

## Science & Technology

### SIX BRIDGES:

#### *The Legacy of Othmar H. Ammann.*

By Darl Rastorfer. Yale Univ. Press.

188 pp. \$39.95

The destiny of New York City has always rested on water. The great harbor gave birth to the city. The Hudson River provided an inland artery. The Erie Canal connected the Hudson to the heartland, guaranteeing the fortunes of the metropolis. Yet if water was a boon to the city's preeminence as a commercial entrepôt, it was also a bane to physical expansion and economic efficiency. Bounded by water, the city

he decided to submit plans for New York City's first bridge across the Hudson. His employer and mentor, Hell Gate designer Gustav Lindenthal, envisioned a gargantuan structure of 28 traffic lanes on a half-mile span, supported by cables strung from two massive granite towers. Lindenthal's drawings, reproduced in this book, show a plan captive to the expansive and overstuffed instincts of the Victorian Age, an architectural rendering in which exuberance passes over into sheer excess. By contrast, Ammann's design is an avatar of the modern—a slim, lithe, liberated Daisy Buchanan against

Lindenthal's dowager empress. The generational divide between old master and brilliant apprentice was unbridgeable. When the recently formed Port Authority of New York and New Jersey chose Ammann's design, a star was born.

The George Washington Bridge is, in Rastorfer's estimation, "the most significant long-span suspension bridge" of the 20th century. Part of its significance is owed to the sleek elegance of the design, and part to parsimoniousness: The Port Authority felt compelled by the Great Depression to cut back on expenses, so

it tossed aside Ammann's plan to dress the steel towers in stone. The serendipitous result was to heighten "the machined profile and transparency of the unfinished construction," creating a prototype for the stellar feats of bridge building that Ammann would complete over the next 35 years.

In the style of Ammann's six bridges—the George Washington, Bayonne, Triborough, Whitestone, Throgs Neck, and Verrazano—Rastorfer's account of the 20th century's *pontifex maximus* is spare and clean, free of superfluous detail. Rastorfer, curator of the Cooper Hewitt Museum exhibition *Six Bridges*, is equally enlightening about the theory behind the masterpieces and about Ammann's relationship with Robert Moses, the nonpareil power broker who paved the way for their construction. *Six Bridges* is a long-overdue tribute to perhaps the



Workmen attach a cable over the tower saddle on the Verrazano-Narrows Bridge in July 1963.

could develop only northward until George Augustus Roebling's epic bridging of the East River united Brooklyn and New York in 1883. The bridge brought about the demise of Brooklyn's independence and the eventual creation of Greater New York, a city sprawled across three islands (Manhattan, Staten Island, and Long Island), with only one borough, the Bronx, on the mainland of the United States.

Welding this archipelago into a coherent metropolitan whole required a vast and far-flung infrastructure, including tunnels, railway terminals, and more bridges. Six of the most important bridges were designed by a Swiss-born engineer named Othmar Ammann, the subject of this lucidly written and generously illustrated book.

Ammann's initial break came as inspector of construction on the Hell Gate Bridge. In 1923,

greatest artist-engineer of all time, and a poignant reminder of the heroic age that preceded the ethereal sway of cyberspace, an age when men labored, Prometheus-like, against the corporeal constraints of heaven and nature.

—Peter Quinn

**SOMETHING NEW UNDER  
THE SUN:**

*An Environmental History  
of the Twentieth-Century World.*

By J. R. McNeill. Norton. 421 pp.  
\$29.95

In my youth in the 1950s, the Chesapeake Bay teemed with life. In summer we swam and fished in its clear, brackish waters. In winter we watched in awe as migrating ducks filled the evening sky and poured into the bay. Today, though, the ducks are nearly gone, and the brown waters are hostile to eelgrass, blue crabs, oysters, fish, and humans. Yet even in the 1950s, people reminisced about an earlier golden age when there had been far more ducks.

Do such anecdotes represent yearning for an idealized past or genuine and lasting environmental decline? McNeill, a professor of history at Georgetown University and the author of *The Mountains of the Mediterranean World: An Environmental History* (1992), would choose the latter. In this ambitious and exhaustively researched book (the bibliography lists close to a thousand sources), he argues that the 20th century spawned environmental changes that, though unintended, were extraordinary in scope and intensity.

Erosion, smog, extinctions, shrinking tropical forests, ozone holes, birds suffocating in midair over Mexico City—McNeill has plenty to work with. Individual culprits stalk his landscape, including the inventor of the harpoon cannon and the Shakespeare fanatic who released 160 starlings in New York City. But the real villains, as he discusses in the last quarter of the book, are more complex: urbanization, migration, population growth, globalization, and shifts in preferred fuels and technologies, among others.

His account is not unremittingly gloomy. He notes positive developments, such as smog abatement, forest regeneration, and the return of the sensitive salmon to formerly polluted waters. He acknowledges the upside of many environmental changes—eliminating coastal mangroves, for instance, benefits rice farming—and he generally refrains from character-

izing a change as bad unless it amounts to a disaster for all life forms. But his neutrality sometimes lapses, as when he relegates rival explanations to footnotes or uses *toxic* eight times in two pages. He may have found it impossible to do otherwise after concluding that the growth imperative responsible for so much environmental degradation is, like the European rabbit and the water hyacinth, all-consuming and all-destructive.

—Shepard Krech III

**THE TRIPLE HELIX.**

By Richard Lewontin. Harvard Univ. Press. 136 pp. \$22.95

At least since Descartes described the visible world as “merely a machine in which there was nothing at all to consider except the shapes and motions of its parts,” metaphor has played a central role in scientific understanding. We think of our brains as computers, or we refer to the human genome as the master blueprint for the species. Lewontin, a professor of evolution and zoology at Harvard University, contends that metaphors can mislead as well as enlighten. While conceding that scientific explanations “necessarily involve the use of metaphorical language,” he argues that many common terms have outlived their usefulness, especially in the realm of evolution.

To begin with, he finds fault with use of the word *development* to describe how an organism changes over time. In photography, “the image is already immanent in the exposed film, and the process of development simply makes this latent image apparent.” Some biologists believe that organisms change in a similarly preordained fashion: Genes determine the outcome, while environment, like photographic developer, provides nothing more than “a set of enabling conditions that allow the genes to express themselves.” Scientists who discount the role of environment in this fashion, he contends, are guilty of “bad biology.”

Darwin’s notion of *adaptation* does account for the influence of environment, but Lewontin believes that it too constitutes “an impediment to a real understanding of evolutionary processes.” The term implies that the organism adapts to a fixed world—that the organism is the variable and the environment is the constant—whereas the two actually affect each other. Humans, for example, produce a “microclimate”: a layer of higher-den-