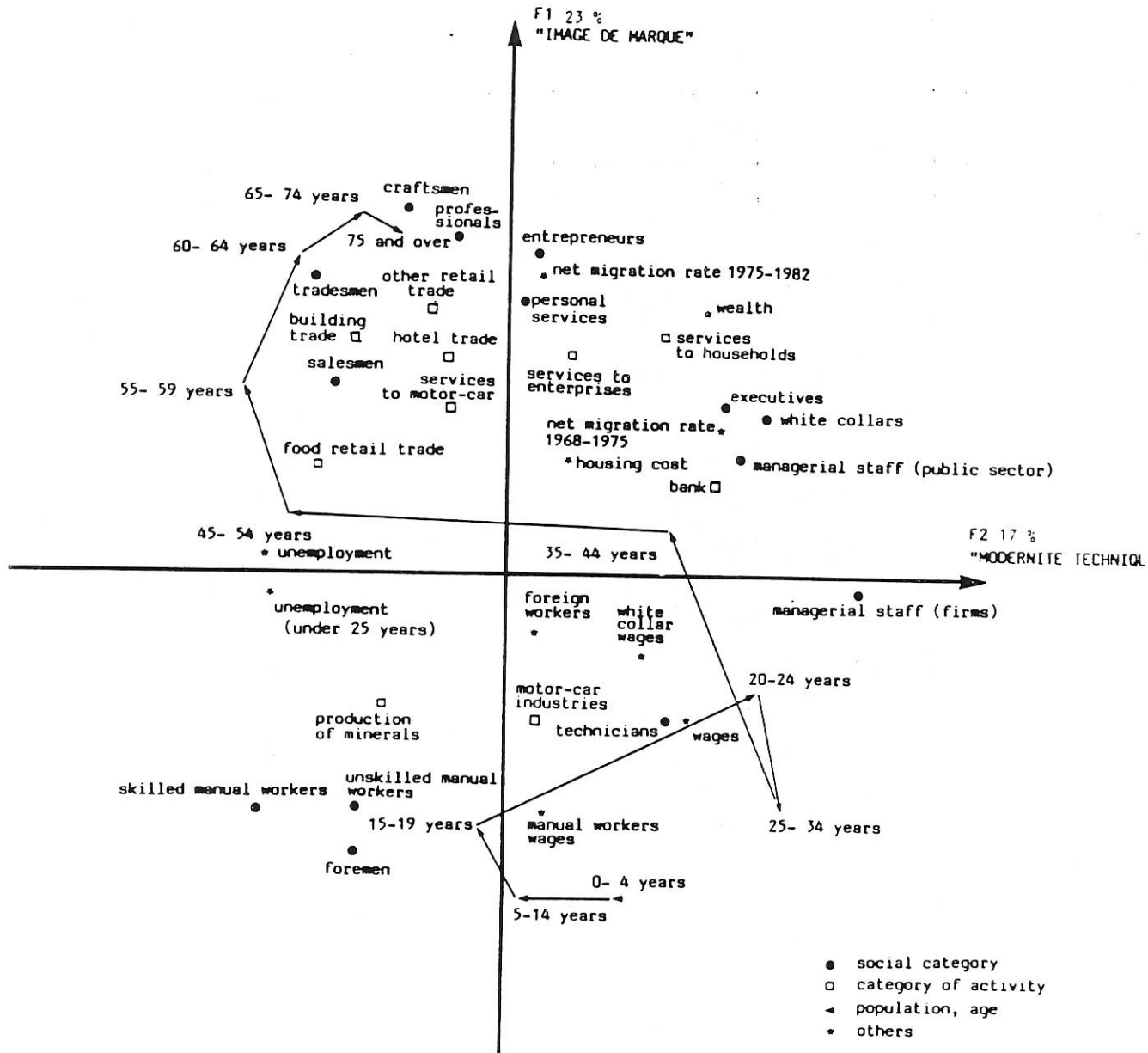


FIGURE 2 STRUCTURE OF THE URBAN SYSTEM IN 1982

CITIES

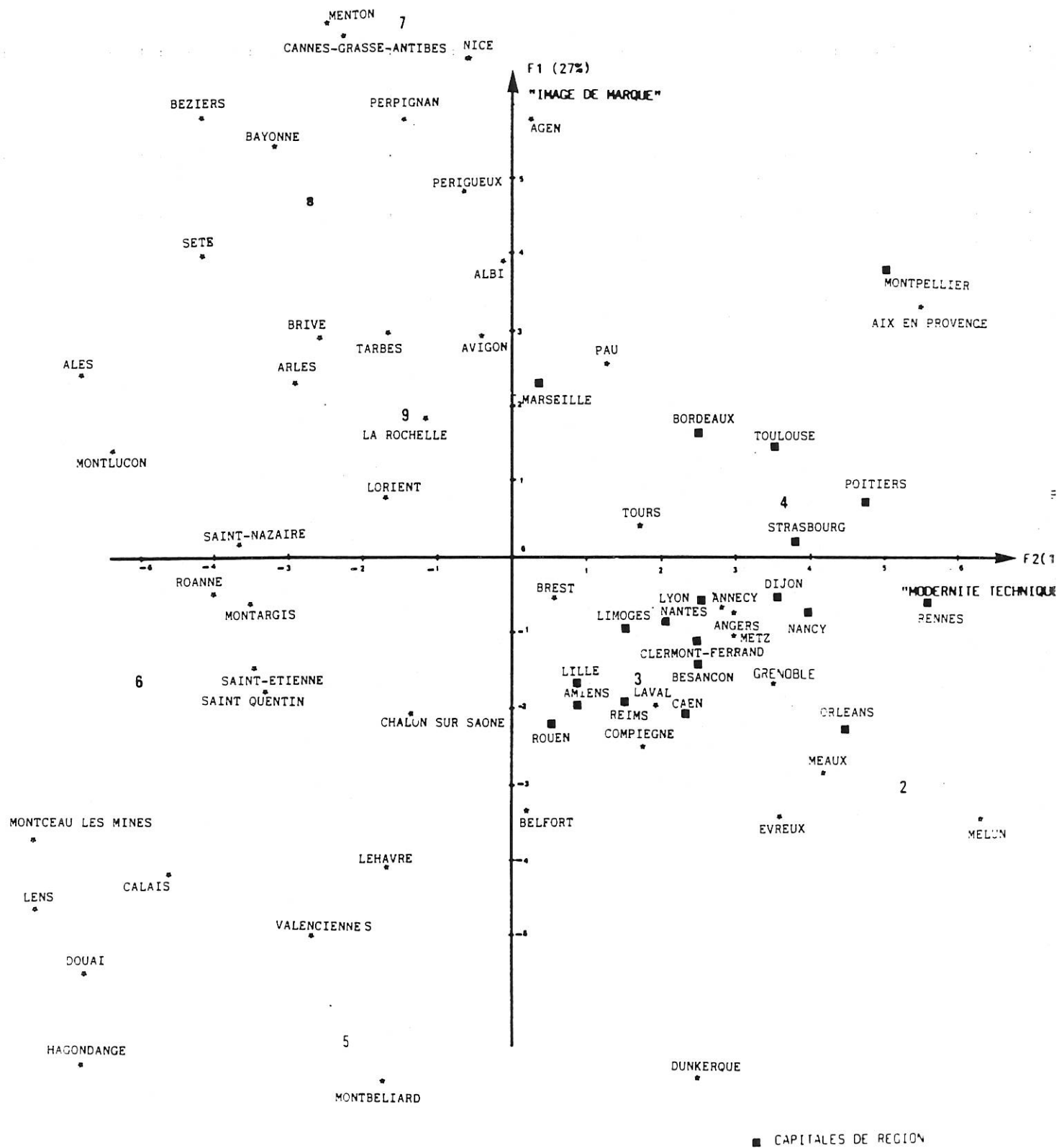


FIGURE 3 TERTIARIZATION AND SUBSTITUTIONS :
GENERAL TENDENCIES OF CHANGE BETWEEN 1954 AND 1980

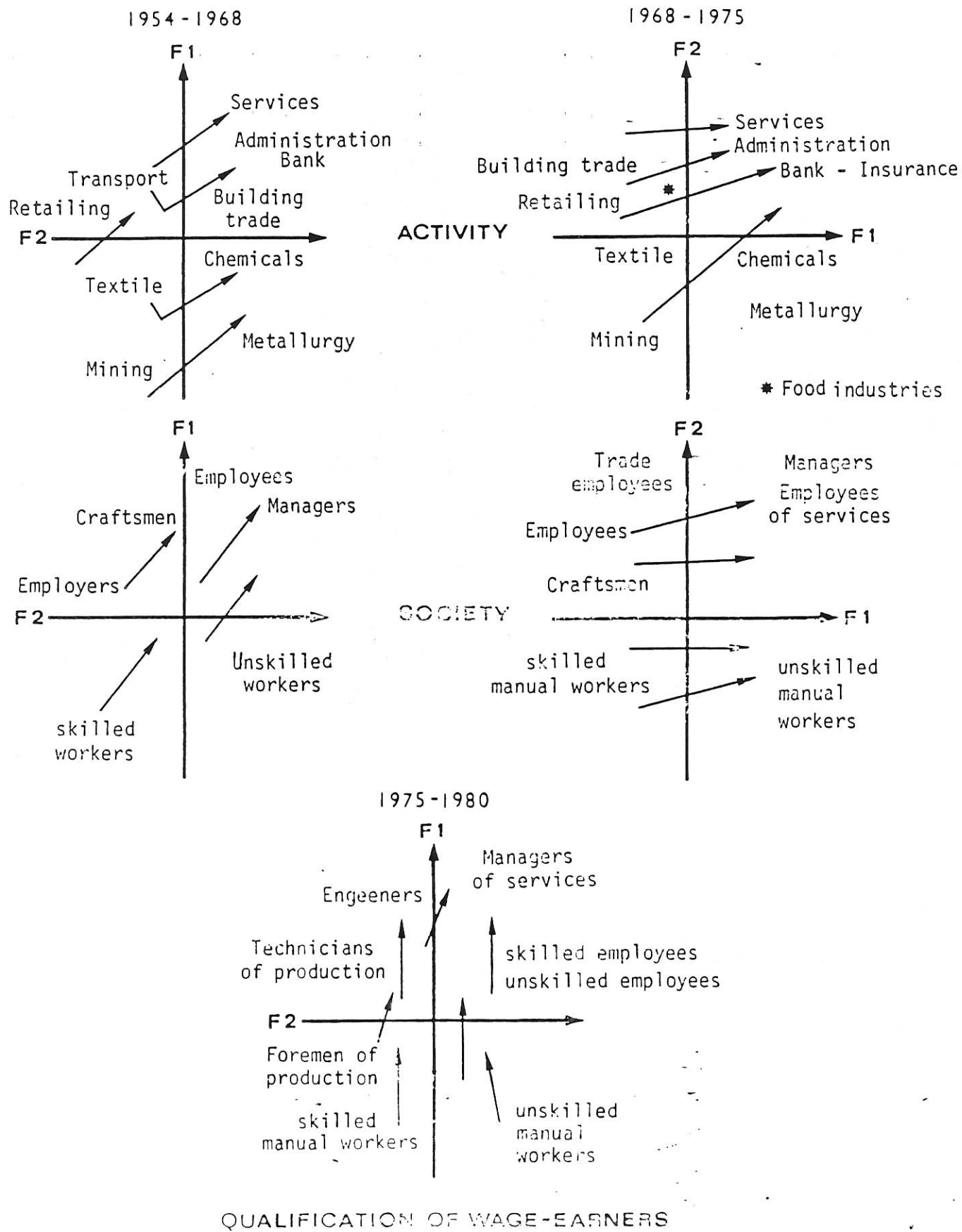


Figure 4

A BIFURCATION IN THE URBAN SYSTEM ?

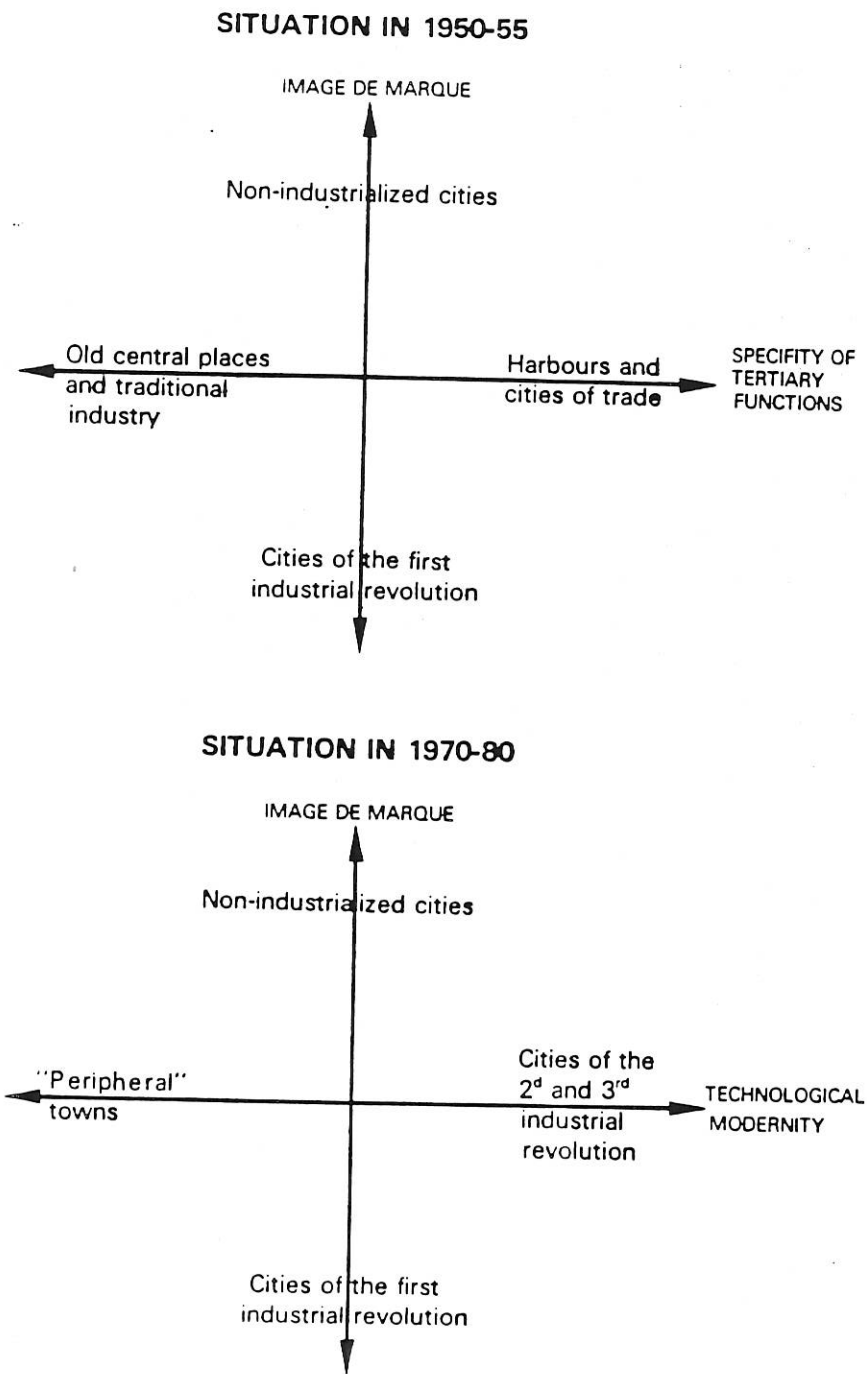


FIGURE 5 URBAN CHANGES 1975-1982

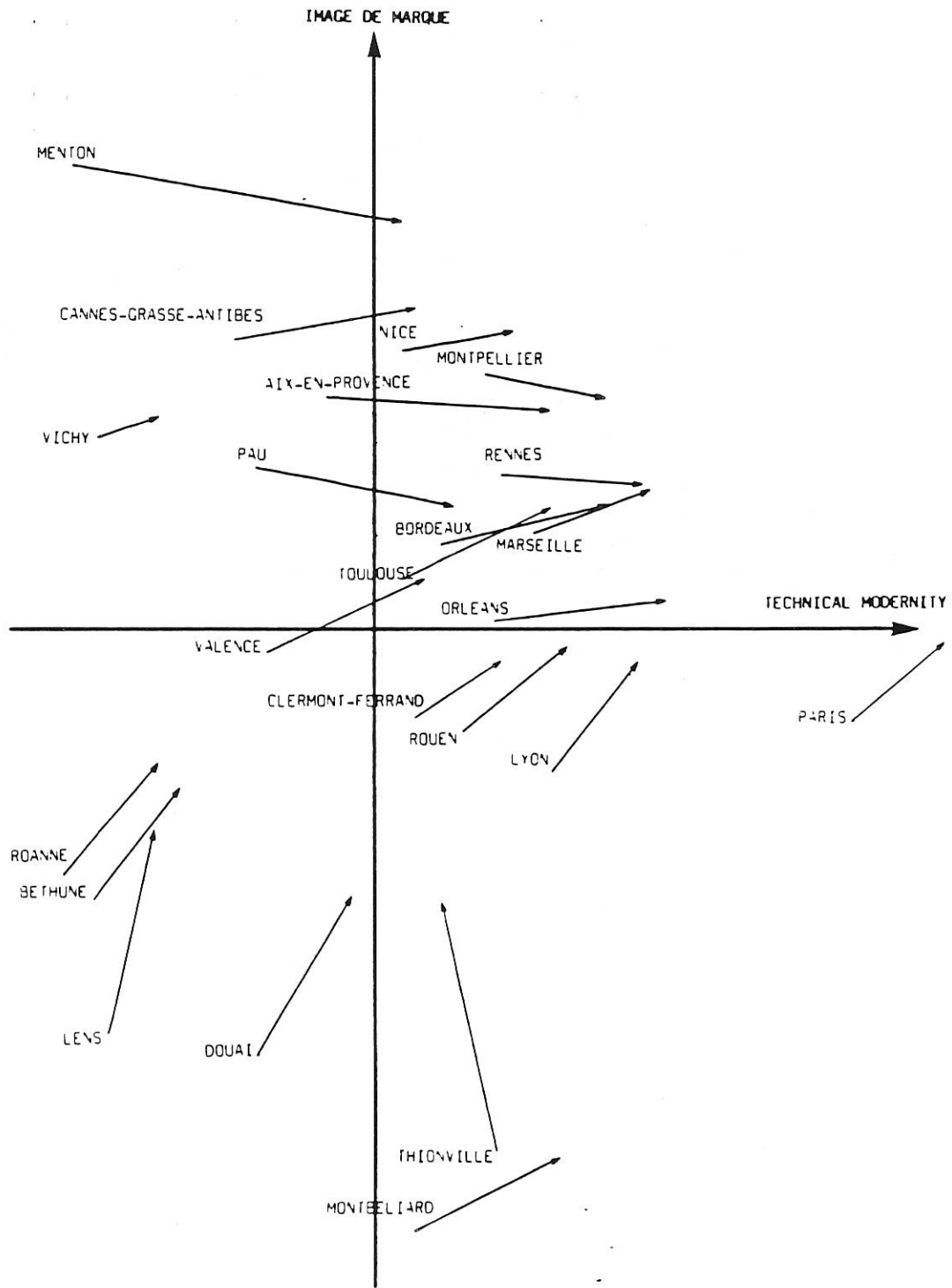
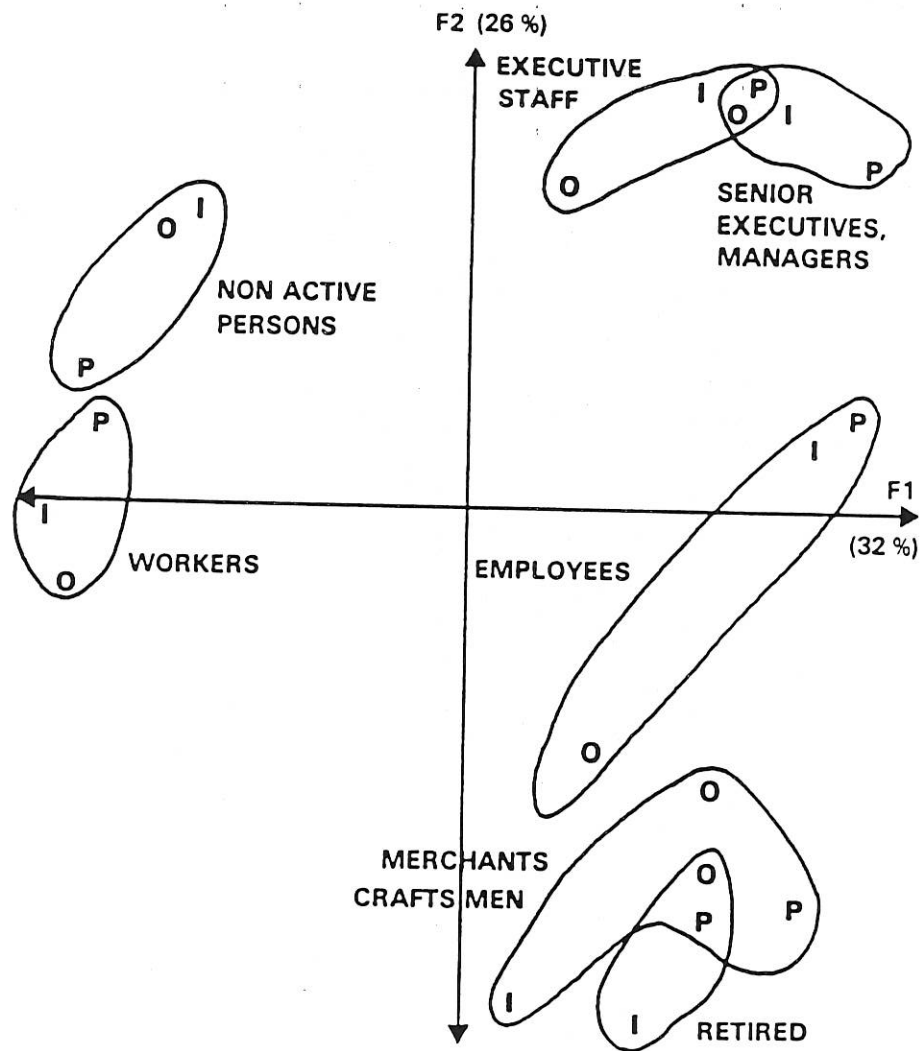


Figure 6

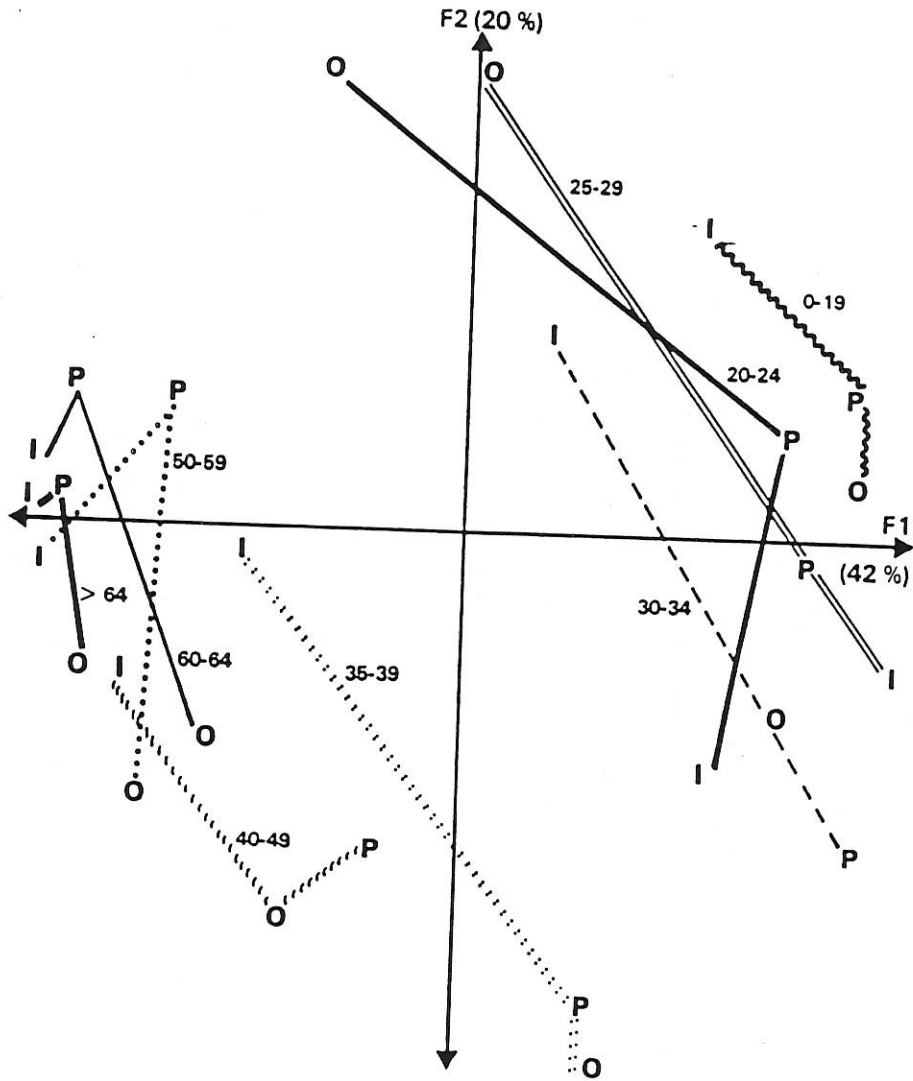
SPATIAL DIVISION OF LABOUR IS REPRODUCED BY MIGRATION FLOWS



First two axes of a principal component analysis upon the composition by social groups of in-migrant flow (I), out-migrant flow (O) and non-migrant population (P) for 112 urban agglomerations larger than 50 000 inhabitants (1975-1982).

Figure 7

**SEGREGATION BY AGE IS REINFORCED BY
MIGRATIONS**



First two axes of a principal component analysis upon the composition by age of in-migrant flow (I), out-migrant flow (O) and non-migrant population (P) for 112 urban agglomerations larger than 50 000 inhabitants