according to Peter L. Galison, a historian of science at Harvard University, that sort of approach declined, as scientists sought to remove overt signs of imagination—now the province of poets and artists—from their work. They were pushed by both the collapse of major theories (e.g., the Newtonian theory of light) built the old way and the availability of new devices, such as the camera. In this new era of "mechanical objectivity," it was thought better to illustrate atlases, for example, with a blurred photograph of a distant star or a fragment of a fossil than to present an imaginative reconstruction.

Scientists busied themselves standardizing their instruments, clarifying their basic concepts, and adopting an impersonal style of writing—all to make it easier for other scientists to understand their work. Facts were no longer "malleable observations but . . . unbreakable nuggets of reality," writes Bower.

In the medical and natural sciences, however, another shift occurred by about 1920, as a door opened to trained imagination and informed judgment.

Today, rigid standards of quantitative rigor tend to be most strongly valued in embattled and divided disciplines such as experimental psychology, contends Theodore M. Porter, a historian of science at the University of California, Los Angeles. Scientists in more secure disciplines, such as in the small community of experimental high-energy physics, operate, in contrast, much more informally. With only a few particle accelerators available, and experimenters continually adjusting their equipment, independent replication of experimental results is difficult. As a result, influential physicists often assess the skills and trustworthiness of the experimenters themselves in order to reach a collective judgment on whether particular findings merit acceptance.

"Scientists employ techniques and ways of thinking which are powerful and effective, but which are often hard to articulate," Porter says. "In science, as in political and administrative affairs, objectivity has more to do with the exclusion of personal judgment and the struggle against subjectivity than with truth to nature."

Superfund Waste

"How Costly Is 'Clean'? An Analysis of the Benefits and Costs of Superfund Site Remediations" by James T. Hamilton and W. Kip Viscusi, in *Journal of Policy Analysis and Management* (Winter 1999), Univ. of Pennsylvania, The Wharton School, 3620 Locust Walk, Ste. 3100, Philadelphia, Pa. 19104–6372.

It's no secret that cleaning up a Superfund hazardous waste site is a very expensive proposition. Is it worth it? Hamilton, a professor of public policy at Duke University, and Viscusi, a professor of law and economics at Harvard Law School, add their voices to those who say that in many cases the answer is no.

Examining a representative sample of 150 out of the 1,388 Superfund sites, and using Environmental Protection Agency (EPA) risk assessments and 1990 census data about the populations in the surrounding areas, the two researchers calculate that at most of the sites, the number of expected cancer cases resulting from contamination is relatively low. Overall, at the 150 sites, $2.2 billion is being spent to avert 731 cancer cases—an average of $3 million per case. But even that figure is misleading, say the authors. At half the locations, the risk amounts to less than one-tenth of a cancer case per site. And at 101 of the 145 sites with any averted cancer cases, the cleanup costs would be more than $100 million per averted case.

Why are the cleanups so inefficient? In part, say the authors, because the EPA has focused on the cancer risk to an individual who becomes contaminated at the site (even though there were residents on only 14 of the 150 sites), rather than on the number of cancer cases expected to arise in the area's population. The inefficiency also is due, Hamilton and Viscusi say, to the fact that Congress, wanting to prevent the Reagan administration from favoring polluters, as it allegedly had been doing, directed the EPA in 1986 legislation to require permanent cleanups, not mere containment of hazardous wastes.

The law also set stringent cleanup standards.

Congress should allow the EPA more discretion, the authors conclude, and the agency, in selecting a remedy for a particular site, should not always insist on restoring sites to pristine condition.

ARTS & LETTERS

The Literature Gene?

"Darwin and Dickens" by Nick Gillespie, in *Reason* (Nov. 1998), 3415 Sepulveda Blvd., Ste. 400, Los Angeles, Calif. 90034–6064.

The post-structuralist literary critic—who is quite sure that all texts have no fixed meaning, that between the signifier and the signified always falls the shadow—has been much in evidence in English departments in recent decades. But a new rival has been sighted: the evolutionary critic, who approaches literature and literary theory with Darwin's *Origin of Species* in hand.

One such critic is Joseph Carroll, an English professor at the University of Missouri–Kansas City. In *Evolution and Literary Theory* (1995), he applies the principles of evolutionary psychology—which holds that much human behavior is governed by the imperative of passing on one's genes—to classic literary works. Take *Wuthering Heights*, Emily Brontë's classic tale about the stormy relationship between the foundling Heathcliff and Catherine Linton (née Earnshaw). Raised as brother and sister, they struggle, according to the conventional interpretation, with quasi-incestuous desires. But current ethological research, Carroll points out, shows that unrelated boys and girls raised as siblings are "genetically programmed" to find sexual relations distasteful. There's no smoldering sexual tension between Heathcliff and Catherine, Carroll insists. They are merely guilty of "infantile tantrums."

Carroll's approach is "basically traditionalist" in subject matter and method, observes Gillespie, a *Reason* senior editor. Other evolutionary critics are more trendy, bringing Darwinian insight to literary theory. For instance, Alexander Argyros, author of *A Blessed Rage for Order* (1992), looks upon art

The Biological Great Gatsby

Bert Bender, an English professor at Arizona State University, writes in the *Journal of American Studies* (Dec. 1998) about the heretofore little-noticed "biological undercurrent" in *The Great Gatsby* and other works of F. Scott Fitzgerald.

Readers familiar with F. Scott Fitzgerald's early work might recall that in those years just before the Scopes trial he wrote of Victorians who "shuddered when they found what Mr. Darwin was about"; or that he joined in the fashionable comic attacks on people who could not accept their "most animal existence," describing one such character as "a hairless ape with two dozen tricks." But few would guess the extent to which his interest in evolutionary biology shaped his work. He was particularly concerned with three interrelated biological problems: (1) the question of eugenics as a possible solution to civilization's many ills, (2) the linked principles of accident and heredity (as he understood these through the lens of Ernst Haeckel's biogenetic law), and (3) the revolutionary theory of sexual selection that Darwin had presented in The Descent of Man *and* Selection in Relation to Sex *(1871). . . . The principles of eugenics, accidental heredity, and sexual selection flow together as the prevailing undercurrent in most of Fitzgerald's work before and after* The Great Gatsby, *producing more anxiety than love from the tangled courtships of characters he deemed both beautiful and damned.*