



Spin determines how a baseball moves. In a curveball (above, lateral view), the ball has topspin, turning in a counterclockwise direction. The turbulence in its wake causes the ball to drop faster than normal. It's the drop more than the curve that gives batters problems.

the two-seam fastball appear almost as one, so as the ball rotates, it may flicker like a rapidly blinking light. That flickering could reveal if the ball has topspin (a curve ball) or backspin (a fastball). There's no flicker with a four-seam pitch, though, since the "blinking" of the four individual seams is so rapid.

Unfortunately for batters, most pitching coaches recommend a four-seam grip for the fastball. But pitchers generally use the same grip for the fastball and the slider (a pitch

that travels faster than a curve ball but spins less) to avoid tipping off the pitch. On the slider, the four-seam grip works to the batter's advantage because it produces the perception of a red dot on the ball visible from home plate. Eight of 15 former major leaguers Bahill and his colleagues surveyed recalled seeing just such a dot. A smart pitcher could use the two-seam grip to avoid this telltale signal. Now if only future Babe Ruths could keep this scientific knowledge out of the hands of pitchers!

Bug Cops

"Policing Insect Societies" by Francis L. W. Ratnieks and Tom Wenseleers, in *Science* (Jan. 7, 2005), American Assn. for the Advancement of Science, 1200 New York Ave., N.W., Washington, D.C. 20005.

Though it may not provide the basis for yet another *Law and Order* spinoff, police work goes on in insect societies, too. The criminals in these societies are females out to spread their genes around, even though that may not be in the colony's best interest and may upset the division of labor between queen and workers. "In the life of any female bee, wasp, or ant, there are two points at which she may try to reproduce," write Ratnieks, a professor of apiculture at the University of Sheffield, and Wenseleers, a fellow at the Institute of Advanced Study in Berlin.

One is when, as an adult worker—incapable of mating, in most species, yet still possessing ovaries—she can activate those ovaries to lay eggs; if reared, the unfertilized eggs will develop into males. That would mean too many males. A typical honeybee colony, for instance, has tens of thousands of workers (female offspring of the queen), but

only a few hundred drones (male offspring of the queen). Enter "worker policing," in which workers (and sometimes even the queen) detect and kill eggs laid by other workers. In the case of the honeybee and the common wasp, this policing eliminates 98 percent of worker-laid eggs. It also appears to have a deterrent effect, discouraging workers from laying eggs.

The other "danger" point in a female insect's life occurs earlier, when she is a larva and can "choose" to develop into a worker or a queen. In most species, queens are specialized structurally for egg laying and frequently are unable to work. "A larva is often better off developing into a queen, yet policing ensures that most are prevented from doing so. Because queens are generally larger than workers and need more food, adult workers can control whether a larva will develop into a queen by controlling her food supply." In a

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honeybee colony, for example, where the queen cannot work and too many queens would reduce efficiency, workers “carefully select” the prospective royals (each likely to head her own colony) from the many wannabes and raise them in the “few special large cells in the brood comb.”

But such benign preventive policing is not an option for a different species: sting-

less bees of the sort that rear their female larvae in sealed cells of the same size. To deal with the excess queens they produce, these bees resort to police brutality: Soon after the unfortunate creatures emerge from their cells in the brood comb, they’re beheaded or torn apart.

Insect reformers, if such there be, have their work cut out for them.

Psychology Grows Up

“Psychology in Recovery” by Paul C. Vitz, in *First Things* (March 2005), Institute on Religion and Public Life, 156 Fifth Ave., Ste. 400, New York, N.Y. 10010.

When it was born in the 19th century, psychology had high hopes of donning a lab coat and growing up to be a science. That has happened to some of the discipline’s offspring, but therapeutic psychology took another route—and had some wild times in its adolescence. Now, it too seems to be growing into a responsible adult.

Experimental psychology was one of the discipline’s first offspring, and it now has children and grandchildren, according to Vitz, an emeritus professor of psychology at

New York University. They are united by a focus on biology and brain function, and all are recognized as hard sciences. Physiological psychology is now known as neuroscience. Cognitive psychology (which deals with human memory, problem solving, learning, and the like) has begotten “such fields as cognitive neuroscience (focusing on brain activity) and cognitive science (focusing on artificial intelligence and robotics).”

Test-and-measurement psychology, a child of the early 20th century, has won recogni-

EXCERPT

Are We All Plagiarists Now?

The 1960s gave us, among other mind-altering ideas, a revolutionary new metaphor for our physical and chemical surroundings: the biosphere. But an even more momentous change is coming. Emerging technologies are causing a shift in our mental ecology, one that will turn our culture into the plagiosphere, a closing frontier of ideas.

The Apollo missions’ photographs of Earth as a blue sphere helped win millions of people to the environmentalist view of the planet as a fragile and interdependent whole. The Russian geoscientist Vladimir Vernadsky had coined the word “biosphere” as early as 1926, and the Yale University biologist G. Evelyn Hutchinson had expanded on the theme of Earth as a system maintaining its own equilibrium. But as the German environmental scholar Wolfgang Sachs observed, our imaging systems also helped create a vision of the planet’s surface as an object of rationalized control and management—a corporate and unromantic conclusion to humanity’s voyages of discovery.

What NASA did to our conception of the planet, Web-based technologies are beginning to do to our understanding of our written thoughts. We look at our ideas with less wonder, and with a greater sense that others have already noted what we’re seeing for the first time.

—Ed Tenner, science writer, in *Technology Review* (June 2005)