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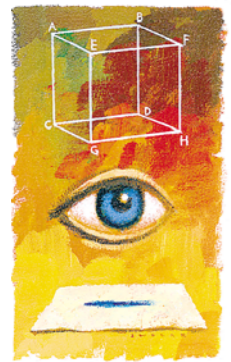
SCIENCE JOURNAL

By SHARON BEGLEY

Extra Dimensions: They Can't Be Seen, But May Be Measured

EVER SINCE PAUL Dirac's feat, physicists have been spoiled rotten. In 1930, the British scientist came up with a set of mathematical equations that predicted the existence of a particle no one had ever suspected, let alone seen: the positron, the anti-matter cousin of the electron. The very next year, positrons turned up in an experiment in California. Ever since, physicists have figured that whatever crazy prediction their elegant equations spit out, some plodding experimentalist might eventually find it.

So it's more than a little annoying that although the glam theory in physics, called string theory, says the world has more than the three dimensions



Paul Zwick

of space we know and love, experiments see neither hide nor hair of anything beyond length, width, depth. Theorists have an excuse for why the extra dimensions don't show up: they're "compactified," rolled up into such a tiny space that we can't see them. It's sort of like a Brobdingnagian viewing a Liliputian straw. To the giant, the straw looks one-dimensional; only if he peered through a magnifying glass would he see its "extra" dimensions of width and depth. When you ask physicists if it isn't a bit embarrassing that their theory depends on dimensions for which there is no observational support, they sort of glare at you and talk about the equations' beauty.

WE CAN DO BETTER, says Lisa Randall, a physicist at Harvard University. Since 1998, she has been working out why we don't see those hypothesized extra directions. "What's become of them?" she asks. Her answer: Extra dimensions might hide without being rolled up, in a way that will let us detect them. She imagines a world much like Edwin Abbott's in his classic book, "Flatland." Maybe we are stuck in three-dimensional space just as the Flatlanders were stuck in 2-D. They had no sense of depth. We have no sense of ... whatever.

But even creatures in a low-D world might glimpse hints of higher dimensions. Visualize this: If a sphere of light from the third dimension drifted down toward Flatland, which you can think of as a sheet of paper, it would appear first as a dot of light (where the first point of the sphere kissed the surface), then as a growing circle of light as more of the sphere intersected, then as a shrinking one (after the sphere's fattest part passed through).

Flatlanders would stare in wonder at this magically waxing and waning circle. Maybe it would inspire some to ask if the world has more than the two dimensions they know. Similarly, says Dr. Randall, maybe we live on a 3-D "brane" (short for "membrane") adrift in a multi-D world. If so, then the extra dimensions might make cameo appearances, providing the long-sought "experimental signatures of extra dimensions," she writes in a paper in today's issue of the journal *Science*.

One place where extra dimensions might make themselves felt is in gravity. The strength of gravity falls off the farther you get from the source. (In precise terms, it decreases by the distance squared.) But if the world had more than three dimensions for gravity to fill, then its strength would fall off faster.

JUST AS PAINTING a gigantic cube with a finite amount of paint causes the coat to get thinner faster than if you use the paint on just one side, so if gravity has to fill more dimensions it, too, will fade faster. Physicists have seen no sign of this fading down to one-tenth of a millimeter, but they might if they probe smaller scales.

Extra dimensions would be a good place to hide stuff. (Imagine if a thief in Flatland were the only guy who knew that height existed.) If subatomic particles smashed together at high-enough energies, they might produce new particles that scoot off into an extra dimension and vanish. Missing particles would thus hint that there's more to the world than up/down, left/right, in/out.

Or, collisions might create particles with unexpected traits: The collision would create something called a gravitational wave that shoots off into an extra dimension and then returns to affect those particles.

"This would be an in-your-face demonstration of extra dimensions," says physicist Ramon Sundrum of Johns Hopkins University. "There's a good chance that in the next few years we'll see something associated with extra dimensions." The best shot: at the Large Hadron Collider outside Geneva, Switzerland, which should be good to go in 2007.

Glimpsing extra dimensions would be a godsend to string theory, which is in search of nine or 10 dimensions. If it's right, then what we get might be much more than what we see.

Send comments to sciencejournal@wsj.com.

Makeover After Takeover

How Buzz and Better Control Put YSL Back on the Map Under New Owners at Gucci

By DEBORAH BALL

WHEN BUYERS at Bergdorf Goodman in New York ordered 60 of Yves Saint Laurent's new Mombasa handbag last fall, Ronald Frasch figured that was plenty. Demand for these kinds of expensive baubles had evaporated after Sept. 11, and Mr. Frasch, chairman of the Neiman Marcus Group Inc. unit, was bracing for the worst Christmas in recent memory.

But to his surprise, the \$700 bag—a soft, oyster-shaped leather shoulder bag with a curved deer-horn handle—sold out in a couple of weeks. "We reordered everything we could and got 600 pieces," Mr. Frasch says. "We thought our order had been aggressive but we weren't even close. You can't get a hold of that bag now."

The Mombasa offers early evidence of a successful relaunch for brand Yves Saint Laurent, the once-glorious French couture name that fell on hard times and then sat on the sidelines for most of the 1990s' designer-goods revival. Gucci Group NV bought the YSL brand in 1999 for \$1 billion and made it a cornerstone of its global multibrand strategy.

In the years since, the YSL makeover has been a closely watched fashion drama. Style mavens have been waiting to dissect the spin Gucci's design chief, Tom Ford, would put on the groundbreaking looks that earned Mr. Saint Laurent the title of world's greatest living designer. Shareholders, meanwhile, were itching for the kind of results that Mr. Ford and Gucci Group's chief executive, Domenico De Sole, produced when they took the tarnished Gucci label and turned it into a profit machine, spitting out \$5,000 dresses and \$700 purses.

"There's a lot riding on this," says Andrew Gowen, retail analyst with Lehman Brothers. YSL is a test of Gucci's ability to make viable businesses out of other designer names, including Stella McCartney and Alexander McQueen, it has assembled since 1999. "If they failed to achieve their financial ambitions, it would be regarded as a clear failure," Mr. Gowen says. Such a public stumble would be a first for the Gucci Group management team.

Gucci got a tattered piece of fashion history when it bought YSL. Mr. Saint Laurent was only 26 when he founded his label in 1962, but he was already famous, so talented that Coco Chanel regarded him as her successor as the premier Paris couturier. He reinterpreted modern fashion, infusing his couture collection with Mondrian minimalism and safari suits. On the business side, he was the first to make his ready-to-wear clothes a serious commercial venture and one of the first to fuel growth through licensing.

That strategy, though, eventually sullied the YSL name by creating a labyrinth of licenses for everything from YSL cigarettes to plastic YSL shoes, which sold for \$125 in the Tokyo subway. Further fragmenting the image were nine different store designs around the world and no coordination among the licensees who churned out the dizzying array of cheap goods. By the early 1990s, highbrow department stores largely dropped the brand, and it was overtaken by labels like Giorgio Armani, Chanel and, later, a revived Gucci. After Gucci Group acquired YSL, Mr. Saint Laurent continued to design hand-made, one-of-a-kind garments for rich socialites and celebrities, but in January he closed his couture business and retired from fashion.

The Gucci label had itself suffered a fate
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YSL: Survival of the Fittest

- **1962** Yves Saint Laurent, who had been chief designer of Christian Dior, opens his own couture house following rave reviews for modernizing Dior's collections
- **1966** YSL opens its first ready-to-wear Rive Gauche boutique, putting the group at the forefront of a new fashion trend
- **1972** Squibb buys control of YSL; the house starts licensing out its brand name
- **1986** Italian financier Carlo De Benedetti buys 25% of YSL, with Saint Laurent and partner Pierre Berge controlling the rest until 1989, when the company goes public
- **1999** Gucci acquires YSL's beauty and ready-to-wear businesses. French billionaire Francois Pinault acquires the couture house
- **2000** Gucci designer Tom Ford presents his first Rive Gauche collection
- **2001** Yves Saint Laurent announces his retirement and closes the couture house. Under the artistic direction of Tom Ford, YSL churns out critically acclaimed ready-to-wear collections, boosts sales and scores solid fashion hits with items such as the Mombasa bag



Dave Hogan/AP/ImageDirect

Star power: Nicole Kidman wears a black, strapless YSL dress to the screening of 'Moulin Rouge' at Cannes, above; left, the Mombasa bag popularized by Gwyneth Paltrow



Signs of Comeback in Luxury Goods

LUXURY GOODS are starting to sell once again.

A few designer companies say they are seeing the first signs of an uptick since Sept. 11 took the wind out of their sales. Stocks have rallied. Some executives are making their first optimistic remarks in almost nine months.

"The underlying businesses are recovering slowly," says Scilla Huang Sun, manager of a luxury-goods fund for Claridenbank, Zurich.

Tiffany & Co., of New York, said net income for the first-quarter rose 6.3%, in part due to stronger U.S. sales. Hermès International SA, of France, reported a 6.8% rise in first-quarter revenue. Italy's Prada Holding NV last week said its on-and-off plans for an initial public offering of stock are on again, aimed for summer. LVMH Moët Hennessy Louis Vuitton SA projected

operating profits for the French luxury-goods corporation would climb "quite substantially above" 10% this year, compared with a drop of 20% in 2001.

Still, it's a little early to break out the Don Perignon. "Conditions continue to be quite difficult, though there will be some progress in the second half of the year," said Domenico De Sole, Gucci Group NV's chief executive. "It will be a slow recovery."

Tourism still hasn't fully bounced back to Hawaii, Las Vegas and other shopping destinations, says Claire Kent, a Morgan Stanley analyst in London. Many Japanese consumers continue to stay home. As a group, Japanese shoppers buy more than 30% of luxury goods world-wide and make one-third of those purchases in the U.S. and Europe. "The environment is still very tough," Ms. Kent adds.

—Alessandra Galloni

Latest Battle of Midway Centers on Airport

Shutdown of Strip Brings Peace To One Million Gooney Birds But Ruins War Veterans' Plans

By ANDY PASZTOR

SPECKS OF U.S. TERRITORY in the middle of the Pacific Ocean, the Midway Islands are known best for their World War II role as a jumping-off point for U.S. forces beginning to turn the tide against Japan. Now the islands are emerging from another battle—albeit one far less momentous—over who will maintain and man Midway's isolated airport. And in an odd twist, this current fracas involves some of the same soldiers who fought on Midway six decades ago.

Over the past few years, Boeing Co. has quietly subsidized a private company, Midway Phoenix Corp., to run Henderson Field—Midway's single, pitted strip—and to keep rudimentary emergency services running, primarily as a selling point to airlines using Boeing's two-engine 777 for trans-Pacific routes that can last 14 hours or more. Under Federal Aviation Administration rules, such twin-engine jets aren't allowed to stray as far from potential places to put down as four-engine jets, many of them made by Boeing archival Airbus.

But three weeks ago Midway Phoenix pulled out, and the FAA shut the airport down. The company had invested \$15 million in facilities designed to attract tourists—a stylish gourmet restaurant, and a deep-sea fishing center among the



amenities—but had clashed repeatedly with the island's administrator, the Fish and Wildlife Service of the U.S. Department of Interior, over the company's proposals to open up more beaches (closed to protect seals and other animals) and to encourage small cruise ships to anchor in the lagoon.

The Fish and Wildlife Service "kept restricting what we could do," says Bob Tracey, an executive at Midway Phoenix, based in Cartersville, Ga. "It was supposed to be a model government-company relationship. But as it evolved, we couldn't see our way clear to make any money." An Interior spokesman counters that the company knew precisely what restrictions it faced in a wildlife sanctuary, adding that the government went out of its way to be flexible and agreed that Midway Phoenix wouldn't have to pay nearly \$2 million in disputed bills.

In pulling out, Midway Phoenix took with it around 150 assorted laborers who operated not only the airport but also the water, electric and sewage systems. In making its decision to close the airport, the FAA determined that the federal conservation officials remaining on the island weren't capable of running Henderson, its tower or its fire and rescue teams. The FAA action put Midway off-limits to all carriers, some of which have had to shift their routes to meet FAA landing proximity guidelines, and it left some elderly veterans of the Battle of Midway in the lurch.

The veterans and their supporters have spent the past 18 months planning for an early June ceremony on Midway commemorating their victory there in 1942. Sponsors of the event were told the FAA wouldn't permit their chartered Boeing 737 to make the 2,000 nautical mile round trip between the
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In NIMH Study, Therapy Works As Well as Drugs For Depression

By SHARON BEGLEY

I'M A BAD PERSON and don't deserve to have any fun. "I'll never get the job, so I won't even apply." "This date will be a disaster because I'm ugly and stupid and no one will ever love me."

Patients suffering from depression are besieged by such thoughts, with the result that they're unable to enjoy much of anything. Their sleep and eating are disrupted, and they often have no energy for the simplest daily activities, let alone work or family.

Thanks to breakthroughs in understanding the brain chemistry underlying depression and in formulating drugs like selective serotonin reuptake inhibitors, or SSRIs, a standard of care for severe depression has evolved: Treatment guidelines for psychiatrists "call unequivocally for medication," says Robert DeRubeis, chairman of the psychology department at the University of Pennsylvania in Philadelphia.

But in the largest and longest-running study to pit medication against psychotherapy, Dr. DeRubeis and colleagues have found cognitive therapy—which basically teaches patients to think about their thoughts differently—is at least as effective as standard drugs in treating severe depression. The results of the study, which was funded by the National Institute of Mental Health and GlaxoSmithKline PLC, maker of the antidepressant Paxil, were presented at the annual meeting of the American Psychiatric Association in Philadelphia.
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Should the Moon Be Safeguarded From Developers?

By JIM CARLTON

A DISPUTE over prohibiting development on the moon is causing rising tides of controversy on earth.

In the vanguard of one side is Rick Steiner, a fisheries professor at the University of Alaska and environmental activist, who proposes that the United Nations designate the moon one of its World Heritage Sites, reserved for peaceful and scientific purposes. Among the many who oppose that idea is the Moon Society, a non-profit organization of astronomers, computer programmers and other scientists who advocate "large-scale industrialization and private enterprise" on the moon.

Mr. Steiner plans to present his proposal tomorrow at the International Space Development Conference in Denver. "The bottom line here is: Let's go and explore our universe, but let's not go as Genghis Khan," he says. "Let's go as Mother Teresa."

In an e-mail to Mr. Steiner about the conference, the Moon Society's president, Gregory Bennett, said: "You'll want to be prepared to explain why the moon (or perhaps any real estate in the universe) ought to be the province of an authoritarian socialist state."

Referring to the heavy contingent of conference attendees who are expected to favor the
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Protected

A sample of World Heritage sites:

- The Statue of Liberty
- Yellowstone Park
- Kremlin and Red Square
- Auschwitz
- The Taj Mahal

Source: UNESCO

INSIDE

Advertising

Army's Latino Ads Target La Familia

Danger takes a back seat in the latest campaign, aimed not only at youths but at Mom, Dad and even the local priest. B3



Health

Thinking Like a Child

Scanning technology is charting how children's brains work differently from those of adults. The effort could improve the handling of learning disabilities. B7

Classifieds B4