Rugosity as a New Planning Paradigm

Planning students in the 1970s all studied the monocentric city model. It is a descriptive model in which land uses form concentric rings around the city center, with different uses bidding for land and the highest and best use capturing the land in each ring. In this model, the city has one unique center, the central business district, with offices around it. The outer-most ring is low-density, single-family residential, with open space (agriculture) beyond that. The basic development of the monocentric model occurred in the 1960s and 1970s, largely through the work of William Alonso, Edwin Mills, and Richard Muth. Most urban economics courses still introduce students to the monocentric city model, so you have probably seen it before.

In the 1980s, planners, economists, and geographers began to note that larger metropolitan areas had developed a hierarchy of centers, and so hypothesized that polycentric development is a natural outcome of growth. Again, open space (agriculture) would occur at the fringe. Joel Garreau popularized this notion in Edge City: Life on the New Frontier, published in 1991. I wrote about the benefits of polycentric development in my May 2017 column, (planning.org/planning/2017/may/research).

A new article, “High Rugosity Cities: The Geographical, Economic and Regulatory Pathology of America’s Most Non-Concentric Urban Areas,” published in Land Use Policy by UC Davis Professor Catherine Brinkley, attempts to push this concept further. I have never featured Land Use Policy in this column. It is not a standard planning journal. But what could be more central to urban planning than land-use policy? For academic planners, Land Use Policy has an impact factor of 3.194, which puts it up there with the highest ranked planning journals.

I have also never featured rugosity in this column. The word isn’t part of my vocab. It’s defined as a measure of surface roughness and routinely used by coral reef biologists. Areas of high rugosity allow corals to attach and grow. The term is also used in medical sciences to approximate complex topographies. But what does it have to do with cities?

Rugosity versus concentric growth

Brinkley explains it this way:

The guiding theory in urban development largely views non-concentric urban form as undesirable and even pathologic… As a result, the dominant planning discourse calls for concentric urban areas, thereby minimizing the urban [-rural] interface. Yet, the urban interface is known to be important to housing markets, particularly where farmland amenities are valued… High-rugosity urban areas are associated with the sustained vigor of both urban and agricultural land uses.

She argues that cities should work more like coral reefs than concentric circles—supporting a diversity of niches and uses for sustained vigor and resilience. High urban rugosity can be achieved by maximizing greenbelts, green wedges, wildlife-habitat corridors, working lands such as ranches or farms, and park space.

To quantify rugosity, Brinkley uses GIS to measure the rural-urban interface in 483 counties. These counties are selected because they are part of metropolitan areas and have agricultural sales of over $50 million per year. The urban perimeter is measured for each county, and this in turn is used to compute a comparative rugosity index. The actual perimeter is divided by the perimeter of a concentric area encompassing the same amount of land to find the degree to which each urban area exhibits non-concentric morphology.

The 30 counties with the most non-concentric forms are selected for case study analysis. Many of the counties with the highest-rugosity scores are among the top agricultural producing counties in the U.S., far exceeding the $50 million floor for case study selection.

Threats to validity

The articles featured in this column often provide teachable moments, and this column is no exception. The Brinkley
article contains a quantitative analysis that uses a series of development-related variables—including the urban population, population growth, housing stress, farmland acreage, community-supported agricultural sales, and 43 variables representing individual states (with so-called dummy variables, either zero or one)—to explain the urban area perimeter (miles of urban–rural interface) of each county.

Unfortunately, this analysis is compromised by the presence of a confounding variable: the population of the urban area, which is an extraneous variable correlated with other independent variables (such as community supported agricultural sales) and the dependent variable, the urban area perimeter. Large urban areas, measured in terms of population, have more of everything—coffee houses, pigeons, and, of course, miles of perimeter. As a result, the study’s findings would be more meaningful if the dependent variable were a dimensionless measure of rugosity, such as the comparative rugosity index, defined above as actual miles of perimeter divided by the miles of perimeter in an identically sized concentric area. I would also drop the confounding variable of population size.

This analysis also presents the statistical issue of endogeneity. In a statistical model, you have an endogeneity problem when there is a correlation between your independent variable $x$ and the error term $e$ in model $y = a + b \, x + e$. In this case, $y = a + b \, x + e$.

Endogeneity most often arises when your independent variable $x$ is a function of your dependent variable $y$, and vice versa. This condition is known as “reverse causality.” Farmland acreage affects the urban perimeter, and the urban perimeter also affects farmland acreage, but it is unclear which is the cause and which is the effect. Community-supported agriculture arguably depends on both. Endogeneity biases regression coefficients.

To address endogeneity, I would approach this problem not with simple linear regression, but instead with structural equation modeling, discussed in a previous column (“Accessibility vs. Mobility: The Right Methodology,” Planning, July 2012: planning.org/planning/2012/jul/research.htm).

Finally, the analysis may lead to false inferences of statistical significance because there are so many independent variables. The conventional significance level, 0.05, means there is a five percent chance a variable will incorrectly be labeled significant. With 48 variables, we would expect at least two false positives where variables are mislabeled.

Notwithstanding these methodological issues, Brinkley’s article blazes a new trail in its challenge to the dominant theory in urban economics: the monocentric city model. As a measure of urban development, rugosity offers the best of both the monocentric- and the polycentric-city models because it is elegantly simple to calculate and use, but still encompasses the complexity of polycentric development. These are big advantages, and because of them, I could see many planning agencies working measures of rugosity into regional land-use plans in the very near future.

—Reid Ewing

Ewing is a distinguished professor of city and metropolitan planning at the University of Utah, an associate editor of the Journal of the American Planning Association, and an editorial board member of the Journal of Planning Education and Research, Landscape and Urban Planning, and Cities. More than 60 past research You Can Use columns are available at https://bit.ly/2E5tH8S.
Walkable City Rules: 101 Steps to Making Better Places, by Jeff Speck, AICP (Speck & Associates), is a concise, updated, how-to version of the author’s 2012 Walkable City: How Downtown Can Save America, One Step at a Time.

It is not modest (supposedly those who read it will “understand more about the practical aspects of city planning than 90 percent” of planners). But neither is it solemn. Speck hopefully compares his ideal readers to the fabled prison inmates who knew all the jokes and simply gave them numbers.

Elsewhere, he cites Donald Appleyard for the finding that people on lightly traveled streets averaged three friends, while those on busy streets averaged 0.9. “That’s hardly the best ad copy: ‘Heavy traffic: for those times when you want to have slightly less than one friend.’”

This book can be viewed as the latest shot in the struggle against modernist traffic engineering. We learn, for instance, that reducing a four-lane urban street to three lanes makes them safer while maintaining traffic flow. But walkability is not necessarily winning against sprawl. “Most of the subsidies and market persuasives that drove the initial suburban outflux are still in place, and too many powerful organizations still benefit from our dependence on cars and roads.”

Not all of Speck’s rules are dogma: the discussions of rotaries, self-driving cars, and ride-hailing services, for instance, leave room for further discussion and experiment.

Each “step” or “rule” is rigorously limited to two pages, usually with an example or two and an endnote telling where to find out more. The rules are bunched into 19 parts. The first part focuses on selling walkability on grounds of wealth, health, climate change, equity, and community; the last part focuses on what can be done right now.

In between are rules on mixed uses, local schools, integrated and attainable housing, parking, transit, safety, street design, bicycling (“an unmitigated good”), intersections, sidewalks, and good spaces. Rule 87—“Don’t Let Terrorists Design Your City”—reminds us that Americans are 568 times less likely to die in a terror attack than a car crash.

If bollards must be placed in public spaces, recognize that “they are still money wasted,” but design them well.

Within Walking Distance, by Philip Langdon, looks at why and how Americans are shifting toward a more human-scale way of building and living. To improve conditions and opportunities for everyone, he says that places where the best of life is within walking distance ought to be at the core of our thinking.

Beyond Mobility, by Roberta Cervero, Erick Guerra, and Stefan Al, shows how prioritizing the needs and aspirations of people creates great places, which the authors argue is as important, if not more important, than expediting movement to create better communities and economies.

Strategies of Segregation: Race, Residence, and the Struggle for Educational Equality, by David G. Garcia (UCLA), documents how white leaders imposed segregation on Mexican Americans (and African Americans) for decades in the school system and the housing market of Oxnard, California—and how the wronged groups were able to organize and win a key class-action lawsuit in 1974 (Soria v. Oxnard School Board of Trustees).

The author identifies four strategies used by Oxnard’s founding mayor and school superintendent Richard B. Haydock and colleagues to make the systematically unequal treatment of Mexican Americans seem normal:

- establishing racial hierarchy with Mexicans and blacks at the bottom.
- connecting residential and school segregation to make both seem normal. Services were minimized in predominantly Mexican neighborhoods, school attendance boundaries were redrawn, and restrictive covenants enforced exclusion.
- maintaining segregation within schools with “segregated classes, distinct recesses, and staggered release times for Mexican students.”
- omitting a rationale for all of the above. The school board documented what it did but never mentioned why, thus implying consensus.

The author uses interviews to bring Mexican Americans into the conversation; neither local newspapers nor the class-action case itself reflected their voices. While the history is not carried beyond 1974, it remains relevant at a time when racism is again on the rise.
Democratizing Urban Development: Community Organizations for Housing across the United States and Brazil, by Maureen M. Donaghy (Rutgers), addresses how community organizations try to protect low-income people from high-end development.

The author takes a case-study approach, comparing Rio de Janeiro, Atlanta, Sao Paulo, and Washington, D.C.

Such comparisons can be tricky, but in all four cases “residents struggle for the state to recognize their right to occupy space increasingly out of financial reach,” and none has been strikingly successful.

In Rio, the Vila Autodromo combined radical ideology with a weak relationship to the powers that be. The resulting strategy was to seek “international actors” to pressure the city government to allow residents to remain.

In Atlanta, the Historic District Development Corporation had a more conservative ideology, a mixed relationship with the state, and limited resources.

In Sao Paulo, the housing movements participated in state institutions but they were “far from sufficient as mechanisms of accountability.”

In Washington, D.C., the Housing for All Campaign had a relatively conservative ideology and close relationship with the government, which led to an increased housing budget but no further institutional reforms that would include outsiders in policy making.

The author concludes that community organizations need to be more willing to work within the governmental structure, and that public officials and developers need to view affordable housing “as a solution to poverty rather than as a problem for development.”

Smartie New York City: How City Agencies Innovate, edited by André Corrêa d’Almeida (Columbia University), focuses on how various New York City urban systems are being made smarter and how the lessons learned might be replicated elsewhere. Twenty-eight contributors have produced 12 chapters covering citywide strategy, data analysis, telecommunications, open data, energy management, climate-change resilience, residential organic waste collection, health monitoring, neighborhood innovation, “precision-based” policing, road fatalities, and traffic congestion. Another goal of the book is to raise awareness that innovation is not a monopoly of the private sphere.

Few of the innovations discussed are complete, and “it is too early for a comprehensive evaluation.” The city’s Green Infrastructure Plan engineers decentralized systems that mimic natural water-recycling processes and breaks with the usual combined sewage system. Although it did not meet its milestones, it did show that GI “could be successfully deployed in even its densest communities.” This did not come without controversy: Some property owners resisted, fearing that greenery would impede curbside parking, accumulate litter, or breed mosquitoes.

Link NYC similarly seeks to repurpose the vanishing payphone infrastructure by providing “a free Wi-Fi signal, as well as other city and user amenities, at regular intervals throughout the city.” The goal is to attract advertisers in wealthier districts whose payments would subsidize underserved neighborhoods, a particular challenge in that the signal does not work above the second story. The book is well-organized, practical, and full of advice based on street-level problems and experiences.

Renew Orleans? Globalized Development and Worker Resistance after Katrina, by Aaron Schneider (University of Denver) analyzes New Orleans’s post-Katrina economic development strategy as “one that takes goods that were public and turns them into an opportunity for the accumulation of private wealth.” His most visible example is the demolition of 8,000 public housing apartments and their replacement by fewer than 1,000 units with public housing-level rents, all while citywide house prices rose by 34 percent.

“Hurricane Katrina laid bare patterns that appear in all cities: elite factional conflict and capture of local institutions, political determinants of wealth and distribution, and an increasingly exclusionary urban political economy in a rapidly globalizing age.” The book offers a twist on the usual good-government argument that fragmented governing bodies are inefficient; instead, Schneider makes the case that they enable private takeovers of public funds that are rarely accountable. When the city’s recreation department was moved into the New Orleans Recreation Development Commission, its employees lost civil service protection.

The author eschews pessimism, but the book barely avoids it. One chapter diagrams the city’s fragmented “satellite governance,” but it appears that the underlying database has not been updated since 2011. Resistance by unionized workers and communities has appeared sporadically but success is rare. The book itself is not easy reading.

—Harold Henderson

Henderson is Planning’s regular book reviewer. Send new books and news of forthcoming publications to him at 1355 W. Springville Road, LaPorte, IN 46350; email hhsh@earthlink.net.
**ET CETERA**

**PLANNERS PLAYLIST**

**Talking Practice** from Harvard University’s Graduate School of Design moves design from theory to reality. Hosted by Grace La, professor of architecture and chair of Harvard’s Practice Platform, each episode brings in a different architect, landscape architect, or planner to talk through the what, why, and how of their projects—and take a broader look at the state of design today.

**City of the Future** is a brand-new biweekly podcast led by staff from Sidewalk Labs, Alphabet Inc.’s urban innovation lab, magnifies the new ideas and technologies already beginning to transform our cities. Initial episodes have explored delivery robots, adaptive traffic lights, and modular pavement.

**First Floor Corner Store** is set on discovering the innumerable ways to build community in the built environment. Host Maggie Kraus, MLA, a leadership associate at the American Planning Association, interviews landscape architects, artists, gardeners, and policy makers to bring to life stories that aren’t always told in the planning world. And for better accessibility, each interview comes with a glossary.

**The Eminent Domain Podcast** dissects condemnation and property rights law with the biggest names in the eminent domain community. Episodes cover preparing witnesses for court, state- and county-level peculiarities from the across the country, and cases to watch.

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**FILM**

**BLINDSPOTTING**

Now streaming, this labor-of-love debut written by and starring *Hamilton’s* Daveed Diggs and his childhood friend Rafael Casal weaves together the complex, nuanced, balanced characters and interactions that make up neighborhoods in America today. The setting is the pair’s hometown of Oakland; against a backdrop of gentrification, neighborhood change, and marked racial tension, we are dropped into the perilous last three days of a year-long probation for Collin (Diggs).

Blending humor, drama, social commentary, and masterfully lyrical dialog, the film helps us wrestle with the big questions of today’s cities while steering clear of overly simplistic answers.

—Ezra Haber Glenn, AICP

Glenn teaches at MIT’s Department of Urban Studies & Planning and writes on cities and film. Visit him at urbanfilm.org.

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**TOOLS**

**FROM DATA TO VIZ**

Most data can be visualized using one of 20 chart types—or at least that’s what the website From Data to Viz argues. The site provides an interactive decision tree to help guide users to the best representation of their dataset, then offers up similar examples with real-life data and reproducible code snippets. It also offers a gallery of common pitfalls, from “the spaghetti graph” (too many lines) to choosing the wrong chart axis. Go to data-to-viz.com to learn more.

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**RANKED**

**THE BEST DESTINATIONS FOR MILLENNIALS 2019**

Vacation rental search engine HomeToGo analyzed more than 500 U.S. cities to find the 50 most appealing to millennial tourists—meaning each location was scored on its flight affordability, food, and “Instagramability.” Check out the top five here, then go to hometo.com/united-states/#millennials for the full list.

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3. Tampa
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5. Los Angeles
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Getting Comfortable with Being Uncomfortable

Greater destruction of the built environment due to climate change. Increased displacement of disenfranchised people from rising housing costs in major metropolitan cities. Rising mass incarceration of predominantly African-American and Hispanic populations in the U.S. The year is 2019, choose your adventure.

These realities represent a handful of reasons for which one may advocate. For the past year and a half, my adventure has been housing.

My newfound crusade is unwieldy, verbose, and bursting with advocates who have cultivated this space for decades through both formal and informal means—albeit not always in agreement or working toward a common goal. However, we cannot accept a siloed approach to a problem fundamentally relevant to every individual. Greater collaboration is necessary to more efficiently use the diverse expertise of advocates.

I became aware of this need during Boston’s YIMBYtown conference last year. In late 2017, I joined the newly established planning committee responsible for hosting YIMBYtown, a national gathering of Yes in My Backyard housing advocacy groups and enthusiasts with the purpose of sharing resources and identifying solutions to the housing crisis.

To say I had no prior experience in housing advocacy is a gross understatement. Albeit, every one of us has housing experience. I was raised in Brooklyn, resided in Seattle and Washington, D.C., and currently live in Greater Boston. Housing insecurity has been my norm, and I could not perceive of an alternate reality where housing did not embody struggle. YIMBY was my introduction to exploring this other possibility.

During our 2018 conference, community organizations committed to antidisplacement solutions organized a counter event, then marched toward our venue and interrupted our programming to communicate their perspectives on the housing crisis. I listened intently to learn where we diverged in our understanding of the problem and the solution, but that moment never came.

Put mildly, being protested felt uncomfortable, and while many congratulated the planning committee for our efforts, the event and counterevent demonstrated to me an immense need for intentional collaboration.

This experience highlighted the consequence of discrete movements that do not collaborate despite embarking on the same adventure. To clarify, I am not promoting the assimilation of housing advocacy groups for the sake of simplicity or convenience. Rather, it is a missed opportunity for organizations to share resources—networks, information, tactics, and strategies—and propel the greater movement forward, especially when progress rests largely on the backs of volunteers. Division is debilitating, particularly if and when the perceived differences are minute. Overcoming divisions is never comfortable, but the time is now to get uncomfortable.

As Harvard professor of social ethics Mahzarin Banaji succinctly said in a recent talk I attended, “How we discriminate in the modern world is who we choose to help.” Upon reflection of my experiences as a housing advocate, conference organizer, and recipient of protest, I am genuinely anxious my help is not landing on communities that could benefit most from my service.

Thus, I am choosing to reframe my housing adventure for the new year into three goals: promoting housing production to relieve a measured need without displacement; prolonged conversations with housing advocates to identify nuances and similarities, while acknowledging the real differences; and maintaining moderate levels of anxiety and discomfort to advance intentional collaboration between advocates.

Hallah Elbeleidy is a policy analyst in Urban Programs at the Lincoln Institute of Land Policy, where she focuses on climate change mitigation and adaptation and data development and mapping. Housing advocacy is a personal passion of hers—one she intends to pursue for the foreseeable future.