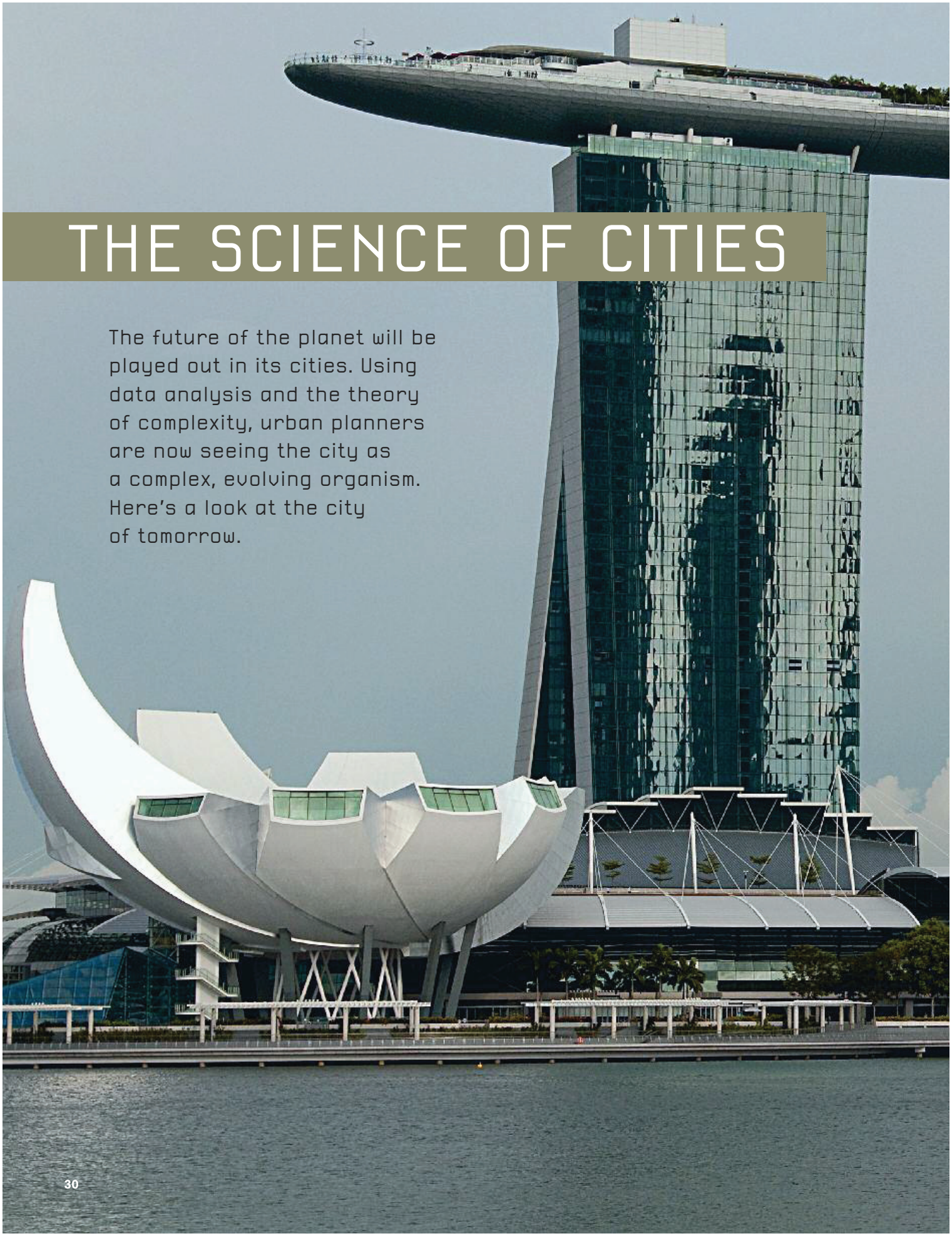

THE SCIENCE OF CITIES

The future of the planet will be played out in its cities. Using data analysis and the theory of complexity, urban planners are now seeing the city as a complex, evolving organism. Here's a look at the city of tomorrow.

To save the countryside, densify the cities

BY BENJAMIN KELLER

Every second, another square meter of green space disappears in Switzerland. Architects, scientists and politicians hope to slow this sprawl by putting more people in the cities. Some of their solutions are surprising.

On a computer screen, the countryside around Geneva seems almost pristine. As the animation begins, small black dots appear here and there, ever more of them, until finally the entire region is covered with black clusters. This trip from 1938 to the present on the Federal Office of Topography's website starkly illustrates the disappearance of Switzerland's farmland, at a constant pace of about 30km² per year.

This urbanization of the countryside results directly from the inability of cities to absorb more inhabitants. Although Switzerland's population increased from 6.5 to 8 million between 1980 and 2012, the population of its five largest cities (Zurich, Geneva, Basel, Bern and Lausanne) has stagnated around a total of 1 million, according to the Federal Office of Statistics. Zurich's population has even dropped from 440,000 in 1960 to 377,000 today. One reason for the exodus has been the dramatic improvement in public transportation, notably the S-Bahn.

"Urban sprawl began at the end of the 19th century with the advent of trams and trains," explains Vincent Kaufmann, a professor of urban sociology and mobility analysis at EPFL. "They made it possible for people to live further from where they worked, in better, less expensive housing." The trend toward suburban life accelerated in the 1960s with the rise of the automobile and has continued with the expansion of the railway network. Today, says Kaufmann, 9% of employees work more than 50 km from home.

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RAISING AWARENESS

This is hardly a new phenomenon, but its consequences – a less-than-optimal use of land, pressure on the countryside, economic cost and environmental impact – and the pace at which it is occurring have created an urgent need to get it under

control. "Beginning in 2002, Switzerland's goal has been to reduce the number of urbanized square meters per inhabitant so that it eventually stabilizes at the 1997 levels of 400 m²," says EPFL architecture professor Emmanuel Rey. This will be even more crucial to maintain in the future, given that by 2035 another 800,000 people will be living in Switzerland, according to the "average" scenario put forward by the Federal Office of Statistics. It is difficult to see how the country can house these people and meet its urban density objectives without calling into question people's ever-increasing appetite for more personal space.

Urban population density should be increased.

To deal with this challenge, officials from all three levels of government – communes, cantons and the confederation – have created a strategic document that sets out options and guidelines. One of its proposals is to increase population density in existing buildings – essentially to "build a city on the city." "The idea is to prevent metropolitan areas from sprawling outside their limits," explains Kaufmann, who offers his own paradoxical solution: slowing down transportation (see box).

There is widespead agreement among researchers and architects that urban population density should be increased. To launch the discussion, the Zurich-based architectural group Krokodil designed a new city north of Zurich that would be created by joining the communities that make up the Glattal metropolitan area. Now a hodgepodge of small cities and villages with a total population of 158,000, the region includes Zurich's International Airport as well as many companies.

Despite its urban character, the Glattal is developing piecemeal, stretching outward without developing a coherent center. "Residents still think they live in the countryside, even though the region has all the attributes of a city," comments Krokodil's Raphael Frei. "Rather than building indiscriminately and constantly pushing the limits of the metropolitan area outward, they'd be better off embracing this urban identity and increasing population density inside the current boundaries."

"We need slower public transport"

If Switzerland's roads and trains were less efficient, there would be less urban sprawl. That's a difficult idea for Swiss who take pride in the quality of their infrastructure to accept, but EPFL professor Vincent Kaufmann believes in it. "The Swiss are obsessed by speed," he says. "Slowing down public transport in zones with development issues would give people an incentive to live closer to where they work." Confronted with longer commutes, urban professionals would try to find housing within 10-15 km of their workplace.

Kaufmann suggests lowering the speed limit on freeways and slowing down trains. "We could consider eliminating the rapid intercity trains in favor of regional trains in order to stimulate growth in smaller cities and thus encourage polycentric development."

FILLING IN THE HOLES

Elsewhere, industrial areas that were abandoned during the deindustrialization of the early 1990s are being redeveloped, such as the Flon District in Lausanne, Ecoparc in Neuchâtel, Erlenmatt in Basel and Kreis 5 in Zurich. The Federal Office of Territorial Development estimates that there are more than 350 such "brownfield" sites with a total surface area of 1,820 hectares – larger than the city of Geneva. These areas could house at least 190,000 people and 13,000 companies.

There are other ways to increase population density. At EPFL, the Deep City project is exploring the possibility of developing underground urban areas by burying such buildings as shopping centers and cinemas. "Every city could implement this," says professor Aurèle Parriaux, who directed the research. He concedes that building a five-story department store underground would cost 9% to 23% more than on the surface, and that it would subsequently be more expensive to repair, but it would be better insulated. Moving in the opposite direction, a study by the Zurich University of Applied Sciences in Business Administration demonstrated the enormous housing potential that could be tapped by adding a story or two to existing buildings in city centers or by replacing these buildings by new, taller ones.

These solutions will of course require political decisions, starting with the March 3 popular vote on a revised law on urban and rural development. By prescribing "compact development of the built environment" and limiting existing development zones in favor of cities, the text already leans toward an increase in population density. ■