

The urban system concept and the role of the heritage cultural territorial units within its context.¹

Appendix to

The urban planning requirements of cultural heritage conservation policy

Background Note for a *Planning Studies Centre's Symposium* within
the "Eu Raphael Programme".

1. The City as an (Urban) "System"

It certainly cannot be said that the research into the city carried out in recent years has not represented almost a general "surmounting" of the traditional concept of the city, linked to the physical aspect of construction in an area bounded by continuous settlements.

All the analytical reflection, of geographers, economists, sociologists, town planners, in particular in the field of the so called "regional sciences" has aimed at substituting the physical concept of the city, with a "systemic" concept of the same: the city as a "set" of relations between phenomena, events, flows. These relations develop in space and are therefore "spatial". They have however to take into account the conspicuous and important amount of relations which do not develop in space, and which therefore are *aspatial*² *as well*. This is undoubtedly an important methodological improvement. Force of habit is however still relevant. And in practice, administrative

¹ Abridged paper based on selected passages from: Franco Archibugi's *Theory of Urbanistics, Lectures on a Reappraisal of City Planning Foundations*, forthcoming (chapt.6,7 & 12).

²As a lot of scholars and writing from time immemorial have argue. See for instance Webber (1964).

borders are still created, town plans are made, operational concepts are produced, with reference to *physical* urban structures, that are characterised by the *continuous built-up area*, which is often called "*consolidated*" (with an obvious allusion to something "solid").

There is undoubtedly an open, but more often latent, conflict, between the approach which we call "physical" to the city and the "systemic" approach to the same. The second is more at home in research centres, in universities, in books; the second is more at home with the practitioners, the political and professional operators, in the architects and engineers studies, in the plans in blue-print.

On the other hand, "city" still means "territorial delimitation" in some way: whether it is a case of the physical delimitation of the built-up area, as in the physical approach; or of the delimitation of the area in which the relations (interactions) are developed which are pre-selected to characterise the urban phenomenon, as in the economic approach: various flows, gravitations, exchanges, etc.

Instead, in the "systemic" approach as well, any delimitation of an area (in our case the area of the city as we have understood this: as a system of functional relations whose requirements must be defined) is *coextensive* (in as much as it is a "part") with the delimitation of all the other areas, which are likewise parts of the same superior system.

Thus if we can speak of the city as an "urban system", this city-system has as well, like the old city, its own territorial delimitation: rather - as we will see better - such a delimitation constitutes an inevitable and indispensable "functional component" of it. It is only a case of a different, and more complex, set of phenomena that is pre-selected to identify its limits.

2.The Theory of Town Planning as a Theory of Urban Systems

The conclusion can be drawn from what we have discussed up until this point which may seem superfluous or banal, but which is however full of conceptual consequences: that *the theory of town planning coincides in essence today with a theory of urban systems*.

In fact, if the city, "understood in a modern way" cannot be conceived other than as an urban "system"; and if town planning is the art of building the city; town planning is reduced to being the art of constructing urban systems, or the "theory" and "policy" of urban

systems.

A first rigorous implication of this conclusion is that any other type of town planning, today, is only the *left-overs of old ways of conceiving the city*. This does not mean that criteria, values, goals, and even techniques, present in these "other" town planning types, are necessarily superseded, negligible or old. Many may still be valid, but only if they are verified, "convalidated", "ratified" in the light of the modern *theory of urban systems*. In fact, a large part of the modern theory of town planning, or of urban systems consists in including these old contents and town-planning instruments within the logical and territorial confines of the urban system. Without this convalidation, and this relative inclusion, the old baggage of town planning risks, if used, producing contradictory, irrational and in short deleterious effects.

3. The definition of the requirements of the city

From what has been said, it can be deduced that the *theory of town planning*, today, is identified with a *theory of urban systems* (no different from how, today, the concept of the modern city is identified with that of the "urban system").

From such identity arise primarily a series of deductions to be considered.

For instance, a very simple deduction such as where an "urban system" is not produced there is not a city either. What does this mean?

It may mean and justify a series of assertions which at first sight can even seem arbitrary and too drastic.

For example, it may mean that many urban agglomerations which today we call "cities" and which derive this denomination from history, must be re-discussed in their function of theirs. A plethora of cities, above all among those called "small" and "medium", and which (on the crest of the apparent success of micro-dimensions: "small is beautiful") have found a recent ephemeral re-launching of opinion, although with very modest results in the facts - today do not deserve the name of city, *unless* they are, from their design and operational aspect, inserted in the territorial unit which we have called the "urban system"; in short *unless* they are part of an *urban system*.

If in fact the urban system, in its semantics, represents the new, modern way of conceiving the city, the study of the requirements of the city has become the study of the requirements of the urban system; and therefore also the foundation of a methodological requalification of the same "modern" town planning. In this sense, it can be said that town planning culture is finding a new frontier for itself.

If therefore the requirements of the urban system represent today the requirements proper to a city understood in a modern way, the theory of urban systems becomes therefore the "core" of modern town planning. It will take its first step by redefining in fact the *requirements* of the urban system, as a modern expression of the city. This is what we will attempt in this lesson.

After which, the theory of urban systems will be able to proceed to a more articulated analysis of the *requirements* of the modern city.

4. The urban system (or city, tout court) requirements.

Any requirement of the modern city opens the discussion to the need to organise things in order to "satisfy" the requirement which is capable of producing the desired "city-effect". In fact whilst the task of the theory of town planning is the analysis of the requirements, that of the methods to satisfy these requirements is the task of the town planning policy. If the analysis of the requirements, for example, implies - as we will see - that the modern city cannot be "systemically" conceived *below certain size thresholds*, both of population and territory, the distribution and delimitation of the urban systems cannot but be one of the first guide lines of a policy of urban systems, which is recognisable and implementable only on the national scale, albeit with all the consultation and consent of more decentralised decision-making levels.

Moving now to an initial analysis of the requirements of the modern city, as the first step of a theory of town planning, we intend to examine, discuss and identify these requirements on the basis of six main "categories":

1. size requirements;
2. internal accessibility requirements;

3. economic functionality requirements;
4. ecological equilibrium requirements;
5. requirements concerning image, aesthetics and historical-cultural conservation;
6. functionality and self-sufficiency of services requirements.

These six categories of requirements are the primary goals of any town-planning study. And such goals constitute an *adaptation of the traditional goals of town planning to the conditions of the modern, current conception of the city*; a conception in which the system of reference has been, so to speak, widened to new more complex functional roles and contents of urban well-being. In short, it is from this analysis of the requirements of the modern city that should emerge the integrated "concept" of the modern city and its implementation policies.

4.1 Size Requirements

The actual possibility of the formation of urban systems, their efficiency and functionality, are to be considered as conditioned by the assumption of *correct* or *appropriate* spatial dimensions of the urban unit as territory and demographic consistency. The dimensions in play are therefore: *population* and *land surface*.

The demographic requirement is represented by the opportuneness of a *minimum population threshold*, below which it would not be possible to ensure an economic performance (economy of scale) of urban services, that is effectively competitive (in efficiency and quality) with that of the "big cities"; and that degree of integration which excludes "external" commuting³ to the system.

Therefore, this "minimum" size requirement is as will be seen strictly interrelated with the requirement (see below Para.4.6) of the

³ For example in Italy, from the examination of the various models (both theoretical and in existence) and by their comparison with the actual settlement situation, in the already mentioned "Progetto '80" *one million* inhabitants was established as a minimum population threshold. This threshold may have considerably gone down in Italy and other countries (to *500 thousand* people) by the year 2000, as can be seen in the proposals made in some recent research carried out in the context of the preparation of the "Ten-year plan for the environment" of the Italian Government (RI, Ministero dell'Ambiente (1992); Archibugi (1992b)). Also a multinational research (France, Germany, Great Britain, Italy) done by Planning Studies Centre (with cooperation of others research institutions of the countries involved) for the European Commission on "the integration of cities in their regional environment" (see Archibugi et others, 1998), provides the same findings and results.

quality and quantity of "superior" urban services. Without a critical catchment mass, many productive units of superior services (e.g. the universities; certain stable artistic cultural activities: theatres, concerts; etc. would not reach a sufficient "economic" size to allow them to establish themselves or survive. An inadequate size would be translated

1. into the absence of such activities (in the area representing the system) and therefore into the failure of the other requirement of the presence of the "superior" urban services;
2. or in an anti-economic presence, to a greater or lesser extent financed by public resources, i.e. running at a loss, which would be harmful and in the long run counter-productive to the physiological growth of the system.

Another minimum size requirement can be conceived (as "general" as the demographic one just indicated): that of a *minimum land space* in order that the use of the territory necessary for the co-presence of all the other requirements can take place without too many problems; so that, in other words, a settlement density average can be realised in all the system's territory which does not compromise a balanced distribution of the activities and a chronic scarcity of environmental resources.

4.2 Internal Accessibility Requirements

The size requirement is strongly conditioned many times, in contrast, by another general requirement of urban systems: that of *accessibility*.

By accessibility is meant the "internal" accessibility to the system, the possibility of reaching any relevant point from any other point within *acceptable temporal isochrones*.

The urban system is conceived - as said - as the ambit in which each city dweller should carry out - according to acceptable conditions and standards - their activities from on a day to day basis. Doxiadis, who is a very important (albeit neglected) author for the theory of town planning as it is conceived here, calls this the *daily urban system*⁴. *Within the spatial-temporal daily system, what will be the isochrone which the plan will assume as the maximum limit acceptable for*

⁴ See the fundamentally important work by Doxiadis: *Ekistics* (1968), and also, especially with regard to the concept of "daily urban system", a Hearing of the United States Congress, Doxiadis (1970).

accessibility to work, school, shopping, daily recreational and cultural activities? One hour, two hours there and back from home? This isochrone determines the choice of the programmatic space of the urban system.

In effect, with the constraint of certain usable current technologies for systems of transport (and of certain speeds within these, for example the maximum speed of individual automobile traffic) the isochrone is translated into the *maximum spatial diameter* (adapted obviously to the geomorphology of the territory in question) acceptable as vastness of surface for the urban system⁵.

Naturally the maximum distances in terms of miles of diameter may increase with the development of the average speed of transport, which is in turn influenced by the development of technological development in the speed of means of transport.

4.3 *Economic Integration and Pluralism of Activities*

The urban systems should allow (i.e. offer adequate territorial susceptibility for) a *polyvalent economic organisation represented by a vast range of activities* (agricultural, industrial, tertiary, recreational, educational and cultural, etc.) for the purpose of constituting a *various and multiple* possibility of work opportunities for the citizens (bearing in mind the greater professional mobility which will be hastened in years to come).

The *co-presence* should be guaranteed, in the territorial ambits of the urban systems, of the fundamental economic national components in order to obtain the maximum of work choices and the formation of a socio-cultural environment which is not "hindered" and a "flexible" production structure. There should not be excluded however - albeit in this framework of essential poly-valency - the possibility of a relative sectorial specialisation, in particular if it coincides with a better use of land resources (e.g. certain agricultural cultures, tourist industry, "clean" industries, etc.) or with necessities of a land strategy in relation to certain infrastructure problems (e.g. large hinterlands for

⁵ In the *Progetto '80* aold planning document of the Italian Government (1969) , a maximum threshold was assumed (in 1969) for the spatial size of the urban system of an isochrone of 60-90 minutes corresponding, with the transport technologies of 1980, to distances of 100-150 km diameter. Furthermore the maximum thresholds in terms of isochrones may be reduced with the changes in life style of the users. The planner will have to thus keep to policy choices considered acceptable, after the necessary trade offs, perhaps achieved with the due consultation of experts and/or with a survey of the users.

port equipment at the national level, etc.).

Integration and pluralism of economic activities (i.e. a certain *mix*) have appeared more and more as determining factors for the *city-effect* whose features the theory of town planning attempts to define. In the past the growth of certain industrial activities in an urban area was considered the determining factor in urban growth. Industrial cities, although "specialised" and suffering from certain structural deformations and some negative requirements as well, always had an important reference role for the growth of urbanisation and the development of the conditions of the most advanced urban life.

Some experts have taken the economic "weight" of activities of a city whose products are bought by residents of other areas into such consideration that they have seen it as the main factor of solidity and urban well-being, to such an extent that a theory (called the "economic basis theory") was elaborated according to which the economic potential of an area is the result of its "exports": the higher these are the economically stronger the area will be⁶.

But for some years this has no longer been the case. First of all in the overall activities and in the measurement of production values, even when calculated with the methods of traditional economic accounting (the SNA), the weight of primary and secondary activities (agriculture and industry) has diminished. It is known that tertiary activities, have a market which is strongly linked to the place of production. It occurs therefore that a strong economic "specialisation" of an area - even if it produces commercial credit due to the flow of exports that it creates, is not accompanied by an adequate flow of well-being coming in, since the area itself becomes not very "attractive" for residential locations or for income producing tertiary activities. Moreover the diminished weight on the value of overall regional production is accompanied also by a phenomenon of the strong decrease of employment by product unit: and the incomes produced therefore are distributed beyond the area both as wages and as profits. (This is the case of many declining industrial areas, despite the duration of a certain level of traditional production.) A rigorous balance of payments at the inter-regional level (or of an urban area) would demonstrate negative flows in the area in question even in the presence of strong commercial credit flows. (In these terms the

⁶ For the "economic basis theory", among the many works belonging to the "regional sciences" see that of Tiebout (1956a, 1956b, 1962).

"economic basis" theory understood as a "basis of payments" would be convalidated.)

To produce the city-effect then, there is the requirement of a *plurality of economic activities*, which can bring into balance - so to speak - the external economic accounts of the area in question. Certainly if these accounts were in credit, the requirement would not be lacking: but that would mean that other areas would be in debit, and this would not reach the requirement of economic self-sufficiency of the urban system which is expressed by means of economic integration and pluralism.

The urban system therefore would be such only if it responds to this requirement.

4.4 Ecological Equilibrium Requirements

The physical-natural environmental conditions are obviously the primary ones connected to the safeguarding of the physical health of city-dwellers. It is necessary to identify what standards of air and water quality and what standards of liquid and solid waste pollution and the consequent standards of technical treatment of the same (sewers, purification, dumps, etc.) are indispensable for a given population.

From the point of view of the conceptual relevance for the theory of town planning, it is necessary to recognise that this group of requirements is so obvious and so primary (not by chance have these services been spoken of in terms of technical services of "primary" urbanisation) that they can be considered ... secondary or less important in a modern urban planning conception.

Nevertheless, the development of the city has seen everywhere (and perhaps in the cities with a higher development of income and well-being) such a progressive disequilibria between the elementary available means for these technical services and the production of emissions, waste and refuse, that even the simplest primary urbanisation brings with it problems and difficulties; and has made so impelling the so-called environmental protection (when historically in town planning it was almost taken for granted and obvious)⁷.

This equilibrium, which has increased greatly in recent years, is the

⁷ Wider considerations on this subject in my book: *The ecological city and the city effect*, Ashgate, London, 1997.

converging result of opposing phenomena:

1. urban density has increased;
2. energy consumption per capita has increased in a geometric progression (mainly with heating and urban traffic combustion);
3. refuse per capita has increased likewise;
4. the urban areas have got bigger and the peri-urban urban "spill-over" areas have been reduced;
5. emissions of a chemical nature have amalgamated and become concentrated creating difficulties for natural recycling.

In short, the consumable "environmental space" has been reduced enormously, upsetting the traditional standards that were acceptable up to a few decades ago. The conservation of physical environmental quality has become therefore a priority goal in urban planning. And the identification of a territorial-environmental space that is adequate to guarantee land-use/environmental quality re-equilibrium. i.e. a new biotic-environmental equilibrium defined at the "theoretical" level, has become an essential requirement of the urban system. The urban system is identified therefore in an "urban eco-system".

In reality, "environmental" well-being is so intrinsic with the evolution of town planning that recent insistence on the importance of increasing the "ecological" coefficient in planning seems very strange.

The relations between ecology and planning are thus pushed towards two moments which become in substance divided and which may even get to the point of opposing each other: as if some basic and objective principles of planning might develop in contrast with those of a policy for environmental protection, and as if urban and territorial planning might be distinct, in its goals and instruments from environmental planning, whilst in reality they are the same thing.⁸

In fact any urban and regional planning which does not pose as one of its prime goals the conservation and good use of the physical space, environment, natural resources, places and the conditions of well-being of the users, is a non-sense, it has never actually existed! If anything, throughout its evolution, it may have neglected some socio-economic goals, but certainly not the physical ones! The reason for the more recent insistence on environmentalist values with respect to the socio-economic ones, lies perhaps in the fact that the analysis of systems, which by definition is (or should be) all-inclusive (or

⁸ On this point, see my paper from the 9th AESOP Congress in Glasgow in 1995, Archibugi (1995).

"holistic" as it has become common to say), has placed the accent on some organic, structural interdependencies of the urban processes; and from this has derived a greater awareness (with respect to the past) that ecological equilibrium has become essential for the pursuit of all the goals of planning, with none excluded.

In this case it is a question of a "technical" perfecting of planning. To say however that the urban system has become, in the conscience of planners, an urban "eco-system" is claiming something pleonastic, from the logical point of view, and contradictory from the semantic point of view: what "system" would it be, in fact, if it did not incorporate the capacity of expressing an *internal equilibrium* between all the forces which push it in its evolution? those forces which tend, in fact, by their very nature, to destabilise the given and potential equilibrium?

Summing up thus, these considerations on the requirements of ecological equilibrium of the urban systems, it can be said that any urban system should present certain geographical physical characteristics, and have the necessary space in order to guarantee an adequate equilibrium between "pressure" on the environment, deriving from the normal development of urban activities which are its indispensable requirements (residential activities, traffic, work activities, urban waste and pollution, etc.) and the capacity of the environment itself to "recycle" or absorb the impact of such pressure *in the ambit itself of the urban system* (that we define as "loading capacity"). The urban system should therefore have the capacity to unload outside itself, i.e. elsewhere, its tensions and its ecological disequilibria.

It could be said for this purpose that the urban system should also be an urban "eco-system" as well (if the two concepts were not so pleonastic, in the unitary logic that we are defending here).

This requirement is quite parallel and analogous to the preceding one which postulated an "economic equilibrium" in order for it to be an urban system. In this case the equilibrium postulated is an "ecological equilibrium", which must bring it to the level of compatibility and not incompatibility, with the preceding one⁹.

⁹ For further considerations see the work by R.L. Meier (1976).

4.5 *The Perceptible (Aesthetic or Historical-Cultural) Image*

Another fundamental requirement of the urban system is that of its perceptible image on the part of the city-dwellers (but which is also reflected by that of visitors).

It is what is often called the "urban landscape"¹⁰.

Without an urban landscape, few cities in the past carried out their urban role. Their identification is made difficult: and thus the urban effect is lost.

But in the current dimensions of the city phenomenon, and in compatibility with the other requirements imposed by the urban effect, what is the urban landscape that should be conserved and promoted?

Naturally in this case there are strong limitations and suggestions provided by the *pre-existencies*. The image of a city resides in its history, in the way in which the natural place has been altered which has served as its background, and in its "monumentality" created by pre-existing architectural and town-planning solutions.

Nevertheless, almost everywhere monumentality is today compromised and upset by conditions and forms of use which no longer correspond to the uses for which it was conceived and constructed.

In the first place *the roads*: those built in all past eras, whether medieval, renaissance, baroque, or even 19th century, in all cities which are more than a century old, are not suitable for today's automobile traffic. An elementary town planning trend should be that of excluding them from automobile traffic!

But the *dimensions* of the manageable urban phenomenon in terms of urban system cannot make the historic city only a museum, even if it must make it compatible with an organisation which does not try to adapt it in impossible ways to modern functions.

Modern functions cannot be ignored: if we do not wish to suffer the cost of an urban disequilibrium which ends up destroying the same opportunities of conserving the inherited monumentality. But solutions must be sought for these functions, on a vaster territorial scale than that of the urban system, which go beyond mere "adaptation" to historic functions exercised, even if this will change radically the destination of use of many historic assets, so long as their perceptible image is kept.

¹⁰ A well known and exhaustive work on this subject is that by Gordon Cullen (1961).

This sort of "individuality of the urban facts" has been and still is the dominant motive of many town-planning theories: in particular those expressed by historians and designers¹¹. The undoubted importance which research or the safeguarding of local values assume among the requirements of the modern city, when these values are neglected or cancelled, must not lead to an underestimation of the harm which is caused to the efficiency of town planning overall (thus also - in the ultimate analysis - to the defence of these local values) when - in the name of these values - the other requirements of the modern city (which are the subject of this lesson) are forgotten or sacrificed. This is unfortunately the dominant factor in current traditional town planning: the neglect of the most crucial aspects of systemic town planning; those on which the success of architectonic values depend as well!

It is necessary thus to safeguard the perceptible image of the city, whether it is modern or old, its landscape, together with, and in form that are compatible with the search for all the other requirements of the urban system.

For those urban systems which must create *ex novo* such an image and such a landscape, the problem is certainly more simple; in attending to the implementation of the urban system, the production of the image and the landscape must also be attended to. The imagination of the designers, in this, knows no limits! In these cases limitation is based only on the availability of the usable technical and economic means.

In those cases where the transition from past *urban functions* must be managed *which* are no longer up to the standard of the current ones, without transforming the fabric and monumentality of the past, the new functions must be moved elsewhere and relate the old structures to adaptable current functions without doing them any harm. The logic of urban systems is in fact that can allow this transformation without radically upsetting the landscape because it only transposes the solution to a more *comprehensive* scale¹².

¹¹ An example with many interesting and appropriate cultural references is the work by A. Rossi (1966).

¹² This transposition seems almost obvious when we are faced - with all respect for "historical individuality" - urban realities which have been transformed in size to the point of passing from tens of thousands to hundreds of thousands of inhabitants! What can be suggested that is practical for us by this collective imagination inherited from the past, unless an apocryphal, very modern, past-oriented illusion? If not a theory which is completely useless for facing the real problems of today?

In conclusion, it can be repeated that a fundamental requirement of the urban system is that of obtaining by means of a specific "design invention", a high degree of environmental "amenity" and a significant "strength of image" for its constituent elements. To the design invention will be delegated (during further definition of the territorial arrangement of each urban system taken by itself, a definition which could be made precise by spatial plans on a national scale) the design of solutions that can provide something "typical", "original" and "specific", for the form and structure of each system. This is to respond to the general requirement that each system must give to its citizens and visitors a vivid and "impressive" image of the "personality" of the environment that it represents¹³.

Furthermore the requirement of the urban system is that of preserving the historic image and urban landscape inherited from the past in forms that are compatible with the limitations produced by the need to satisfy the *other* modern requirements of the city. In order to obtain this in fact a design is necessary on the scale of the entire urban system, without which the above-mentioned requirements will not be satisfied¹⁴.

The need to guarantee the image and urban landscape in the urban system¹⁵ is not only present on the scale of the system overall, or of the most important parts of the system (which we will call in para 5 "supporting axis" of the system) which are subjected to the most pressure from development, but is also present on the scale of some of its particular parts: the more peripheral parts, which are less hit by urban development, but which because of this risk losing their functionality, which they had on the other hand in their history (albeit

¹³ In "*Progetto '80*" document (already mentioned) besides formulating the general requirement mentioned previously an attempt was made (in proposing a hypothesis of restructuring by means of the delimitation of thirty "systems") to bear in mind the potential of the pre-selected areas to correspond, in an initial approximation, to that requirement.

¹⁴ Numerous points on this may be found in the work by Kevin Lynch, on *Managing the Sense of a Region* (1976), which represents well the passage from traditional urban identity to the new entity of urban region.

¹⁵ In their most traditional sense, urban design features have always been considered an efficient tool for the beautification of the city (as the City Beautiful movement tried to affirm), but also as a tool for "personalisation" of the city. A forgotten French author of the first years of this century, Benoit-Levy (1910) reached the point of proposing the decoration the omnibus (which presently would be city buses and subways) with special forms and colours, such as to adapt them to the environment. Thus, even if the design of the city's image or personality, is certainly not the primary requirement, (especially given the macro problems of the modern city) it represents, nevertheless, a non-neglectable requirement for the city effect: i.e.. a requirement to care in a special way. Its modern transposition to the scale of the city-region and to the urban system constitutes a not irrelevant challenge to the modern designer.

at other levels of functions).

These "sub-systemic" realities are those which are cut out of the spontaneous development, and should be recovered in the framework of a more general planning of the entire system, as functional areas with some roles, which are not central, but support the functioning of the system overall.

They will be considered as one of the "functional components" of the urban system itself (see below para 4), to which the reader is referred for a better understanding of their functionality).

These are areas, districts, geographical regions that are quite "typical" from the landscape and historical-cultural point of view. Here we wish only to stress that their functional recovery is part of the requirement of recovery or of creation of image and urban landscape: it is a question of that urban landscape made up of a major *natural* presence and a *typical historical-cultural area*, which would risk - if not reached by an active planning process - being suffocated through neglect or through the spill-over of the disordered metropolitan growth.

These sub-systemic areas, inserted in the unitary and integrated context of the urban system, are areas which satisfy the requisites of biotic-environmental integration. They are in fact a "lung" for the daily and weekly needs of open air amusement for the system's population; but if they are not organised and controlled in time, they risk becoming degraded before even being functionalised for this purpose. Within these areas are located the majority of the natural and cultural assets which must be preserved (national and forest parks, coastal areas, museums, castles, archaeological parks, etc.) and which represent a factor of qualification for the urban environment, a requirement of quality of the urban system, and a productive factor of the city effect being sought.

4.6 The Nature and Quality of "Superior" Urban Services

The organisation at the level of the urban system should moreover be such as to guarantee the possibility of an adequate supply of urban services for the centres of participation and decision-making, higher education, culture, social and medical assistance, and the other so-called "rare" services.

The measurement of these services would be determined on the

basis of the evaluation of the goals of the social use of resources, by means of need indicators and choices founded on *uniform national (or supra-national) measurement criteria* for all the systems (at the temporal horizon of the plan)¹⁶.

Some plausible general criteria could be the following:

1. for the *centres of participation and decision-making* it should be pointed out that a uniform accessibility to them from the various points of the system, should constitute one of the fundamental programmatic points of the new territorial organisation. The basic criteria evidently hinges on decision-making decentralisation, and thus an adequate system of participation (at the political level) for the entire territory should be ensured at the centres of the systems and in connection with the national whole; the serious problem of the decision-making concentration of the business and financial world (public and private) should not be ignored, as should not be that of the more and more accentuated detachment between these decision-making centres and the productive units. A part of this is the problem of the *decentralisation* of the so called *business and administrative centres*¹⁷.
2. in relation to education and research, and considering the university an essential component of the urban structure, from both the productive and social-cultural point of view, a metropolitan system is recognisable and functional only in as far as it manages to sustain a *complete university apparatus*, which can also be articulated into decentralised location (as seems best in the model of territorial organisation at the metropolitan level).
3. the structures and services should also be ensured, with their relative (functional and gravitational) national standards at the

¹⁶The Italian case, which is rich in situations inherited from the past, is emblematic. An idea of the possible solutions of a relationship between present day functions of the city understood in a modern way and the conservation of the images inherited from the past, is given in the numerous case histories of urban systems, which are formed from the intelligent integration of several historic cities of a size too small to carry out current roles, in order to create in fact these new entities - i.e. the "urban system" - in which new functions can be reconciled with old structures. For greater details, refer to a work by the author: "Eco-systemi urbani in Italia Eco-Urban Systems in Italy", Gangemi, Roma 1998. (The work will be published in english next year. In this work are described the motivations and functional components (see below para4) of each of the 37 Urban Systems proposed for Italy.

¹⁷Which in Italy for example, and also in other countries such as France and Great Britain, are today monopolised fundamentally by certain big cities.

temporal horizon of the plan, *for social and medical assistance, and the spaces and structures for public services of all types (shopping centres, sports centres, concert halls and theatres etc.)*.

4. the above mentioned urban services should be located such as to avoid the forming, within the system, of areas of congestion and peripheral areas; a supply in other words should be offered which is as "uniform" as possible of all the services in the system territory, in relation obviously to the distribution of the population in the same. To this end, a strategy of *location by "integrated sets" of services* could be particularly functional.

5. The functional components of the urban systems

A policy of urban systems consists in the identification in any concrete, defined, national territory of the areas, or rather of the "ambits" that are able to carry out the role - if opportunely and suitably "designed" in this sense - of "city systems".

In order to accomplish this identification, on the basis of the requirements indicated above, it is well to define more precisely the elements constituting an urban system: we will call them its "*functional components*".

5.1 Functions and "Parts" of the Territory

The identification and consequent "arrangement" of such components, responds to the first of the tasks of the town planning. There the components were defined as "parts" of the city. Having taken the urban system as a point of reference - as the modern concept of the city - its parts (called in preference here "components") must be seen in relation to the functioning of the system itself.

From a functional analysis of what is meant by "urban system" and of the requirements which characterise it (as above developed) it seems that for *each* urban system (independently from anykind the typologies) the following functional components can be enucleated:

1. first of all its "*area*" and, as a consequence, its "*delimitation*". This functional component, which seems almost obvious and banal, is not deprived nevertheless of some problems, as will be

seen below;

2. second, a fundamental functional division of its area into an "*area of intensive use*" and an area of "*free*" use; a division which beyond any form of functional integration of the total territory of any urban system, must safeguard the different finalisation and therefore "treatment" of the two areas;
3. a "*load-bearing axis*", which represents a functional component of any "organism" (such as the urban system is);
4. a "*halo*" of the load-bearing axis which represents a further specification of the territorial area, seen however as it concerns totally some of the immediate effects of the load-bearing axis;
5. the "*supporting directrices*", which have the function of "supporting", and "sustaining" the accessibility of the system and its most important parts;
6. the "*centralities*" of various weight and worth, which represent in the functional analysis, exactly, a form of "nucleation" or "polarisation" of certain activities, which are not dissimilar from the load-bearing axis, from the point of view of the territorial locations, but are perceptible as a gravitation of functions;
7. the special sub-systemic "structures" which develop, from the point of view of functionality, *territorial specialities* - above all from the environmental and historical-cultural angle - without compromising therefore the *integration* of the entire urban system, but rather in fact favouring it.

We will very briefly examine now each of these functional components¹⁸.

5.2 *Area and Delimitation*

First of all the urban system has its area, with its perimeter which constitutes its delimitation.

This already implies an initial problem: it is a question of deciding whether the delimitation is only that of the system in question or whether it concerns at the same time the adjacent system as well. In the first case - as happens in all the bordering relationships - it is

¹⁸ More details in already quoted book of mine: *The theory of urbanistics* (forthcoming an english edition).

necessary to anticipate some part of the territory which does not belong to any system (a "no-man's land"); in the second the whole territory becomes part in one way or another of some urban system.

But if a multi- or pluri-functional character is rooted in the notion of "urban system" - as we have said - in the sense that it should include *all* (with none excluded) the most important functions of use in the territory, then it is difficult to conceive parts of territory which *do not have their own function of use* to be expressed; even the most neglected, inaccessible and least used parts have a territorial function in some way (if not other than that of representing a nature reserve for the safeguarding of a natural environment which is not replaceable otherwise: all this works to the advantage of the citizen, i.e. the participator in civil and community life). It follows that the second case becomes the most coherent option: that in one way or another each territory becomes part of an urban system.

In this case each *area* of the urban system becomes contiguous with that of another and all the *delimitations* of each urban system have the role of serving at least two adjacent systems (obviously in the cases when the marine surface is not considered as a border).

5.3 "Free" Areas and "Intensive" Areas

Certainly it ensues from such an option that the structure of each urban system (and to be more precise its area) will by necessity include territories with different functions; and, in particular, territories with a *more clear and precise* function (those which undoubtedly contribute to defining an urban structure) and territories whose function is less clear and precise, whose existence is less essential for the characterisation of an urban structure, but which nevertheless must be attributed to a more evident urban structure, for the purpose of carrying out a function, which may make them a component of the system.

In the various theoretical and practical experiences of territorial analysis and design, various denominations are always assigned to these fundamental territory types that express the different territorial functions: people have spoken of "weak" and "strong" areas, central and peripheral areas, principal and complementary areas, "intensive" and "free" areas, etc. Not always in the concrete territorial configuration are the one and the other necessarily always "compact"

or contiguous: sometimes they may also intercalate. But the dominant character of the "strong" areas is that of being tendentially centripetal and "nuclear", and that of the "weak" areas of being centrifugal and dispersed.

In a more precise definition of function and role of the two types of areas as well, in which the "weak" ones can find an impulse in the framework of the pre-selected separation of functions, the "strong" areas will tend - in the various territorial configurations - to assume the character of central areas and the "weak" ones that of peripheral areas; and - as such - the first will tend to find themselves in the centre of the systems, and the second on the *periphery* of the same, without exception.

It ensues from the above that a functional component of the urban system is the sub-division of its area into two basic sub-areas (which here we will call): *the intensive area and the free area*.

a. The "intensive" area

By intensive areas is meant therefore the area which, by analytical survey or design assignation, is considered the centre of the most important features of settlement, those which are capable of characterising the existence itself of the urban system.

Obviously such an area will express the highest values of residential and habitational "settlement" density. But it will express, at the same time, the highest settlement values of other activities (industrial, commercial, social services, etc.) which are expressed by their own indicators of "density". Such density, and in particular the residential one, must in this case be conceived independently from the building typologies which usually determine its value. all the phenomena of stable habitational settlement linked to daily working life, service etc. must be included in the notion and delimitation of the intensive areas; even if the characters of the settlement may take on - on the basis of the typologies in use in the area - a diffused or scattered ("suburban") nature.

The area in question is "intensive" in as far as it participates intensely in the complex and total life of the urban system and is the centre (or could hopefully be the centre) of its most important activities.

If the urban system has been identified and defined well, it is characterised explicitly for its intensive area and not for the "free"

area. On the contrary, when it is desirable to limit the notion of urban system to the phenomena of the most intense and continuous urbanisation (conurbations, metropolitan areas etc.) the urban system would be identified in its intensive area, and the free area could be the "no-man's land" between the various systems, beyond the perimeters of each of these. But having opted for an overall pluri-functional concept of the urban system, these "free" territories would be included - in some way, and in the most rational and motivated way - in a single area, characterising however its specific functions with respect to the more complex and integrated ones of the intensive area¹⁹.

b. The "free" area

The free area would be transformed in such a way from a generic undifferentiated territory to a specific "functional" area of an urban system, maintaining and in fact accentuating its peculiar characteristics.

The "free" area, resulting from the analysis, could in fact be the settlement for mixed activities shared partly among those of an "intensive" area, and in part among those of a free area of an urban system. If these territories, do not have nevertheless the requirements for belonging to an "intensive" area, whilst not having a defined function resulting from the analysis, they should be helped to specialise their qualification of "free" area of a system, at the risk as well of losing both their settlements for habitation and those for activities that are not rationally coherent with their vocation.

The settlements that are most suitable for the "free" areas are obviously those of tourism and free time. These activities, even if they are largely seasonal, activate however occupations which in turn are a factor in the demand for urban services at the primary level. The overall development should however be contained within the system of interdependencies activated by the special settlements for which such areas have a vocation, and not by others, even if these are inherited from the past (which would no longer be rational and coherent with the future economic and urban organisation).

Containing these free areas within these limits of development provides a guarantee that future occupations settled in them may be

¹⁹ See some of the past work by Philbrick (1957a and b) for the concept of the functional distribution of areas in conventional geography.

carried out at levels of income and productivity that are equal to those of the intensive areas, and not as happens today according to a "second class" standard of income and productivity. For this reason the real "economic" development of these free areas starts from a containing of the dispersion of activities not in line with the functional role of free areas within the defined urban system²⁰.

While the urban system overall, and to a large extent the intensive area of the same, are identified in relation to the research into the goal that will guarantee their *functional autonomy* (and it is for this reason that, *minimum thresholds* of population, territory, "market", productive vocation, etc. have been identified among their requirements), the free areas of a system do not have any autonomy, but exist by dint of their functional integration with the urban system of which they are a part and the intensive area of the same. This is why the design of the development of these areas or portions of areas cannot take place unless it is in the framework of, and in strict coherence with, the design of the entire urban system, from which to a large extent they should derive their constraints and goals²¹.

5.4. The "Load-bearing" Axis"

Like any "structure", the urban system has as a basic component its "*load-bearing axis*". It is indeed around such an axis that all the "facts", and phenomena of settlement agglomeration, on which the identification of the system has been based, are placed. It represents a sort of "skeleton", or - as the artisan builders of wooden structures used to say - the "soul" of the system.

Even more than the area, the fundamental, but almost carried over,

²⁰ Other interesting considerations on the concept and use of the free area are found in an essay by K. Lynch (1964), republished in Kepes, ed. (1972).

²¹This is the case - which is widespread in Italy - of many mountainous and hilly areas which present few possibilities and vocation for an intense polyvalent development, even if they are the centre of relatively important historic urban centres. But despite this the rational principle is largely ignored of a non-autonomous development design for them and of the dependency of their development on the design of the entire system in which they should be placed. This seriously damages the quality of their actual development, and disperses their potential in a series of disconnected interventions which not only do not produce a sufficient economic effect but also compromise what could be had with an appropriate functional specialisation of the area in question, as a "free" area.

For a wider discussion about the role of free areas in city policy see Chapter 15 of a work already mentioned (Archibugi, 1979). See also other contributions by the author (Archibugi, 1976 a and b).

component, the axis is the "creative" component of the system, and generates those structures and fundamental relations which make an "urban system out of an archipelago of settlements".

The load-bearing axis of a system is presented obviously as a linear relation of and in the territory. But it must not be considered as a simple "infrastructure" relationship. It is difficult to calculate with the instruments usually used for measuring territorial (for example, gravitational) phenomena; it is a relationship of "belonging", of identity, of the system, before even a relationship of functions.

This is why rather than being a reality to be pointed out, the axis is a *design concept to be developed*. It is difficult to conceive the design development of an urban system, if it does not begin from the identification of its possible load-bearing axis, around which all the other functional determinations "rotate".

In the reflection on the territory which leads to the identification of urban systems and - at the same time - their supporting axes, can be found a variety of situations or cases which lead to the introduction of a further qualification and distinction in the concept and meaning of the load-bearing axis: a fundamental, *principal* axis with "stronger" characteristics; and *weaker less incisive segments of the same* which are mainly "lateral" but often also central. The imprecise border of the qualifications of the two sections of the axis may be defined simply with an ordinal character: an axis of the "first" or "second" degree, and - for the more marginal ones - also of the "third" degree.

The *axis of the first degree* is that which supports by itself the whole system.

The *axis of the second degree* is that segment of the axis which has characteristics of minor force, and which does not justify by itself an urban structure and is obviously dependent on the physiognomy and morphology of the axis of the first degree.

The *axis of the third degree* is only marginal in character and appears often as peripheral. The "laterality" and "marginality" of the axis of the second and third degree is produced in the case of compact systems whose most important centres do not present particular impediments in their functional interrelations. The laterality and marginality may also be "central" when the morphological characteristics of the system and axis which supports it present some spatial interruptions, which cannot allow a continuous axis of the first degree; but nevertheless there is a need for the continuity of the axis

otherwise the system would lose one of its fundamental supports²².

5.5 *The Load-bearing Axis "Halo"*

The load-bearing axis, however conceptual in expression, must be identified with a clear sign which configures and synthesises its character. But its effective placement in the territory is not precise. Whilst its sign is easy on a synthetic scale, if relations with reality diminish and the scale gets smaller it more than likely that the locating of the axis will fade even more and be lost in a much wider ambit of what the sign would represent on a superior scale. This indefinite and not easily representable "effect" on a territorial scale for which we can speak however in terms of (and we can design) a load-bearing axis, we will call a "halo". It will be a diminishing surface adjacent to the sign of the load-bearing axis which will have a consistency dictated by the settlement and geographic characteristics of the area in question.

In fact, the load-bearing axis halo, at a degree of development of the fully mature urban system, could easily coincide with the entire "intensive" area of the same system. The times and methods in which it will happen, will depend as well on the settlement and geographic characteristics of the system and on the starting urban morphology. For example, a great conurbation already existing, will tend to develop a halo of its axis for all the adjacent plain and lightly hilly territory for many kilometres: that which in the greater part of the configurable cases corresponds to all the area defined programmatically as "intensive".

5.6 *The "Supporting Directrices"*

The load-bearing axis, which characterises - as said - the system, with its structures of the first, second and the third degree and with its "halo", is linked to directrices which allow it to maintain links both with the free area of its system, and with the territory of the adjacent systems. Such directrices could be called "supporting directrices".

They are fundamentally *infrastructure directrices*, around which may be developed functional settlements and junctions of recovery of pre-existing centres or specialised centres of the "free" area.

²² The concrete determination of the load-bearing axis of the Italian urban systems, as suggested in the work already quoted (Archibugi 1987), provides many examples which are more eloquent than any definition.

The supporting directrice may constitute therefore a functional crossing with the other systems and their axes.

5.7 . *The "Centralities" and the "Services" Nuclei*

The urban system is the carrier, by its nature, of an urban effect widespread in all the area concerning it, but with a particular presence and density along the load-bearing axis and its "halo". Nevertheless as far as the "services" at their various dimensional and access scales are concerned, it is reasonable that they are "concentrated" in certain points of the axis, approximately corresponding to the pre-existing urban settlements.

Beyond a certain threshold of size and use such centres merit being indicated as important nuclei of the structure. Their more precise and complete locating could be designed only after a more thorough study of the relationship between the "centres of demand" (or the residence of the users) and standards of programmatic accessibility, with respect to the pre-existing "centres of supply" (installations).

In an approximate and general way the strategic places of such locations in the most important urban centres may be identified. In order to symbolise the "hierarchy" of access according to the nature and "rarity" or "frequency of use" of the services themselves, we can for the moment classify the centres into three categories: centres of the *first, second and third degree*.

In the *centralities "of the first degree"* are placed the activities which have an effective catchment area above a threshold which can "feed" all the superior urban services which produce the "city-effect".

In a survey of a "present state", these centralities are those which produce a "city-effect". In other words they are centres in which such an effect is already present: and *others* are the problems of urban organisation which must be faced (congestion, hypertrophy, gigantism, etc.).

In the *centralities "of the second degree"* may be conceived the activities, which will be ideally located (more or less organised in "integrated sets" of services) having a "catchment area" of a smaller amount of inhabitants, which is not in itself enough to feed the superior urban services which would produce the city-effect, but if they are coordinated in a functional whole, they could reach this level. Thus they are situations which are very close to the role of bringing

about a process of territorial development that brings the city-effect. We could define them as "potential centralities" at "defined conditions". Any way they are service centres or nuclei, which are ready to be activated for different and superior functions. In the *centralities "of the third degree"* may be conceived, ideally placed, the activities (likewise more or less organised in "integrated sets") having a "catchment area" which is absolutely insufficient to feed the services capable of producing the city-effect, and which do not even have the potential to aspire to such a role, and which could only carry out an auxiliary role, if they are in some way "conurbated" (whilst also respecting their territorial autonomy in some way) with other more evident potential centralities.

The activities which, given the frequency of use, go beyond the catchment area of the type identified - given the circumstances - to produce a city-effect, i.e. those of the first degree, have as a catchment area the entire population and as a threshold of accessibility the entire area of the urban system: they are therefore activities that can (in the present, potential or policy-oriented state) be *indifferently* located in any point of the system (or of its axis), bearing in mind the needs of each structure, as concerns its installation and integration with other activities (and with regard to the minimisation of user access costs). They are evidently studied and designed at the operational level in the design of each system.

In the centralities of the first degree, the activities of superior services are already present - as mentioned - and the problem which is posed if at all is that of a functional and territorial "articulation" or "breaking up" of the same, in order to reduce the operational units and adapt them to the "multiple" of minimum functional catchment area thresholds indicated.

The activities on the other hand which, given the frequency of use, are below the catchment threshold indicated for the centres of the third degree, are activities which may be likewise located in a widespread way, following the concrete territorial distribution of the pre-existing urban centres; it will be the task of the design of the system and sub-system (local and district) to evaluate the concrete service needs and establish their best location in the ambit of the framework or supporting axis of the system.

However, we must be careful not to reproduce, by means of the concept of centrality - which is universal - the old and anachronistic

concept of the city as opposed to that of the country; and careful not to slip again into a mere "physical" conception of the city as a dense "built-up" area. Volumetric density can certainly represent a specific attribute of centrality, but it does not represent the city in itself. In short, whilst it is difficult to conceive the city without centrality (as some excessive spatial de-formalisation has attempted, and is still trying to conceive), centrality does not produce *per se* the city: it is, so to speak, an indispensable condition but not sufficient.

6. Special Sub-systemic Structures: Cultural Heritage Territorial Units for Conservation and Valorisation Policy, and their role

The urban system is such in as much as it is conceived as *unitary*, *integrated* and *functionalised* in its single parts, which all contribute - each with its own role - to the "*performance*" of the system as a whole.

Functional integration of the system (as it has already been assumed in the works relative to the conceptual definition of the urban system) means that on the inside of the system must not be created any territorial "hierarchy", but only territorial "functions"; in other words there cannot be single parts of the system which have - at more modest levels - the same functions of the system as a whole, since otherwise the principle and concept of functional integration would be negated.

Nevertheless there are in the concrete historical experiences of each territory, and thus also of those which we want to integrate into the system (transforming the urban structure from an "archipelago" into a "system"²³), some specific realities, which have special qualifications, which it would be well not to "smother" in the "rationality" of the system, or which it would be well to "recover" - in the framework of the system - from a tendency to degradation due to the fact that such realities were the function of services which no longer find their rational placement in a modern organisation of the territory (of which the urban system would wish to be the expression)²⁴.

²³ Expression taken by Corrado Beguinot.

²⁴ The design of centres of superior services will arise from an evaluation of the needs of the services themselves, coherent with the policy of "urban systems" eventually installed. On this subject the works by the *Centro di studi e piani economici* - (1978a, 1978b, 1993), on the

In any system these realities must and - so to speak - "shaped" in order not to make them contradict with the overall development of the system, or let them be completely absorbed by it.

We would define such realities as: "*special sub-systemic structures*" of autonomous qualification or requalification. They must be indicated in a particular way, whilst leaving to the design of the system (or to their own inter-systemic or inter-regional design) the task of defining them more precisely both in their sign and location²⁵.

In particular these sub-systemic realities concern necessities for "environmental" or "historical-cultural" (or mixed) recovery, conservation and valorisation.

standards of tertiary activities constitute - for Italy - a methodological reference base. Furtherly, the already mentioned multinational research (France, Germany, Great Britain and Italy done for the European Commission by the *Planning Studies Centre* with cooperation of other research institutions of the involved countries, provides an interesting set of *urban and environmental indicators* to assume as minimum or maximum standards in order to get an urban effect and to implement an urban systems policy in Europe. The research report will be published under the title *The urban ecosystem in Europe: towards an European urban system concept and strategy*, Ashgate, London 1998.

²⁵ Italy (like all countries having a strong historical tradition bearing on the territory) is very rich in this realities, which today tend to become degraded further, or to survive only by dint of the bad organisation of the territory, and which in a new way of conceiving urban development, could and should recover their vitality, even if this is completely "new" in comparison to that which witnessed their growth and development.