
SCIENCE & TECHNOLOGY

When Congress passed the first patent law in 1790, it deemed the matter important enough to create a board composed of the Attorney General and the Secretaries of State and War to evaluate applications. In 1793, a new law dropped the time-consuming requirement that applications be screened. The results were predictable. In 1829, an "inventor" patented the medieval farming technique of letting land lie fallow for a season to increase subsequent crops. By 1836, with the establishment of the U.S. Patent Office, the screening requirement had been reinstated and the foundations of today's system were laid.

The question of what can be patented has also fallen to the courts. The peddling of "patent medicines" during the early 19th century led to a judicial ban on patents for "mischievous" creations. In 1822, a federal court ruled that "mere abstractions" could not be patented. In 1978, the Supreme Court cited the 1822 decision in ruling that computer programs (based on mathematical formulas) were not eligible.

That principle, along with the Court's "obvious" rule—denying patents for common-sense improvements on existing designs—is bound to make for some complex cases as technology races ahead. In 1980, the Supreme Court had to decide whether new genetically engineered organisms could be patented. It said Yes. The patent system, Sherwood concludes, is probably up to any challenge that science can produce.

Equality for The Egg

"The Energetic Egg" by Gerald Schatten and Heide Schatten, in *The Sciences* (Sept.-Oct. 1983), The New York Academy of Sciences, 2 East 63rd St., New York, N.Y. 10021.

Until the 1970s, cell biologists largely concurred with the view of Hippocrates and Aristotle that the female's contribution to human reproduction was essentially passive. Under a normal microscope, sperm appear active, while eggs seem inert.

But during the last decade, new electron microscopes, which magnify details 250,000 times, began to tell a different story. According to the Schattens, biologists at Florida State University, sperm and egg now appear to be "mutually active partners."

The electron microscopes show that as the sperm approaches the egg, it synthesizes a long, thin filament that "harpoons" its target, triggering chemical changes within the egg that rouse it to action. Hair-like "microvilli" on the egg's surface reach out and pull the male cell inward, finally clasping it to the surface.

Meanwhile, the egg begins a series of defensive measures to keep other sperm at bay. (In humans, up to 40 sperm may approach at once.) Within 30 seconds of the meeting of sperm and egg, a tough antisperm "umbrella" composed of proteins fends off possible intruders.

As the captive sperm, "lilliputian" in size relative to its host, begins swimming toward the nucleus, "microtubules" (only 25 billionths of a meter thick) within the egg push the swimmer toward its center. Once it arrives, the microtubules form themselves into a "sperm aster" that

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radiates in all directions throughout the cell. The egg's nucleus, waiting off to one side, rushes down one of the corridors created by the aster and, within one minute, merges with the sperm nucleus. Almost immediately, the first steps toward creation of an embryo get underway.

Fertilization, the Schattens say, is "the riskiest of all biological processes." Small wonder then, that the egg has developed such aggressive mechanisms to ensure its success. No longer will it be possible to view fertilization as a solo act.

RESOURCES & ENVIRONMENT

What OSHA Is Up To

"Auchter's Record at OSHA Leaves Labor Outraged, Business Satisfied" by Michael Wines, in *National Journal* (Oct. 1, 1983), 1730 M St. N.W., Washington, D.C. 20036.

The Reagan administration's attempt to "deregulate" industry helped get the U.S. Environmental Protection Agency (EPA) into hot water. Meanwhile, hardly anybody is paying any attention to EPA's twin, the Occupational Safety and Health Administration (OSHA).

OSHA director Thorne G. Auchter has not only avoided public controversy, he has even acquired a mild taste for regulation, writes Wines, a *National Journal* correspondent. For example, Auchter's OSHA was expected to abandon longstanding agency attempts to limit workers' on-the-job exposure to carcinogens. But last April, OSHA suddenly announced plans to issue emergency regulations on exposure to asbestos. OSHA also sidestepped chemical industry and White House opposition to regulations requiring labels with tips on handling and safety for all hazardous chemicals used in American factories. The initial cost to industry will be almost \$600 million, plus \$228 million per year thereafter.

Auchter's critics, chiefly labor union officials, believe, as one put it, that Auchter was "dragged kicking and screaming into regulation." He took action on asbestos, they say, only after a congressional committee grilled him in March. And the new regulations will probably just codify standards already accepted voluntarily by industry. Critics also charge that OSHA's enforcement of existing regulations is lax. In 1982, for example, the agency levied only \$5.8 million in fines against violators; in 1980, Jimmy Carter's OSHA collected \$18.5 million.

Auchter replies that his brand of "cooperative regulation" allows business to put its money into workplace safety and health rather than legal battles with OSHA. The agency's own resources have also been redirected. A controversial new "targeting" policy exempts from federal inspection factories in industries with low health-related absenteeism. (An existing program exempts all industries in the 21 states that have their own safety regulations.) OSHA officials claim that the cutback allows them to scrutinize the most dangerous workplaces, particularly