

The New Metropolis: Rethinking Megalopolis

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LANG R. and KNOX P. K. The new metropolis: rethinking megalopolis, *Regional Studies*. The paper explores the relationship between metropolitan form, scale, and connectivity. It revisits the idea first offered by geographers Jean Gottmann, James Vance, and Jerome Pickard that urban expansiveness does not tear regions apart but instead leads to new types of linkages. The paper begins with an historical review of the evolving American metropolis and introduces a new spatial model showing changing metropolitan morphology. Next is an analytic synthesis based on geographic theory and empirical findings of what is labelled here the 'new metropolis'. A key element of the new metropolis is its vast scale, which facilitates the emergence of an even larger trans-metropolitan urban structure – the 'megapolitan region'. Megapolitan geography is described and includes a typology to show variation between regions. The paper concludes with the suggestion that the fragmented post-modern metropolis may be giving way to a neo-modern extended region where new forms of networks and spatial connectivity reintegrate urban space.

Metropolitan morphology New metropolis Spatial connectivity Megapolitan region Spatial model American metropolis

LANG R. and KNOX P. K. 新的大都市区：对特大城市的再思考，区域研究。本文探讨了大都市形态、尺度以及关联性之间的相互关系。文章回顾了由地理学家 Jean Gottmann, James Vance, 以及 Jerome Pickard 提出的“城市蔓延非但不会割裂区域反而会引发新型关联”这一观点。文章首先追溯了美国大都市的发展历程，并引入一个新的空间模型来展示大都市变化的形态学。紧接着文章在地理学理论和实证研究基础上综合分析了“新大都市”的特征。新大都市的一个核心要素在于，其巨大的尺度有助于形成一个更大的跨大都市区城市结构-特大城市区域。文中对特大城市区域地理学进行了相关描述，同时还提供了其类型学来展现区域间差异。文章总结到：破碎的后现代的大都市区域可能会让位于以“新现代”方式扩展的区域，在这样的区域中新型网络和空间关联性再度将城市空间整合。

大都市形态学 新大都市 空间关联 巨型城市区域 空间模型 美国大都市

LANG R. et KNOX P. K. La nouvelle métropole: repenser la mégapole, *Regional Studies*. Cet article examine les relations existant entre la forme, l'échelle et la connectivité métropolitaines. Il revisite l'idée, proposée en premier lieu par les géographes Jean Gottmann, James Vance et Jerome Pickard, selon laquelle la capacité d'expansion des villes ne démolit pas les régions, mais conduit plutôt à de nouveaux types de liens. L'article commence par un examen historique de la Métropole américaine dans son évolution et introduit un nouveau modèle spatial montrant que la morphologie métropolitaine est en train de changer. Vient ensuite une synthèse analytique, fondée sur la théorie géographique et les résultats empiriques, de ce qui est étiqueté ici comme étant la 'nouvelle Métropole'. Un élément clé de la nouvelle Métropole est sa grande échelle, qui facilite l'émergence d'une structure urbaine trans-métropolitaine encore plus vaste – 'la région mégapolitaine'. La géographie mégapolitaine est décrite et inclut une typologie afin de montrer les variations entre les régions. L'article se termine en suggérant que la Métropole post-moderne éclatée est peut-être en train de laisser la place à une région étendue néo-moderne dans laquelle les nouvelles formes de réseaux et de connectivité spatiale réintègrent l'espace urbain.

Morphologie métropolitaine Nouvelle métropole Connectivité spatiale Région mégapolitaine Modèle spatial
Métropolis américaine

LANG R. und KNOX P. K. Die neue Metropole: ein Überdenken der Megalopole, *Regional Studies*. In diesem Beitrag wird die Beziehung zwischen der Form, dem Maßstab und der Konnektivität von Metropolen untersucht. Es wird ein frischer Blick auf die erstmals von den Geografen Jean Gottmann, James Vance und Jerome Pickard vorgebrachte Idee geworfen, wonach die urbane Ausdehnung nicht zum Auseinanderreißen von Regionen führt, sondern vielmehr zu neuen Arten von Verknüpfungen. Zu Beginn des Aufsatzes werfen wir einen historischen Rückblick auf die Entstehung der amerikanischen Metropole und führen ein neues räumliches Modell ein, in dem die sich wandelnde Morphologie der Metropole verdeutlicht wird. Als Nächstes stellen wir eine analytische Synthese vor, die auf der geografischen Theorie und den empirischen Ergebnissen im Zusammenhang mit dem hier als 'neue Metropole' bezeichneten Phänomen beruhen. Ein wesentliches Element der neuen Metropole liegt in ihrer

gewaltigen Ausdehnung begründet, welche das Entstehen einer noch größeren transmetropolitanen Stadtstruktur begünstigt – der ‘Megapolitanregion’. Es wird die megapolitane Geografie beschrieben, wozu auch eine Typologie gehört, mit der Abweichungen zwischen den einzelnen Regionen aufgezeigt werden. Wir schließen unseren Beitrag mit der Vermutung, dass die fragmentierte postmoderne Metropole von einer neomodernen erweiterten Region abgelöst werden könnte, in der neue Formen von Netzwerken und räumliche Konnektivität den urbanen Raum neu integrieren.

Metropolitane Morphologie Neue Metropole Räumliche Konnektivität Megapolitanregion Raummodell
Amerikanische Metropole

LANG R. y KNOX P. K. La nueva metrópolis: remodelar la megalópolis, *Regional Studies*. En este artículo analizamos la relación entre la forma, escala y conectividad metropolitanas. Revisamos la primera idea que aportaron los geógrafos Jean Gottmann, James Vance y Jerome Pickard de que la expansibilidad urbana no separa a las regiones sino que produce nuevos tipos de vínculos. En este ensayo hacemos primero una revisión histórica de los cambios en la metrópolis americana e introducimos un nuevo modelo espacial que muestra los cambios en la morfología metropolitana. A continuación aportamos una síntesis analítica basada en la teoría geográfica y los resultados empíricos de lo que aquí denominamos la ‘nueva metrópolis’. Un elemento clave de la nueva metrópolis es su amplia escala que facilita la aparición de una estructura urbana transmetropolitana aún más grande: la ‘región megapolitana’. Describimos la geografía megapolitana e incluimos una topología para mostrar las diferentes variaciones entre las regiones. Terminamos sugiriendo que la metrópolis postmoderna y fragmentada podría dar paso a una región neomoderna ampliada donde las nuevas formas de redes y conectividad espacial reintegren el espacio urbano.

Morfología metropolitana Nueva metrópolis Conectividad espacial Región megapolitana Modelo espacial
Metrópolis americana

JEL classifications: O18, O51, P17

INTRODUCTION

The main difference between an urban area at the scale of the Atlantic Urban Region [i.e. megalopolis] and the traditional metropolitan scale is that the emerging larger form has a multitude of major nodes whose areas of influence are likely to be autonomous. Nevertheless, the individual urban centers benefit from mutual proximity, and there is bound to be increased interaction.

(REGIONAL PLAN ASSOCIATION (RPA), 1967, p. 35)

then, sometime in the 1950s a ‘city of realms’ began to be evident, but what were the determinants of its structure? ... the process of parturition ... changed outlying areas from the suspected functional potential for semi-independent existence – first felt when suburbs began to be large and separate enough so some activities found in the central cities came to be replicated there – to actual semi-independent.

(VANCE, 1977, p. 410)

The evolution of metropolitan space remains fundamental in understanding the spatial organization of advanced economies. The above passages suggest that post-war US development produced a multi-nodal yet integrated urban structure at both the metropolitan and megapolitan scales. VANCE’s (1977) ‘urban realms’ and GOTTMANN’s (1961) ‘megalopolis’ (as interpreted by the RPA) highlight different dimensions of metropolitan scale and form, yet the two ideas are linked. Both offer the counter-intuitive notion that urban expansiveness does not tear regions apart but instead produces new types of connectivity.

This paper revisits these ideas, recasting Vance’s concept of urban realms in the context of the extended contemporary scale of metropolitan regions. There have

been significant changes in real estate investment in the USA in the past quarter century, in tandem with equally significant changes in the structure and functional organization of metropolitan regions. Traditional patterns of urbanization have been repealed as new rounds of economic restructuring, digital telecommunications technologies, demographic shifts, and neo-liberal policies have given rise to new urban, suburban, and exurban landscapes. Urban regions have been stretched and reshaped to accommodate increasingly complex and extensive patterns of interdependency, while the political economy of metropolitan America has been reshaped in response to socio-economic realignments and cultural shifts. If the industrial metropolis was the crucible and principal spatial manifestation of what Ulrich Beck has dubbed the ‘first modernity’, contemporary metropolitan America may be viewed as an emergent spatial manifestation of a ‘second modernity’, in which the structures and institutions of 19th-century modernization are both deconstructed and reconstructed (BECK *et al.*, 2003). Viewed in this way, traditional models of metropolitan structure and traditional concepts and labels – ‘city’, ‘suburb’, ‘metropolises’ – are ‘zombie categories’. According to BECK and WILLMS (2003):

zombie categories embody nineteenth-century horizons of experience, horizons of the first modernity. And because these inappropriate horizons, distilled into *a priori* and analytic categories, still mould our perceptions, they are blinding us to the real experience and ambiguities of the second modernity.

(p. 19)

Contemporary metropolitan America is characterized by a 'splintering urbanism' (GRAHAM and MARVIN, 2001) that severely challenges the nomothetic models of urban form and structure that for so long have been the staples of urban geography. As in the 'Mega-City Regions' of Europe (HALL and PAIN, 2006) and the USA (CARBONELL and YARO, 2005), the consequence is a dominant new form of urbanization: polycentric networks of up to 50 cities and towns, physically separate but functionally networked, clustered around one or more larger central cities, and drawing enormous economic strength from a new functional division of labour. This paper recasts the discussion of urban form and structure in the USA in terms of the 'New Metropolis' that is part of a network of 'Megapolitan Areas'.

Data used in this paper are derived from a larger research project at Virginia Tech on 'megapolitan' geography. The megapolitan concept has been developed in part to depict geographically where the next 100 million Americans will live (LANG and NELSON, 2007b). This analysis identified 20 emerging megapolitan areas that are based on the US Census Bureau's definition of a 'combined statistical area' (CSA). These megapolitan areas extend the census's current method several decades forward. The main criterion for a census-defined CSA is economic interdependence, as evidenced by overlapping commuting patterns. The same holds true for megapolitans. Based on projections of commuting, by 2010 the census will

likely show that Phoenix–Tucson in Arizona and Washington–Baltimore–Richmond (i.e. Washington DC, Maryland and Virginia) have become CSAs. In 2020, several more metropolitan areas will pass this threshold, and at mid-century all 20 megapolitan areas should officially be CSAs.

EVOLVING METROPOLITAN FORM

Until the mid-20th century, urban and metropolitan form could safely be conceptualized in terms of the outcomes of processes of competition for land and ecological processes of congregation and segregation, all pivoting tightly around a dominant central business district and transportation hub (Fig. 1a). During the middle decades of the 20th century, however, American metropolises were unbound by the combination of increased automobility, and the blossoming of egalitarian liberalism in the form of massive federal outlays on highway construction and mortgage insurance that underwrote the 'spatial fix' to the over accumulation crisis of the 1930s (CHECKOWAY, 1980; HARVEY, 1985; LAKE, 1995). The result was a massive spurt of city building and the evolution of dispersed, polycentric spatial structure, and the emergence of urban realms (Fig. 1b).

Urban realms

Initially, the shift to an expanded polycentric metropolis was most pronounced in the north-eastern USA,

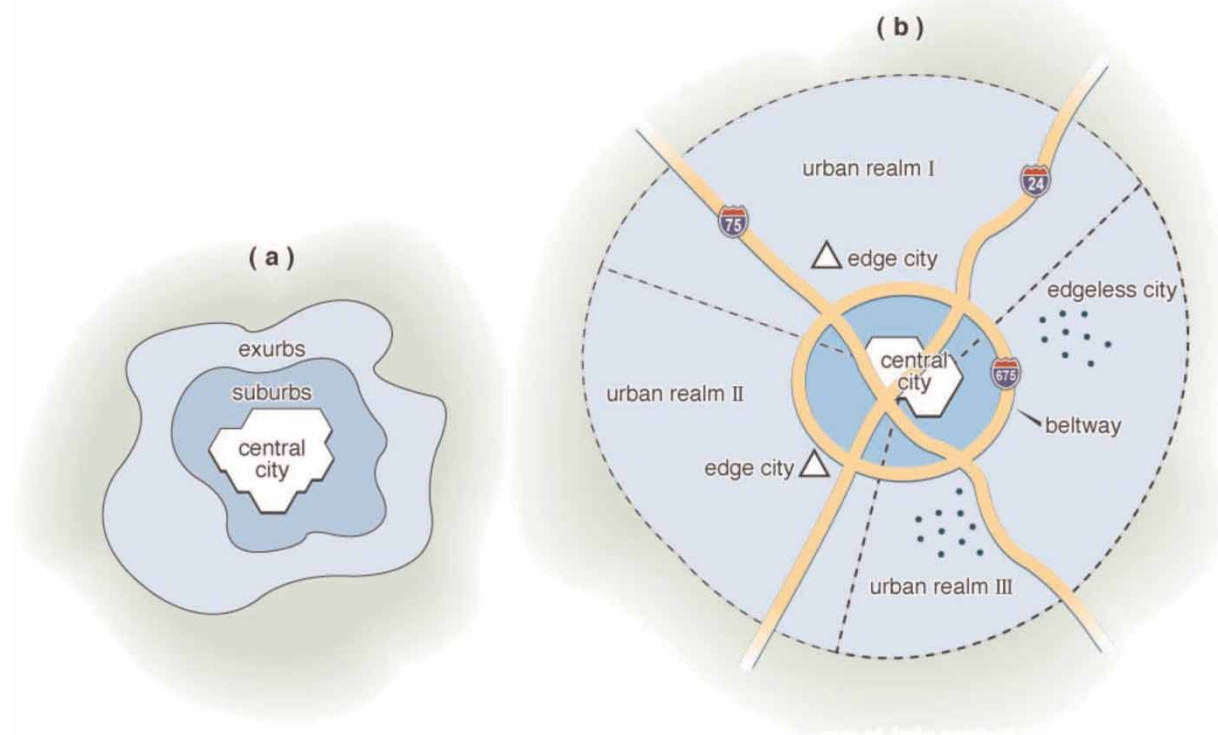


Fig. 1. Evolving 20th-century metropolitan form

and Gottmann captured the moment with his conceptualization of 'megalopolis'. It was not long, however, before observers noted the change elsewhere. MULLER (1976) was among the first to note the emergence of a new 'outer city'. VANCE (1977) argued that major metropolitan areas in the USA, such as Los Angeles in California, New York in New York State, and San Francisco, also in California, had grown so decentralized that they had become a series of semi-autonomous subregions, or 'urban realms'. Vance's basis for identifying different realms within metropolitan areas rested on several criteria. The first is the overall size of the region – the bigger the metropolis, the more plentiful and differentiated the realms. Next is an area's terrain and topography. Physical features such as mountains, bays and rivers often serve to delimit realms by directing the spread of urbanization into distinct and geographically defined areas. The third variable is the amount and type of economic activity contained within it. Realms can also be distinguished by either an overriding economic unification, such as the Silicon Valley in California, or shared employment centres as are identified by commuter sheds. Finally, the regional geography of transportation, as originally recognized by HOYT (1939), also plays a role in separating urban realms. This process began with trolley cars but is now centred on Interstate Highways, in particular metropolitan beltways. Beltways can either define the boundary of an area, as reflected by the expression of one being located 'inside the Washington beltway', or unify a realm as in the case of the LBJ (Freeway) Corridor north of downtown Dallas in Texas.

To Vance, urban realms are natural functions of the growth of cities; the city has changed structurally as a collection of realms, that has grown 'one stage beyond that of a metropolis' (VANCE, 1964, p. 78). The core-periphery relationship weakens as realms become more equal. The basic organization of the region becomes more cooperative as the shared urban and cultural identity of the urban realms creates what Vance called a 'sympolis' rather than a metropolis. For example, consider the relationship between Orange County and Los Angeles, California. Orange County is clearly part of Greater Los Angeles, but it also maintains a distinct and semi-autonomous identity as 'South Coast'. Orange County contributes significantly to the region's larger economy but mostly does not compete with Los Angeles. Industries such as the automotive design found at the Irvine Spectrum, a master-planned high-technology office park in the centre of the county, show this pattern. Several car companies chose the Spectrum for access to California trends and regard Orange County as 'the next capital of cool' (SKLAR, 2003). Orange's association with the Los Angeles helps makes this once sleepy suburban county cool and the larger Southern California region gains by additional economic activity.

Realms have their own subregional identities, such as those in the Los Angeles region such as South Coast (or Orange County) or the Inland Empire (Riverside and San Bernardino Counties). The realms around Los Angeles are so distinct that South Coast and the Inland Empire have their own subregional newspapers and airports. On a smaller, but emerging scale, a place such as the East Valley of Phoenix (with such major suburbs as Mesa, Tempe, Chandler and Gilbert) already has its own newspaper and will soon have a separate national airport from Phoenix. Finally, urban realms also show up in business names, such as South Coast Plaza, Inland Empire National Bank, or the *East Valley Tribune*.

LANG and HALL (2008) synthesized thinking on urban realms and offered four realm types based on a mix of social characteristics, built densities, and development age:

- Urban core realms: the original places of substantial 19th- and 20th-century development, including the region's major principal city and downtown.
- Favoured quarter realms: the most affluent wedge of a metropolitan area, containing upscale communities, luxury shopping, and high-end office districts.
- Maturing suburban realms: the areas of substantial late 20th-century and early 21st-century development that are rapidly filling in and will ultimately extend the edges of the metropolis.
- Emerging exurban realms: extended, rapidly growing, lower-density spaces that contain leapfrog development and will not be full extensions of the main metropolitan development for decades to come.

The relationship between these realm types plays a role in determining the overall megapolitan dynamic. Favoured quarters, such as Southern California's South Coast (Orange County), are often job rich, but have expensive housing. A less affluent maturing suburban realm, such as the Inland Empire (or Riverside and San Bernardino Counties), can develop a dependence on the favoured quarter. Thus, an important traffic pattern in Southern California is the commute between these two suburban realms. In fact, one of the biggest bottlenecks in the region's freeway system is along a mountain pass (known locally as 'The 91') that divides the two realms.

Exurban realms also serve a critical role in megapolitan formation. The 'mid'-exurban realms that emerge between two proximate metropolitan areas lie in the crosshairs of regional growth. It is in these places where commuters go in both directions and provide the linkages – based on a shared economy – that join metropolitan areas.

The new metropolitan form

Parallel with the development of urban realm theory were new models of metropolitan form. These concepts

captured the ever-expanding scale and fracturing nature of the late 20th-century metropolis. In 1962, a now obscure urban thinker Jerome Pickard took Gottmann's megalopolis idea a step further and developed a national map of 'urban regions'.¹ PICKARD (1966) then followed up with an analysis of how US migration patterns were expanding these regions. In 1970, Pickard projected growth in urban regions to the year 2000 (Fig. 2). With remarkable precision Pickard predicted the basic frame of the nation's current pattern of urbanization. He also clearly delineated between an urban region and a metropolitan area. An urban region, to PICKARD (1970), is:

not necessarily a contiguous 'super city' but rather it is a region of high concentrations of urban activities and urbanized population. (p. 154)

From his original work on urban regions, PICKARD (1962) argued that urban regions were not simply an extended city:

The largest urban region, sometimes called 'megalopolis', extends along the northern Atlantic seaboard from Portland, Maine to Washington, DC. A popular misconception has led to calling this a 'city 500 miles long'. It most definitely is *not* a single city, but a region of concentrated urbanism – a continuous zone of metropolises, cities, towns and exurban settlement within which one is never far from a city. (p. 3, original emphasis)

PICKARD (1970) also noted that:

urban regions have evolved during the automobile era from multiple urban nodes that expanded very rapidly toward regional cities. (p. 154)

By Pickard's definition, an urban region is required to have a total population of 1 million people and an average population density of at least three times the national average (PICKARD, 1962).

Pickard was indeed a seer, but he was not alone in noting the role that post-war metropolitan expansion played in changing basic regional form. In 1980, geographer BRIAN J. L. BERRY (1980) argued that:

urbanization, the process of population concentration, has been succeeded in the United States by counterurbanization, a process of population deconcentration characterized by smaller sizes, decreasing densities, and increasing homogeneity, set within a widening radii of national interdependence. (p. 13)

Moreover, Berry also identified new urban development at the 'intermetropolitan peripheries' (p. 16). These are the spaces that in many instances have boomed in the past three decades and are now what are called the 'mid corridor realms', as shown in Fig. 2.

Following Berry, LEWIS (1983) coined the term 'galactic metropolis' to capture the disjointed and decentralized urban landscapes of late 20th-century North America. The galactic metropolis is vast, with

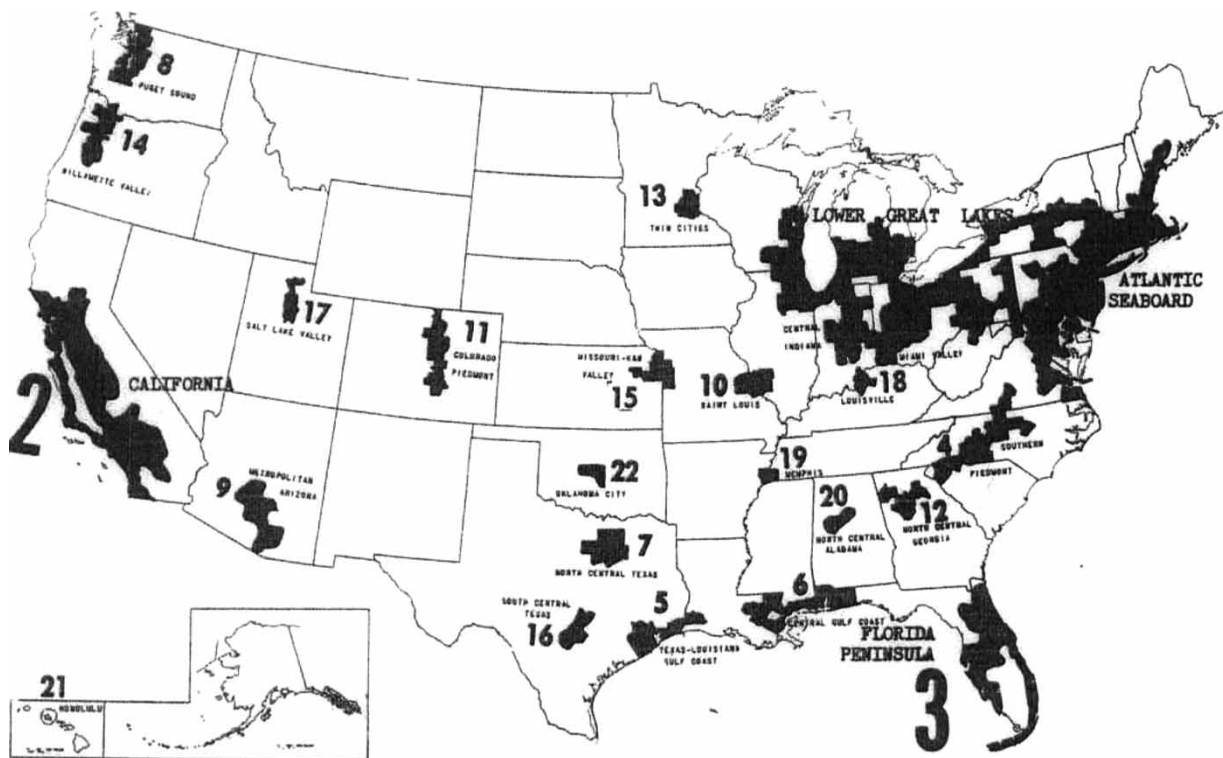


Fig. 2. Vance's projected US urban areas in 2000

varying sized urban centres, subcentres and satellites; it is fragmented and multinodal, with mixed densities and unexpected juxtapositions of form and function. The basic unit of the galactic metropolis includes a:

cluster of space-consuming buildings near an interchange, all equally and easily accessible by car and truck, and all lavishly furnished with 'free' parking.

(LEWIS, 1983, p. 31)

Looking at US cities established after 1915, Lewis found that every one had evolved in the 'galactic' form rather than with a traditional nucleated morphology (LEWIS, 1995). Lewis also found that even older, more established metropolitan areas have subsequently developed in this same direction, especially at their edges.

More recently, HALL (2001) identified six common types of nodes within the polycentric metropolitan form of developed economies:

- Traditional downtown centres: the hub of the traditional metropolis, now often the setting for the oldest informational services – banking, insurance, and government.
- Newer business centres: often developing in an old prestigious residential quarter and serving as a setting for newer services such as corporate headquarters, the media, advertising, public relations, and design.
- Internal edge cities: resulting from pressure for space in traditional centres and speculative development in nearby obsolescent industrial or transportation sites.
- External edge cities: often located on an axis with a major airport, sometimes adjacent to a high-speed train station, always linked to an urban freeway system.
- Outermost edge city complexes for back offices and research and development (R&D) operations (typically near major transport hubs 20–30 miles from the main core).
- Specialized subcentres: usually for education, entertainment, and sporting complexes, and exhibition and convention centres.

The edges of metropolitan areas have meanwhile generated an enormous literature, partly because of the sheer amount and pace of growth, and partly because of the innovative nature of much of the growth (TEAFORD, 2006). Historian ROBERT FISHMAN (1987) saw a fundamental change in metropolitan form as a result of the emergence of what he called the 'technoburb', metropolitan fabric that: 'lacks any definable borders, a center or periphery, or clear distinctions between residential, industrial or commercial zones' (p. 189) and 'can best be measured in counties² rather than city blocks' (p. 203). SUDJIC (1992) wrote about the '100-mile city'; while the challenges of characterizing evolving metropolitan fringes in contrast to mid-century suburbs ('sitcom suburbs') invoked a great variety of neologisms: 'postsuburbia', 'exurbia',

'exopolis', 'generica', 'satellite sprawl', 'mallcondoville', and so on. As much as anything, this flurry of terminology was a reflection of a clear shift from the central city–suburban and urban–suburban–rural frameworks associated with the industrial era and the Fordist city toward more complex and variable expressions of metropolitan form associated with the transition to post-industrial economic structures and the 'variable geometry' of more flexible forms of capital accumulation.

The novelty, complexity, and fluidity of contemporary metropolitan form has been the focus of the 'LA School', which vigorously challenged old assumptions about economic structure and space, leaning heavily on the deconstructive impulses of postmodernity as an explanatory framework (e.g. DEAR, 2002; DEAR and FLUSTY, 1998; SOJA, 2002). Drawing on the Los Angeles metropolitan region as both avatar and exemplar, the LA School has emphasized the disjointedness, disorder, and apparent variability of outcomes of metropolitan restructuring. Yet, an empirical comparison of the changing socio-economic structure (as measured by population density, rent, house values, and per capita income) of ten metropolitan areas (consolidated metropolitan statistical areas, or CMSAs)³ in the USA between 1970 and 2000 suggests that 'stasis, rather than volatility, is a common pattern in the landscape' (HACKWORTH, 2005, p. 499). Hackworth's analysis affirmed the intensifying polycentricity of metropolitan America, along with the 'valorization' of the outer suburbs; while six of the ten metropolitan areas had evidently experienced pronounced reinvestment in their central core.

THE ANATOMY OF THE NEW METROPOLIS

With this background, one can draw on the broader literature, together with recent empirical analyses undertaken at the Metropolitan Institute at Virginia Tech, to posit an anatomy of contemporary metropolitan form: the New Metropolis (Fig. 3). Key to the polycentric structure of the New Metropolis are clusters of decentralized employment – where office employment is arguably the most significant element (LANG, 2003). In this context, edge cities are one of the most striking components of the New Metropolis.⁴ Yet of more than 3 billion square feet of office space in the USA in the 13 largest US metropolitan areas in 2005, only 13% was in edge cities (LANG *et al.*, 2006). Downtown settings accounted for 33%, while commercial corridors along major intra-metropolitan highways accounted for another 3.8%. Smaller clusters of office development within the urban envelope of principal cities accounted for an additional 5.2%, and secondary downtowns accounted for 1.2% of office space. But one of the

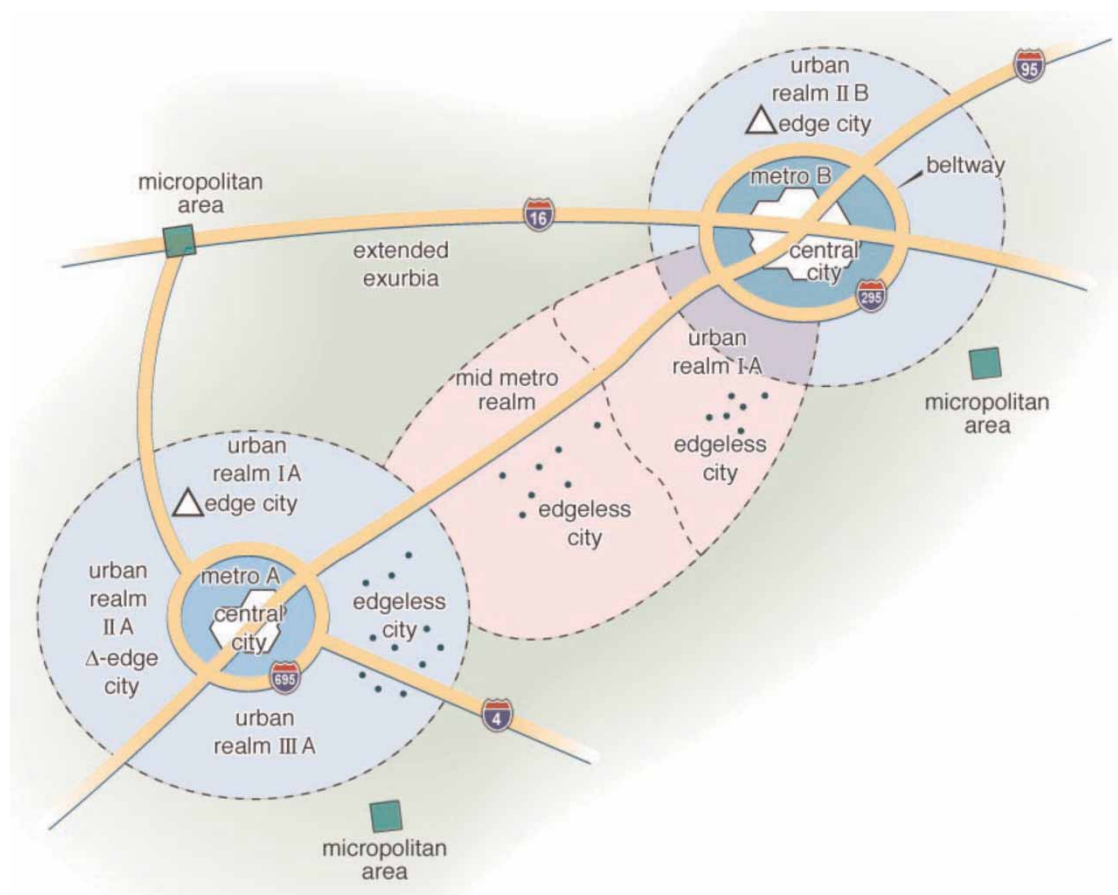


Fig. 3. *The New Metropolis*

most distinctive characteristics of the New Metropolis is the pattern of development in outer suburban and exurban areas, which accounted for more than 40% of total office space in settings that LANG (2003) has dubbed 'edgeless cities'. Edgeless cities may fill a county and might even be the dominant focus of commerce in whole urban realms. They are one step further removed in spatial logic from older city centres than edge cities.

The residential fabric of the New Metropolis is also distinctive in comparison with the integrated metropolis of the modern era (Fig. 1a). As the metropolitan areas have grown, their suburbs have changed, becoming quasi-urbanized, part of a new form of metropolitan development. In the New Metropolis the suburbs contain significant concentrations of poverty (SWANSTROM *et al.*, 2004), and have a growing share of the nation's single-person households (FREY and BERUBE, 2003) and seniors (FREY, 2003). The New Metropolis is also characterized by 'boomburbs' – fast-growing suburban jurisdictions with more than 100 000 residents that have maintained double-digit rates of population growth in recent decades (LANG and LEFURGY, 2007), and by extended tracts of exurban development with packaged, themed, and fortified subdivisions of private master-planned developments that provide

sequestered settings for competitive consumption – 'Vulgaria' (KNOX, 2005, 2007).

Megapolitan areas

But the most distinctive attribute of the New Metropolis, its signature feature, is its scale. Bound together through urban freeways, arterial highways, beltways, and interstate highways, the prototypical New Metropolis is rapidly emerging as part of a megapolitan region. Megapolitan regions are integrated networks of metropolitan areas, principal cities, and micropolitan areas. The US Census now recognizes a polynuclear 'principal city' category that lifts select suburbs to the status of big cities.⁵ The census has also established a new 'micropolitan' category, for principal cities between 10 000 and 50 000 residents that are more populated than rural places, but smaller than big metros. Micropolitans fill in a large share of space in between metropolitan areas. In fact, metropolitan and micropolitan areas now cover over half the land area in the Continental USA between them (LANG and DHAVALA, 2006).

In the 1960s, Dallas and Fort Worth were clearly colliding, as were Washington and Baltimore by the 1980s. Now regions with more distant urban cores such as

Phoenix and Tucson, Tampa and Orlando in Florida, and San Antonio and Austin in Texas are beginning to exhibit the same pattern, only on a more extensive scale. The entire North Carolina Piedmont extending from Raleigh to Charlotte seems, to drivers on Interstate 85, as one continuous countrified city.

According to LANG and DHAVALA (2005), the USA has ten megapolitan regions (Table 1), with six in the eastern half of the country and four in the west. Megapolitan regions extend into 37 states, including every one east of the Mississippi River except Vermont. As of 2004, Megapolitan regions contained about one-fifth of all land area in the lower 48 states, but captured almost 70% of the total US population with over 205 million people. The 15 most populous US metropolitan areas are also found in megapolitan regions. By 2040, megapolitan regions are projected to gain over 85 million residents, or about three-quarters of national growth (LANG and NELSON, 2007b). To put this in perspective, consider that this area, which is smaller than north-west Europe, is about to add a population exceeding that of Germany's by mid-century. The costs of building the residential dwellings and commercial facilities to accommodate this growth could run over US\$35 trillion by some estimates (NELSON, 2004; NELSON and LANG, 2007). Much of this

development will fill in the gaps between metropolitan areas, consolidating the links among principal cities and micropolitan areas within megapolitan regions.

Interstate highways are major structural elements in megapolitan development. Interstate 95, for example, plays a major role in megapolitan mobility from Maine in the north-east to Florida in the south-east. The West's bookend to I-95 is I-5, which runs through three separate megapolitan areas. Interstate 10 also links three megas – SoCal, Sun Corridor, and Gulf Coast. Interstate 85 forms the backbone of the Southern Piedmont, running from Raleigh in North Carolina south-west to Atlanta in Georgia.

Traditional measures of functional regions – commuter sheds, for example – are only partially relevant at the megapolitan scale. The areas are simply too big to make many daily trips possible between distant sections. However, data showing commutes of 50 and 100 miles each way indicate a growing number of people who journey to work between big megapolitan metros (LANG and NELSON, 2007a). According to the US Census Bureau, the number of 'extreme commuters' (or those who travel 90 miles or more to work) is growing (NAUGHTON, 2006). In 2005, 3.4 million people made such a commute, or double the number in 1990. In addition, the fastest growing commuting

Table 1. *Megapolitans at a glance*

Megapolitan area	Megapolitan states	Anchor metros	Signature industry	2000 and 2004 Presidential vote
Arizona Sun Corridor	Arizona	Phoenix–Tucson	Home building	Republican
Cascadia	Oregon, Washington	Seattle–Portland	Aerospace	Democratic
Florida Peninsula	Florida	Miami–Orlando	Tourism	Democratic/ Republican
Great Lakes Crescent	Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania, West Virginia, Wisconsin	Chicago–Detroit	Manufacturing	Democratic
Gulf Coast	Alabama, Florida, Louisiana, Mississippi, Texas	Houston–New Orleans	Energy	Republican
I-35 Corridor	Kansas, Missouri, Oklahoma, Texas	Dallas–Oklahoma City	Telecom	Republican
Megalopolis	Connecticut, Delaware, Massachusetts, Maryland, Maine, New Jersey, New York, Pennsylvania, Rhode Island, Virginia	New York– Washington, DC	Finance	Democratic
NorCal	California, Nevada	San Francisco– Sacramento	High-technology	Democratic
Piedmont	Alabama, Georgia, North Carolina, Tennessee, South Carolina, Virginia	Atlanta–Charlotte	Consumer banking	Republican
SoCal	California, Nevada	Los Angeles–Las Vegas	Entertainment	Democratic

departure time is between 05.00 and 06.00 hours, indicating a boom in long journeys to work (NAUGHTON, 2006). The percentage of people who participate in a regional economy without technically living in its officially designated metropolitan area is correspondingly rising (MORRILL *et al.*, 1999). But one question the US Census Bureau does not ask is the frequency of commutes – or the number of days in an average week that a worker reports to their place of employment. It may be that while commuting distances grow, the number of actual trips drops (LANG and NELSON, 2007a).

The changing nature of work is feeding this transition. In many fields workers simply need not be present in the office five days per week. The practice of ‘hoteling’ where employees ‘visit’ work infrequently and mostly work at home and/or on the road is common in high-technology firms and will soon spread to other sectors. This allows people the flexibility to live at great distance to work in remote exurbs or even a neighbouring metropolitan area. Innovations in and diffusion of broadband technology will even further drive this trend as the ability to conference visually into meetings improves to the point where it proxies face-to-face interaction. This is not to say that direct physical connectivity is unimportant. For one, it is hard to advance to senior management in most businesses without being plugged into office politics, which requires some ‘face time’ with key people. However, face-to-face interactions may become a more specialized type of exchange used for building trust, networking, or closing deals (SASSEN, 2002; THRIFT, 1996).

But commuting is just one aspect of regional cohesion at the megapolitan scale. Other integrating forces exist such as goods movement, business linkages, cultural commonality, and physical environment. A megapolitan region could parallel a sales district for a branch office. Or, in the case of the Northeast Megalopolis or the Florida Peninsula, it can be a zone of fully integrated toll roads where an ‘E-Z Pass’ (Northeast) or ‘SunPass’ (Florida) works across multiple metropolitan areas. More importantly, they have become the basis for economic regions with distinctive economic, political and cultural profiles where functional interdependencies exist among companies in the strongly communicative branches in the top end of the tertiary sector – banks, financial services and insurance companies, law firms and advertising industry. Table 1 profiles some basic elements of the ten megapolitan regions, including a thumbnail of their economy and politics. Note that the ‘signature industry’ may not be the largest in the region, but instead is the one whose image is most easily identified with leading metros in the megapolitan region. Table 1 also shows the mega ‘anchor metros’. These metros are often the biggest in the megapolitan region and maintain strong social and business links with each other. The political leanings by

mega are based on the results of the 2000 and 2004 Presidential elections.

Megapolitan regions vary in spatial form and scale. Some exhibit a corridor (or linear) form, while others spread out into vast urban galaxies. Arizona’s Sun Corridor, for example, forms a definite corridor structure and covers a fairly modest area (Fig. 4). Table 2 shows how the corridor megapolitan form fits within the hierarchy of urban complexes that exist throughout the USA. The types are listed by their scale, starting with metropolitan areas and moving up to massive ‘megaplexes’.

The Dallas–Ft Worth ‘metroplex’ forms an extended metropolitan area where the two major nodes lay some 30 plus miles apart. Until the development of the Dallas–Ft Worth (DFW) Airport⁶ at the midpoint in the metroplex, Dallas and Ft Worth functioned as two different worlds. But DFW helped integrate the region so thoroughly that one now has a hard time distinguishing between the two places.

Just beyond a metroplex in scale are the 100 mile-plus anchor cities, such as Phoenix and Tucson (or the Sun Corridor), which is labelled a ‘corridor megapolitan’ in Table 2. In this new metropolis era, the commuting patterns between these places will join some under the Census’s new CSA category by 2010, with Phoenix–Tucson being a leading candidate.

Above the corridor scale are the ‘galactic megapolitans’ (named in part based on LEWIS’s, 1983, definition). These urban complexes spread broadly over dozens and even hundreds of counties and form a vast web of metropolitan areas that are linked by overlapping commuter sheds and business networks. Leading examples are the Piedmont and Great Lakes megapolitan regions.

Finally, there are megaplexes, which comprise the largest urban complexes in the USA. An example is the pairing between Southern California and Arizona’s Sun Corridor. Despite being separated by miles of desert, SoCal and the Sun Corridor are linked by goods movement along several rail lines and two Interstates (I-8 and I-10). The west side of the Sun Corridor, which is most proximate to SoCal, has a land market shaped by access to these transportation corridors. In fact, a place such as Goodyear in Arizona along I-10 has a booming market for warehousing linked to the Port of Los Angeles.⁷ SoCal and the Sun Corridor share many other affinities, including linked housing markets (as Californians seek lower cost locations), similar master-planned development practices, integrated business networks (especially in defence contracting and goods movement), and a similar Western Sun Belt climate and lifestyle.

US Census Bureau’s ‘combined statistical areas’ (CSAs)

As noted above, the US Bureau of the Census uses a new metropolitan geography – the CSA – that approximates the corridor megapolitan concept

In the study by Lang and Nelson, megapolitan areas share at least 15% of new commuters (1995 onward) via a linking county.

The census treats commuting patterns as the key variable in identifying an economically integrated space. It has used this measure since metropolitan areas were first officially defined by the census in 1949. Commuting is taken as a proxy for a host of other variables such as retail and housing markets. For example, if job losses occur in one metropolitan county, then the residents of a neighbouring metro county who commute to these jobs will be impacted. It will also affect their ability to purchase goods and services and afford housing. Commuting, therefore, reveals much larger patterns of economic integration at the megapolitan scale.

At the moment, no megapolitan area meets the 15% threshold to form CSAs. But this research will establish how close many corridor megapolitans come to this commuting level. A quick test of the Phoenix–Tucson megapolitan shows that Pinal County, which is in the southern part of the Phoenix region, had 9% of its workers commuting to Pima County (metropolitan Tucson) in 2000. Therefore, Phoenix–Tucson was just 6 percentage points away from official recognition by the census in 2000 as a CSA. Given the dynamic nature of these metropolitan areas, the Phoenix–Tucson megapolitan area may have already crossed into CSA status, but this status would not be assigned until after the 2010 Census. Other corridor megapolitan areas that could qualify as CSAs 2010 include: Phoenix–Tucson; Los Angeles–San Diego; San Francisco–Sacramento; Washington–Baltimore–Richmond; Tampa–Orlando; New Orleans–Baton Rouge; San Antonio–Austin; and Chicago–Milwaukee.

As Pickard understood in the 1960s, planning for the future involves more than simply projecting population growth. It also means considering what new urban forms might emerge along with metropolitan expansion:

Regional urbanism will eventually force us to a new level of thinking . . . Washington and Baltimore must plan for the eventual binding of their suburban and commuter zones into an interlocking mesh. Dallas and Fort Worth are already meshing, whether willing or not, and Miami and Fort Lauderdale are merged with West Palm Beach into a continuously developed urbanized strip 80 miles in length.

(PICKARD, 1962, p. 3)

The megapolitan geography outlined in the present paper is based on an extrapolation of existing trends. It draws on the US Bureau of Census's metropolitan statistical categories and methods to predict which urban areas will combine into corridor megapolitan areas. By 2020, and perhaps even 2010, metropolises where the anchor cities lay 100 miles or more apart

will be officially recognized by the US government. As Pickard noted, such an extended metropolis will require new thinking. In 1962, it was shocking to imagine that Dallas and Fort Worth were merging. But this reality is now so mundane that the idea that the two places were ever really separate seems dated. Several decades from now the same might be true of dozens more even larger metropolitan twins. Now is the moment to consider the implications of such a future and plan for a 21st-century megapolitan area that dwarfs previous urban regions in scale and complexity.

A REASSERTION OF MODERNITY?

Metropolitan expansion and regional integration on this scale invites a reconsideration of the traditional separation of urban and regional scales in the analysis and theorizing of spatial organization. It also suggests that one needs to look beyond locally bounded processes of competition for land, ecological processes of congregation and segregation, and broader impulses of post-modernity for an appropriate interpretative framework. In this context, the New Metropolis, along with the evolving network of world cities (TAYLOR, 2004), and increasing evidence of 'glocalization' – the simultaneous shift from the traditional institutions and agencies of governance and development upward to the global economy and downward to non-profits and local actors (SWYNGEDOUW, 2004) – is consistent with the idea of a reassertion of the processes of modernization that are:

wrestling free from the cocoon in which the managed capitalism and planned modernity of the postwar era had tried to contain them.

(SWYNGEDOUW, 2005, p. 126)

The challenge is to identify new analytic categories that help in understanding and theorizing the spatial outcomes of this second modernity. There is already a debate on typologies of settlement categories (BERUBE *et al.*, 2005; CHAMPION and HUGO, 2004; CROMARTIE and SWANSON, 1996; FREY, 2004), and the US Census Bureau has extended its traditional categories to identify combined statistical areas and micropolitan areas. The census has also tried to capture the changing dynamic of metropolitan area growth by softening its central city definition to include such former suburbs as Scottsdale in Arizona and Thousand Oaks in California (LANG *et al.*, 2005; LANG and LEFURGY, 2006). But this geography may already be dated by the emergence of even larger-scale and networked urban complexes. The US Census Bureau needs to rethink completely some basic dimensions of its categories to show the emergent functional relationships of the new 21st-century metropolis.

In this regard, there is an emerging research agenda focused on the megalopolis. Organizations such as the Lincoln Institute of Land Policy and the Regional Plan

Association are actively promoting scholarship on what they term 'megaregions' (RPA, 2007). Virginia Tech is one of several universities that now conduct studies on what it calls megapolitan areas. Researchers at Georgia Tech and the University of Pennsylvania have examined the Piedmont and Northeast megaregions, while Arizona State University will soon release a report on the Sun Corridor (LANG and HALL, 2008).

CONCLUSION: FORCES CONSTRAINING MEGAPOLITAN EXPANSION

While US megapolitan growth has occurred unabated in the past and will likely continue so for the next several decades, there are some threats on the horizon that might significantly curtail further expansion. The first such threat is climate change – in particular the prospects of sea level rise and severe drought. Places such as South Florida and the Gulf Coast are especially vulnerable to shifts in ocean levels and could see large sections of their built areas flooded. The need to redevelop and secure these areas would draw investment away from the metropolitan edge.

Global warming can also cause drought (INTER-GOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC), 2007), which would have a major impact on megapolitan growth in the US West. Urban development in the West relies on a series of reservoirs and aqueducts to deliver water to its arid cities. A warming trend could reduce this water supply in two ways. The first is that it will raise elevations in which snow packs occur. This will shrink the run off in the Colorado System, which provides much of the water to the West. Climate shift could also disrupt the much-needed summer monsoon rains in the West, further damping available water. Clearly, careful stewardship of water is needed in order to sustain megapolitan growth in the face of global warming.

Resource constraints may also dampen or at least alter the form that urban growth takes worldwide. The key variable is the cost and availability of energy. There is a growing concern that the world might have reached a point at which half its total oil has been consumed – a point known as 'peak oil' (SIMMONS, 2006). There have been several near-hysterical treatments of this topic. The most notable is by social critic James Howard Kunstler, who practically roots for an enduring energy crisis in the hopes that it kills suburban development in the USA. KUNSTLER (2005), a neo-Malthusian, makes a series of highly mechanistic and technologically deterministic assumptions that do not factor human agency into the equation. By contrast, it is assumed that energy constraints may present some challenges to growth, but that market adjustments and creative adaptation of green technology (e.g. plug-in hybrid cars) will mostly mitigate the impact of reduced hydrocarbon capacity.

More probable forces altering future growth patterns are changes in demographics, taste, and public policy.

NELSON and LANG (2007) show how a combination of preference shifts and an older population will produce a greater share of US housing being built in denser settings. The new market for denser housing development combined with public policies that promote smart growth outcomes such as more traditional neighbourhood form and farm land preservation will reshape the metropolis. But it is assumed that most of the new development will be suburban in location if not conventionally suburban in form. The edges will still grow, yet they might take on a more village-like character than the endless sea of tract-style subdivisions that so dominated the US built environment at the end of the 20th century.

NOTES

1. In the 1960s, Pickard was the Research Director for the Urban Land Institute (ULI) in Washington, DC. Pickard produced his series on urban regions under a grant from the Ford Foundation to study 'dimensions of metropolitanism'. The project produced remarkably accurate projections of American metropolitan growth patterns, including correctly predicting the rise of the Sun Belt, which Pickard referred to as 'exotic' regions because they were so different in look and form from urban areas in the Northeast and Midwest.
2. US counties vary considerably in size. The biggest is San Bernardino County, California, which includes the Mojave Desert and is bigger than many Eastern US states. The smallest county is Arlington, Virginia, across the Potomac River from Washington, DC, which is no bigger than a small city. Mid-range counties run 200–800 square miles in size.
3. A Consolidated Metropolitan Statistical Area is the US Census Bureau's old definition for the largest statistical areas. It was replaced in 2003 by a CSA measure. A CSA is defined as two or more adjacent micro- and metropolitan areas that have an employment interchange measure of at least 15% in 2000.
4. Defined by GARREAU (1991, following LEINBERGER, 1988) as consisting of at least 5 million square feet of office space and 600 000 square feet of retail space. Other criteria include a place with more jobs than people; and a reputation for commerce.
5. A principal city replaces the old central city designation in the US Census Bureau's 2003 redefinition of American urban space. The loss of the word 'central' is significant because it reflects the fact that the major cities in the new metropolis might no longer lie in the centre of the region.
6. DFW was the first 'super regional' airport and has been followed by Atlanta's Hartsfield Airport and Denver International Airport. A little noticed quirk in the accounts of the John F Kennedy assassination is the fact that Kennedy had actually flown into Dallas Love Field from Fort Worth Airport, hinting that before DFW the region was less fully integrated than today.
7. This information was relayed to Robert Lang by a city planner from Goodyear on 12 March 2006.

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