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What's News

Business & Finance

Third Point has taken a \$3.5 billion stake in Nestlé, the hedge fund's largest-ever initial bet on a public firm, as it pressures the company to speed growth. **A1**

◆ **Takata and its U.S. unit** filed for bankruptcy protection and announced a deal to sell operations as the firm replaces defective air bags. **B1**

◆ **A Fed move** to cut back on subjective parts of its bank "stress test" is likely to mean fewer failures. **B1**

◆ **Facebook is holding** talks and making deals in a bid to launch original TV-quality programming. **B1**

◆ **Italy said** it was prepared to spend as much as \$19 billion to shut down two regional banks. **B8**

◆ **Shell and Exxon** are pushing back at Dutch efforts to curb gas-field output amid an outcry over quakes. **B3**

◆ **AGIC is buying** drug-maker Ritedose, the first U.S. acquisition for the Hong Kong private-equity fund. **B3**

◆ **Google faces** government accusations that it underpays women and is resisting requests for salary data. **B4**

◆ **SpaceX successfully** launched two rockets within about 48 hours. **B3**

◆ **Mozambique can't** account for over \$1 billion raised for two state firms. **B8**

World-Wide

◆ **Senate GOP leaders** pushing for a health-care-bill vote this week faced objections from all corners of the party, especially over Medicaid and insurance regulations. **A1, A4**

◆ **Two botched attacks** in Europe signal that Islamist terror has entered a new phase that could spawn more "stray dog" assailants. **A1**

◆ **A Koch brothers network** laid out its budget goals for the 2018 midterms at a retreat for top donors. **A4**

◆ **Indian leader Modi** is set to meet with Trump, amid differences over immigration, trade and climate. **A5**

◆ **Nearly 100 people** were missing after a deadly landslide in southwest China, the area of a 2008 quake. **A16**

◆ **Chinese prosecutors** are seeking a prison term for an activist who has documented worker unrest. **A16**

◆ **Ohio state websites** were hacked by a group showing a pro-Islamic State message. **A2**

◆ **Two suspected militants** with possible Islamic State links attacked police in Indonesia, killing one officer. **A5**

◆ **The U.K. raised** to 60 the number of residential towers failing fire-safety checks. **A6**

◆ **A fuel-truck fire** in Pakistan killed at least 138 people and injured nearly 150. **A5**

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In Wake of Deadly Landslide in China, Scores of People Missing



ANGUISH: Relatives of the missing burn incense as they wait on rescue efforts after a landslide swept through the village of Xinmo in China. **A16**

U.S. Activist Targets Nestlé

Loeb's Third Point fund takes \$3.5 billion stake, calls for changes to boost share price

By SAABIRA CHAUDHURI

Billionaire activist investor Daniel Loeb's Third Point LLC hedge fund has taken its largest-ever initial bet on a public company, with a \$3.5 billion

stake in Nestlé SA, piling pressure on the world's largest packaged-foods company to find ways to accelerate growth.

The stake amounts to about 1.25% of Nestle's shares. That's a small investment for the European giant. But it's an unusually big bet for a U.S. activist fund in Europe, where American investors' sometimes aggressive approach has had mixed success.

Nestlé didn't respond to re-

quests for comment.

Third Point outlined an array of changes it believes the consumer-goods giant could make, including improving margins, innovating in its core business and selling noncore assets and its 23% stake in French cosmetics company L'Oréal SA.

"It is rare to find a business of Nestlé's quality with so many avenues for improvement,"

Third Point said in a letter to

investors on Sunday night.

"Despite having arguably the best positioned portfolio in the consumer packaged goods industry, Nestlé shares have significantly underperformed most of their U.S. and European consumer staples peers on a three year, five year, and ten year total shareholder return basis," it said.

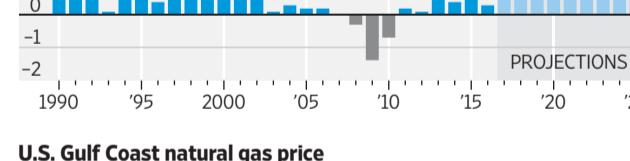
Third Point said Nestlé has fallen behind over the past

Please see NESTLE page A7

Low-Cost Supply

While natural gas prices remain at low levels, petrochemical companies have been pouring money into expanding production of ethylene, made from gas byproducts.

New U.S. ethylene capacity



U.S. Gulf Coast natural gas price



Source: PCI Wood Mackenzie

THE WALL STREET JOURNAL.

SHALE BOOM'S IMPACT IN ONE WORD: PLASTICS

Petrochemicals power U.S. manufacturing, exports

By CHRISTOPHER M. MATTHEWS

When new parents in Rio de Janeiro buy baby food in plastic containers, they are bringing home a little piece of the U.S. shale revolution.

That boom in drilling has expanded the output of oil and gas in the U.S. more than 57% in the past decade, lowering prices for the primary ingredients Dow Chemical Co. uses to make tiny plastic pellets. Some of the pellets are exported to Brazil, where they are reshaped into the plastic pouches filled with pureed fruits and vegetables.

Tons more will be shipping soon as Dow completes \$8 billion in new and expanded U.S. petrochemical facilities mostly along the Gulf of Mexico over the next year, part of the industry's largest transformation in a generation.

The scale of the sector's investment is staggering: \$185 billion in new U.S. petrochemical projects are in construction or planning, according to the American Chemistry Council. Last year, expenditures on chemical plants alone accounted for half of all capital investment

Please see SHALE page A8

BY JULIAN E. BARNES
AND NOEMIE BISSEERBE

BRUSSELS—Two botched attacks in Europe in recent days signal that Islamist terror has entered a new phase, security officials say, one that is more disorganized and less sophisticated but risks spawning a growing number of assailants keen to kill with any means at hand.

When an Islamic State sympathizer tried to set off a bomb Tuesday night at a train

station here, it failed to detonate with the intended force. Investigators suspect he used a faulty explosives recipe found online. The intended victims were able to flee, and the attacker was shot dead.

Last Monday, another would-be terrorist drove a sedan packed with guns, thousands of rounds of ammunition and two canisters of propane gas onto the Champs-Elysées in the heart of Paris. He rammed the lead vehicle of a police convoy, apparently in-

tent on an attack. Instead, police said, he died when he was overcome by fumes after the collision, and no one else was killed or injured.

The lack of training and know-how of this new breed of attacker means many fail. But their lack of direct connection to terror networks makes them hard for intelligence services to track, and their often Please see TERROR page A6

◆ Indonesian police station attacked..... A5

INSIDE



A WORKOUT'S NEW SPIN ON LOG ROLLING

LIFE & ARTS, A10



APPS TO TRACK CHRONIC DISEASES

JOURNAL REPORT, R1

It's 5 O'Clock Somewhere—Unless You've Been Bought by Wal-Mart

* * *

Retail giant spent \$3.3 billion for Jet.com, then had to cope with its happy hour

By SARAH NASSAUER
AND BRIAN BASKIN

HOBOKEN, N.J.—Soon after Wal-Mart Stores Inc. bought Jet.com Inc., employees at the e-commerce startup learned how dry life under the retail behemoth could be.

That's because Wal-Mart took away all the office booze.

Last September, a few weeks after the \$3.3 billion acquisition, staffers gathered in Jet's purple-themed headquarters, with sweeping views of Manhattan, to hear the rumors confirmed: Wal-Mart doesn't allow office drinking.

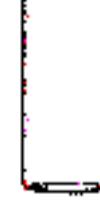
The startup's regular Thursday evening happy hour would have to be moved out of the office to the Wicked Wolf Tavern.

ern and other local bars. Casual deskside drinking had to go.

"People were not thrilled," says Liza Lansman, a Jet executive who in 2015 helped launch the website, which sells everything from detergent to designer purses, and is now president.

Jet employees were accustomed to the perks and quirks of a startup that raised more than \$500 million from investors. They had the requisite pool table, cold-brew coffee on tap and conference rooms named after comic-book locations.

While those things stayed, an array of liquor in an office kitchen cupboard marked Please see BOOZE page A8



U.S. NEWS

THE OUTLOOK | By Richard Rubin

A \$1.5 Trillion Tax Change Flies Under the Radar

Republicans looking to rewrite the U.S. tax code are taking aim at one of the foundations of modern finance—the deduction that companies get for interest they pay on debt.

That deduction affects everyone from titans of Wall Street who load up on junk bonds to pay for multibillion-dollar corporate takeovers to wheat farmers in the Midwest looking to make ends meet before harvest. Yet a House Republican proposal to eliminate the deduction has gotten relatively little sustained public attention or lobbying pressure.

Thanks in part to the deduction, the U.S. financial system is heavily oriented toward debt, which because of the tax code is often cheaper than equity financing—such as sales of stock. It also is widely accessible. In 2015, U.S. businesses paid in all \$1.3 trillion in gross interest, according to Commerce Department data, equal in magnitude to the total economic output of Australia.

Getting rid of the deduction for net interest expense, as House Republicans propose, would alter finance. It also would generate about \$1.5 trillion in revenue for

the government over a decade, according to the Tax Foundation, a conservative-leaning think tank.

The plan would raise money to help offset Republicans' corporate tax cuts and reduce a "huge bias" toward debt financing, said Robert Pozen, a senior lecturer at MIT's Sloan School of Management. That bias, he said, hurts companies built around innovation, which tend to not have the physical assets that banks usually require as collateral.

"What we're proposing is to take the tax preference from the source of funds—borrowing—and take that preference to the use of funds—business investment and buildings, equipment, software, technology," Rep. Kevin Brady (R., Texas), the author of the plan, said at The Wall Street Journal CFO network conference this month.

In a world with no interest deduction, debt-fueled leveraged buyouts by private-equity titans could become more expensive to finance and junk bonds less appealing.

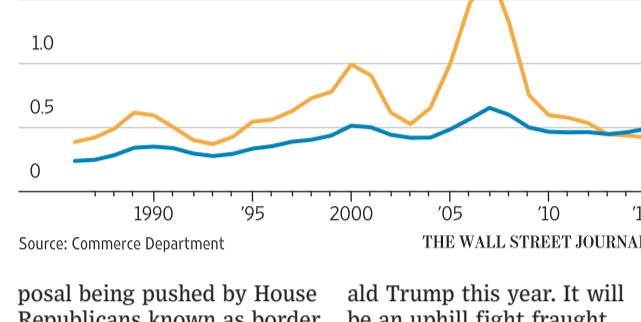
The dollar size of repealing the net-interest-expense deduction is even larger than another controversial pro-

Debt Booster

The ability to deduct interest can give companies an incentive to borrow and may have contributed to debt-fueled investment booms in 2000 and 2007. Amount of interest paid annually by sector:

■ Nonfinancial corporations ■ Financial corporations

\$2.0 trillion



Source: Commerce Department

posal being pushed by House Republicans known as border adjustment, which would tax imports and exempt exports. The border adjustment plan has been under attack from retailers and Republican senators, whose resistance has put it on the brink of failure.

But the idea of eliminating or limiting the interest deduction has generated less vocal opposition, giving it a real chance of passage, perhaps in a scaled-back form.

Republicans are aiming to agree on a framework for tax policy by September and send a bill to President Donald Trump this year. It will be an uphill fight fraught with intraparty political divides, and companies who want to keep the interest deduction will have plenty of clout.

For some debt-reliant businesses, the interest deduction's demise could be a blow. Crop growers who depend on bridge loans to work through seasonal business fluctuations could face higher tax bills.

Andy Hill, who farms corn and soybeans on about 600 acres in north-central Iowa, said he pays less than

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Andy Hill, who farms corn and soybeans on about 600 acres in north-central Iowa, said he pays less than

\$10,000 a year in interest on a line of credit between \$100,000 and \$200,000. That loan helps him bridge gaps between his expenses and his income, between when he needs to buy seed and fertilizer and when he sells his crops.

"[Losing the ability to deduct interest] wouldn't put me in the red by any stretch of the imagination, but it makes it very debilitating as far as household income," said Mr. Hill.

Midsized businesses may also get squeezed.

"The people that utilize debt, they utilize it because they don't have the cash and they don't have the access to equity," said Robert Moskowitz, chief financial officer of Leaf Commercial Capital, which finances businesses' purchases of items like copiers and telephone systems.

"A dry cleaner in Des Moines, Iowa? Where is he going to get equity? He can't do an IPO."

The idea behind the Republican plan is to pair the elimination of this deduction with immediate deductions for investments in equipment and other long-lived assets.

The tax code treats equity financing more harshly than

debt. While interest is deductible, dividend payments typically aren't. Corporate profits can thus be subject to two layers of tax—once at the business level and then when they go to shareholders in the form of dividends.

That means the effective marginal tax rate on equity-financed corporate investments is 34.5%, according to a report released by the Treasury Department in the waning days of the Obama administration. The corresponding rate for debt-financed investment is negative 5%. That subsidy for corporate debt "potentially creates a large tax-induced distortion in business decision making," it says.

Andrea Auerbach, head of global private investment research at Cambridge Associates, which advises institutions that invest in private equity, said the industry would survive a tax overhaul that removes the interest deduction.

"The effects will reverberate for sure," especially among larger firms that rely more on debt, she said. "But debt is still going to be cheaper than equity, so I don't think it's going away."

—Sam Goldfarb contributed to this article.

Breaches in Kings River Levees Flood Parts of Central California



WATER DAMAGE: The Kings River Golf and Country Club in Kingsburg, Calif., was among the properties inundated when barriers on the Kings River failed. Authorities said 90 homes were under evacuation orders following the breaches in the central part of the state.

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U.S. WATCH

OHIO

State Websites Are Targeted by Hackers

Ohio Gov. John Kasich's website and nine other state-government sites were hacked Sunday by a group displaying a pro-Islamic State message.

At one point Sunday, the Republican governor's official website and other Ohio sites showed a message that said, "You will be held accountable Trump, you and all your people for every drop of blood flowing in Muslim countries."

The message, on an all-black background, also said, "I Love Islamic State" and above it said "Hacked by Team System Dz."

Tom Hoyt, a spokesman for the Ohio Department of Administrative Services, said a total of 10 sites were hacked. He couldn't confirm which group was responsible for the hacking but said the state is working with law enforcement to understand what happened.

Brookhaven, N.Y., a town on Long Island, also had its public website hacked Sunday. And the website for Howard County, Md., appeared to be targeted by the same attack, before officials took it down Sunday, a spokesman for the county said.

Ed Romaine, town supervisor in Brookhaven, said that hackers had effectively added a page to the town's website with the same message used on Ohio's sites.

ARKANSAS

Inmate Is Recaptured After 32 Years on Run

An Arkansas prison escapee who had been on the run for more than three decades has been recaptured.

The state Department of Corrections said 60-year-old Steven Dishman was arrested Sunday in Springdale by local law-enforcement and state troopers.

Details of what led authorities to Mr. Dishman and his arrest weren't immediately released. The department said Mr. Dishman was serving a seven-year sentence for theft and burglary convictions in Washington County when he escaped on May 28, 1985.

—Associated Press

NORTH CAROLINA

Missing Teen Found Alive a Year Later

The Federal Bureau of Investigation said a North Carolina teenager who went missing more than a year ago has been found alive in Georgia, and a 31-year-old man faces charges.

FBI spokeswoman Shelley Lynch said Sunday the 17-year-old girl has been reunited with her parents after being found overnight at a home in Duluth.

Agents arrested Michael Wysolovski on charges that include sex offenses. It is unknown if he has a lawyer.

—Associated Press

ECONOMIC CALENDAR

This week, inflation figures are due from Europe and the U.S., including the Federal Reserve's preferred price gauge. The head of the Fed will speak in London, and Brazil's Senate likely will hold a final vote on a contentious bill to overhaul its labor law.

MONDAY: The U.S. Commerce Department releases the **durable-goods** report for May. Demand for long-lasting factory goods fell in April, hinting at potential speed bumps for the manufacturing sector.

Economists will be watching for an indication of whether last month's report was a blip in the data. Economists surveyed by The Wall Street Journal forecast durable-goods orders fell 0.4% in May.

TUESDAY: Federal Reserve Chairwoman Janet Yellen will speak in London on global economic issues in a moderated question-and-answer session with the audience.

As the Fed considers the timing of another interest-rate increase and the start of its plan to wind down its asset holdings, economists expect Ms. Yellen to stress the Fed will base its decisions on incoming economic data.

WEDNESDAY: Brazil's Senate is likely to hold on Wednesday or Thursday a final vote on a bill that would loosen the country's mazelike labor law, which has been a deterrent for investment.

The bill has been under debate for months, and markets rallied as it advanced through

the lower house earlier this year.

But corruption allegations against the proposal's main supporter, **President Michel Temer**, who denies wrongdoing, have fanned opposition, making its approval more complicated.

FRIDAY: Inflation figures from around the eurozone will be in focus throughout the week, culminating Friday in the release of numbers for the currency area as a whole. Economists estimate the annual pace of price rises during June eased in Italy, Spain, France and Germany.

For the eurozone, the annual rate of inflation is expected to drop to 1.2%, from 1.4% in May. That would be the smallest rise in 2017, and likely reinforce the European Central Bank's reluctance to dial down its stimulus measures, despite signs of a continuing pickup in economic growth.

The U.S. Commerce Department releases data on personal income and outlays for May. The Fed will watch this report to see whether its preferred inflation gauge, the **price index for personal-consumption expenditures**, shows signs of firming after several inflation measures have signaled softness recently.

Economists surveyed by the WSJ expect **personal income** grew 0.3% last month.

Spending growth is seen coming in lighter than income, with a 0.1% increase projected, likely due to a soft retail sales report for May.

CORRECTIONS & AMPLIFICATIONS

The first name of Kirk Douglas's mother is Bryna. A photo caption with a House Call article about Mr. Douglas in Friday's Mansion section misspelled it as Byrnia.

Rebecca Richards-Kortum is a professor in Rice University's bioengineering department, and her husband, Philip Kortum, is a professor of psychology at Rice. A Weekend Confidential profile of Dr. Richards-Kortum in Saturday's Review section incorrectly

said that she heads the bioengineering department and that her husband is a biomedical engineering professor.

A photo with a Finance & Markets article on Saturday about the auction that helps set the national price of cheese was taken in Plymouth, Wis., where the auction began. The caption incorrectly identified the location of the photo as Green Bay and incorrectly said that was where the auction began.

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—Kris Maher

U.S. NEWS

Colleges Pledge Support for Discourse

Schools reassess free-speech approach; elite institutions ranked by diversity of opinions

BY DOUGLAS BELKIN

A string of protests on college campuses that shut down events hosting conservative speakers has prompted universities around the country to pledge more tolerance for diverse opinions, but skeptics say they will believe it when they see it.

Johns Hopkins University on Thursday announced a \$150 million effort to "facilitate the restoration of open and inclusive discourse."

The University of California, Berkeley, where protesters halted speeches by Milo Yiannopoulos and Ann Coulter, is debating bringing in conservative faculty to broaden the spectrum of political discourse on campus.

About a dozen schools have signed on to a new doctrine from the University of Chicago that puts free speech above concerns about political correctness.

"I think there's a lot of embarrassment on campuses, so some kind of statement from the top might have good-sounding words but actions speak louder than words," said Jack Citrin, a professor of political science at Berkeley.

Dr. Citrin is a member of the Heterodox Academy, a consortium of about 900 academics that aims to broaden the diversity of opinions on campus. The group has released its second university rankings, which aim to measure just how well the nation's most elite schools are faring in that regard.



Protesters near the University of California, Berkeley campus argued in April over a planned speech by a conservative commentator.

from the University of California system urging faculty "not to criticize affirmative action or to refer to America as a melting pot."

A Berkeley spokesman said a misperception has taken root about the school's tolerance for conservative viewpoints. "We would resist the notion that this campus has been anything other than welcoming to speakers from across the political spectrum," spokesman Dan Mogulof said.

The Heterodox Academy put Yale University 97th out of 106. The ranking noted for the resignation of professors over an email. One of those professors was Nicholas Christakis, who was condemned by a group of students in 2015 after he and his wife—who were then faculty-in-residence at one of Yale's undergraduate colleges—sent an email telling students it was up to them, and not administrators, to decide what Halloween costumes they wanted to wear. Dr. Christakis is now a member of the Heterodox Academy.

Karen N. Peart, director of external communications at Yale, said, "Yale's commitment to free expression is unsurpassed in higher education."

The top-ranked school is the University of Chicago. Provost Daniel Diermeier said the ideal of viewpoint diversity is central to the university's mission.

"We believe that the best education we can provide students to prepare them for the world is to hear diverse points of view even if they feel uncomfortable," Dr. Diermeier said. "We want to provide them with the tools to find counterarguments."

The organization says its members come from across the political spectrum. The largest group—25%—consider themselves moderates, according to a member poll posted on its website.

Harvard University was 103rd out of 106 schools in the ranking. Heterodox, which weighs schools' regulations as well as the ratings of other first-amendment groups, cited Harvard's history of censoring outside speakers, a blacklist on private clubs and a laminated "social justice" place mat handed out to students before winter break in 2015.

The aim of the place mat was to help students prepare "for holiday discussions on race and justice with loved ones."

Striking the balance between protecting both students and the First Amendment isn't easy, said Ari Cohn, a director at the Foundation for Individual Rights in Education.

Harvard rescinded admission offers for at least 10 incoming freshmen after they discovered the students had posted offensive messages in a private Facebook chat. "That's rank hypocrisy," Mr. Cohn said. "And sort of ridiculous."

A Harvard spokeswoman declined to comment on the ranking. She cited a section of Harvard's admission policy stating an offer can be rescinded if a student "engages or has engaged in behavior that brings into question their honesty, maturity or moral character."

The new initiative at Johns Hopkins, an institute funded by the Stavros Niarchos Foundation, aims to "examine the dynamics of societal, cultural and political polarization and develop ways to improve decision-making and civic discourse," according to a statement.

ment. The Stavros Niarchos Foundation is a philanthropic organization created to honor the Greek shipping magnate.

Heterodox ranks Johns Hopkins 60 out 106 and cites a study finding that among 40 leading U.S. universities, the Baltimore school's faculty was among the least diverse in terms of voter registration.

A spokesman for the school declined to comment.

The Heterodox ranking lists Berkeley as 105 out of 106 schools, citing the protests that stopped Mr. Yiannopoulos and Ms. Coulter from speaking as well as a massive

Plastic Bag Bans Are Facing Backlash

BY KRIS MAHER

Business groups are fighting back against plastic-bag bans across the country, setting up collisions between manufacturers, environmentalists and lawmakers.

A decade after San Francisco became the first major U.S. city to ban plastic shopping bags, dozens of municipalities have followed suit. Others like New York and Washington, D.C., have added fees for using some bags.

Recently, more states with backing from plastic-bag manufacturers and other business groups have pushed back with bills preventing such bans. In May, Minnesota Gov. Mark Dayton, a Democrat, signed a bill to prevent cities from banning plastic, paper or reusable bags. The move killed a plastic-bag ban in Minneapolis passed last year. At least five states have similar laws that prevent such bans.

In Pennsylvania, the Republican-led House and Senate passed a measure that would prevent bans on plastic bags statewide.

Officials from at least four major cities in the state, including Philadelphia and Pittsburgh, said they opposed the bill. Gov. Tom Wolf, a Democrat, said he would veto the bill, saying cities should be able to make decisions "in the best interests of their constituents."

But supporters said the bill would preserve 1,500 jobs at 14 facilities in the state that make or recycle plastic bags.

"You have manufacturing jobs that are at issue," said Rep. Frank Farry, a Republican from Bucks County who sponsored the bill. "If that factory closes up, it affects the diner, the school system."

While no city in Pennsylvania has enacted a ban on plastic bags, the idea has been proposed in the past in Philadelphia. Mr. Farry said the bill would pre-empt such laws.

Environmental groups meanwhile continue to push for ways to reduce plastic bags and other consumer plastics, which have been found in ever greater quantities in the oceans and other water systems.

Southwest Heat Tests Firefighters' Mettle

BY COVEY E. SON

LOS ANGELES—Record-breaking temperatures across the Southwest are turning up the heat for firefighters, hampering their efforts and presenting a new layer of danger for workers on the fire lines.

Around 200 miles east of Phoenix, where temperatures ranged from 112 to 119 degrees Fahrenheit in the past week, more than 800 firefighters fought the 21,000-acre Frye Fire descending Mount Graham.

Crews working the fire line can only work up to 30 minutes to an hour at a time before they are forced to retreat to cool off, said Brian Oliver, a safety officer for an interagency coalition at Mount Graham.

If they don't take frequent breaks, crew members risk heat exhaustion or heat stroke. Those conditions can have a mortality rate of 80% for those who aren't treated immediately, Mr. Oliver said.

"Even walking is difficult," Mr. Oliver said. "They're wearing protective equipment that sometimes does not breathe well and usually 50 pounds of gear....Once you put that gear on, you start sweating more as the temperature rises. You get uncomfortable. Then you exert yourself doing arduous labor. It's an oppressive heat, honestly."

Mr. Oliver said the Mount Graham site has seen highs of



The Frye Fire burned Thursday at the western edge of the Pinalejo Mountains in the Coronado National Forest near Willcox, Ariz.

at least 110 degrees every day for the past week.

"As soon as you get off the truck you start sweating," he said.

Mr. Oliver said that if the body reaches 100 degrees and cannot cool down, it can no longer dispel the heat, and bodily functions begin to shut down.

In Utah, a fire started June 17 has grown to more than 27,000 acres, destroying 13 homes. The burned homes were among the 400 homes near the ski town of Brian Head, which was evacuated on Thursday, ac-

cording to state officials.

There have been no reported injuries.

In Arizona, there were 15 active wildfires as of Friday morning, each of which had burned about 1,000 acres or more, according to federal fire-tracking data.

Arizona Gov. Doug Ducey on Friday declared a state of emergency as wildfires continue to spread in the high temperatures, and authorized \$200,000 in emergency funds.

New Mexico has reported 11 wildfires, the largest of which burned 17,000 acres so far. And

Nevada has reported seven wildfires, the largest of which burned more than 15,000 acres.

California already has seen 1,800 fires that burned nearly 20,000 acres since Jan. 1, about three times as much acreage burned compared with the same time last year.

Parts of the state got a reprieve from extreme temperatures Friday after hitting triple digits earlier in the week.

California's wet winter boosted plant growth, which is now fueling many of the grass fires across the state, said Scott McLean, spokesman for Cal

Fire, the state's largest fire authority.

Temperatures were still higher than normal in some areas, presenting a challenge to firefighters.

More than 1,200 firefighters are battling a 1,500-acre blaze near Big Bear Lake, Calif., where temperatures Friday were expected to hit a high of 83.

The temperature becomes much higher for workers along the fire line trying to contain the flames by digging fuel such as grass and brush out of the ground, he said.

Gay Pride Movement Confronts Disputes Over Agenda

BY IAN LOVETT

Gay pride parades in cities across the country have become showcases of the growing acceptance gay and transgender people enjoy.

Delta Air Lines Inc. and Diet Coke sponsored NYC Pride, which took place this weekend—corporate support that would have been unthinkable when the first gay-pride march was held in 1970. Same-sex couples show off wedding rings. Gay members of the military openly kiss their partners.

Now gay pride events across the country have become the stage for a battle over what the gay-pride movement's priorities should be. The outcome of these conflicts could help set the agenda for a movement that has had significant impact on the nation's politics and culture.

The movement's two biggest political goals of the last 20 years—the legalization of same-sex marriage and the right for gays and lesbians to serve openly in the military—have been achieved, leaving an opening at the top of the docket. Activists are now fighting about what events such as LGBT-pride marches should stand for, and who should have a say in that decision.

In one city after another, pride parades have been disrupted by gay and transgender activists who say the needs of many in the community—especially LGBT people who are racial minorities—have been sidelined.

In Washington, D.C., the parade was rerouted because protesters took over the street, denounced the corporate influence on the event

and demanded more representation for people of color on the Pride board of directors.

Protesters with similar demands disrupted the pride parade in Boston and staged a counter-parade in Pittsburgh. At Columbus Pride in Ohio, the parade turned violent: Four protesters were arrested, and four police officers were injured.

"These tensions have been simmering for years," said Andrea Bowen, a transgender activist. "We're simply seeing them come to the fore because we've had these rising expectations, and now we're in this period of drought."

Despite recent political successes, some LGBT people believe pride has strayed from its original purpose: A protest on the first anniversary of the Stonewall Inn riots in New York City, considered the be-

ginning of the nation's gay rights movement.

Martin Duberman, a gay historian, said the early marches were "entirely political," but the events have become increasingly corporate and commercial. "I'd like to see them turn the whole national movement around," he said, "and start paying attention to a host of issues that have been sublimated under the guise of winning acceptance."

Protesters say they are aiming to do just that. At Capitol Pride in Washington, demonstrators' demands included an end to corporate partnerships with big banks and defense contractors and a ban on uniformed law-enforcement officers marching in the parade.

Jen Deerinwater, a member of the Cherokee Nation of Oklahoma and one of the pro-

test organizers, said Capitol Pride should be working on an array of progressive causes—from Native American sovereignty to police violence in black communities—that affect nonwhite LGBT people.

Longtime activists, however, said the protests ignored the progress that had been made and the growing focus many LGBT groups have put on transgender issues.

Cathy Renna, a spokeswoman for Capitol Pride, said she didn't think Pride was the right place to stake out policy positions: It was designed to be a place where all LGBT people, including gay Republicans and police officers, are welcome. Gay pride events—which in some cities cost north of \$1 million—are now impossible without corporate sponsorships.

U.S. NEWS

Health Debate to Play Big Role in 2018

Vulnerable Democratic senators likely to face Republicans who voted for House bill

BY KRISTINA PETERSON

WASHINGTON—This week's expected Senate vote on the GOP health-care bill will showcase a sharp partisan divide on the issue in states where Democrats are poised to play defense in next year's midterm elections.

All Senate Democrats are expected this week to oppose Republican legislation that would dismantle and replace much of the Affordable Care Act. Many of their potential challengers in next year's elec-

tions are House Republicans, who supported a similar bill when it passed their chamber in May.

The 10 Senate Democrats up for re-election next year in states won by President Donald Trump comprise much of the shrinking pool of centrist Democrats who are willing to cross the aisle on high-profile votes. The group includes Heidi Heitkamp of North Dakota, Joe Manchin of West Virginia, Bob Casey of Pennsylvania, Claire McCaskill of Missouri and Joe Donnelly of Indiana.

Some of these red-state Democratic senators voted to confirm some of Mr. Trump's most contentious cabinet nominees and his conservative pick for the Supreme Court.

They also have broken rank on energy policy and gun-control legislation.

Although many of these Democratic senators have been critical of the ACA, none has endorsed the GOP's approach to dismantling it.

The partisan split forced by the health-care votes presents a clear political test in these battleground states: Will the ACA's enduring unpopularity, especially among conservatives, boost those who voted to overhaul it?

Or will recently rising support for the ACA, and the public's skepticism of the GOP alternative, help those who sought to block Republicans' efforts?

It may come down to which health plan voters dislike

more. Candidates on each side appear to be spending more time disparaging the other party's bill than praising their own.

"Based on my initial review, the health-care bill released by Republican leadership appears to be as bad of a deal for West Virginia as the House bill," Mr. Manchin said last week. "This bill makes things worse, not better."

Their stance may in part reflect that the ACA was already a more centrist law than the single-payer government-run system that more-liberal Democrats had hoped to pass, said Gabriel Horwitz, vice president for the economic program at Third Way, a centrist Democratic think tank.

"Its bones are moderate.

It's all about a private-sector solution," Mr. Horwitz said of the ACA. "If you're a red-state Democratic member, you're saying, 'I support a moderate piece of legislation.'"

In the most recent Wall Street Journal/NBC News poll, 16% of respondents said the House-passed version of the bill was a good idea.

The 2010 health-care law, often referred to as Obamacare, was viewed as a good idea by 41% of the 900 adults polled.

The gap is likely more narrow in red states, however, where Republican leaders dispute the notion that the ACA is "moderate" and have spent years campaigning on their pledge to roll it back.

Republicans hold a 52-48

advantage in the Senate, and the party that controls the White House often suffers in midterm elections.

However, far more Democrats than Republicans are in precarious seats in 2018, and how the health debate plays out in those states could be pivotal to the outcome of the contest for the Senate.

The House bill was backed by possible Senate challengers Reps. Todd Rokita and Luke Messer of Indiana, Ann Wagner and Vicki Hartzler of Missouri, Mike Kelly and Lou Barletta of Pennsylvania, Kevin Cramer of North Dakota and Fred Upton of Michigan.

GOP Rep. Evan Jenkins of West Virginia already has said he would challenge Mr. Manchin next year.

Donors Set Out Political Agenda

BY BYRON TAU

more than 30 years.

Officials with the network anticipate the 2018 election cycle budget would be the "largest we've ever had." The Kochs' donor network typically attracts conservatives with a libertarian bent interested in issues like lesser regulation and smaller government.

The event's organizers allowed more than a dozen reporters from national and local outlets to attend the closed seminar on condition they not identify the donors at the event without their consent. The Wall Street Journal agreed to the arrangement.

Charles Koch, along with his brother David, have emerged as major power players in Republican politics, donating and raising millions for conservative candidates and causes typically raised and spent through a network of non-profit organizations. The two men made their fortune in the energy sector, running the privately held company Koch Industries.

The two donors have had a rocky relationship with President Donald Trump. They were publicly critical of him during the 2016 election, and their donor network largely stayed on the sidelines of the general election campaign between Mr. Trump and his Democratic rival Hillary Clinton.

But there are also signs that the Kochs and the Trump administration are prepared to work together on some issues. Vice President Mike Pence met with Charles Koch and other network officials on Friday. Mr. Pence was in Colorado Springs for a fundraising held at the same resort.

Beyond health care, the network identified several areas of cooperation with the Trump administration and the GOP-controlled Congress, including federal court appointments, a tax overhaul, reducing regulations, issues around school choice and veteran's affairs.

A major area of disagreement with the Trump administration comes in the criminal-justice space, where Mr. Trump's Justice Department has been pushing tougher sentencing laws and a crackdown on marijuana. The Kochs have been pushing for an overhaul of sentencing, especially for nonviolent offenders.



Senate Majority Leader Mitch McConnell, shown Thursday, has said he wants a vote on the legislation before the July 4 recess.

HEALTH

Continued from Page One

retention of requirements for insurers to cover patients at the same price regardless of their medical history and with set benefit packages. Those provisions have created new consumer protections but also have driven up premiums for younger, healthier people in particular, which the senators have cited as a primary concern.

"It's going to be a challenge," Sen. Pat Toomey (R., Pa.) said Sunday on CBS, about ameliorating centrists' concerns over the Medicaid changes in the bill. Of the insurance regulations, he acknowledged, "Some of my conservative friends...are concerned that the bill doesn't go far enough."

The Congressional Budget Office is expected to produce a formal estimate Monday of the existing legislation's effects. The GOP could then hold a procedural vote Tuesday or Wednesday, and a final vote later in the week. If the negotiating process is drawn out and requires new, complex changes, the timetable would likely shift.

Senate Majority Leader Mitch McConnell (R., Ky.) has said he wants to see a vote on the legislation's passage

late Thursday or early Friday, before Congress's July 4 recess. If he is successful in garnering at least 50 votes, with Vice President Mike Pence breaking a tie, the House could then take up the Senate legislation, or the two chambers could try to reach a compromise. The House passed its own health bill last month.

If the effort fails, it would

The CBO is expected to offer an estimate Monday of the legislation's effects.

plunge the party's seven-year campaign promise to repeal the ACA into uncertainty and potentially put lawmakers at odds with a president, Donald Trump, who is anxious for a major legislative win.

By late Sunday, it was clear that enough Republican senators had publicly put their votes in play to require more negotiations.

Sen. Luther Strange of Alabama said Sunday on Fox News that he is "not there yet" in supporting the plan, adding that he was "very strongly optimistic" that the bill could be passed.

Meanwhile, Democrats and

backers of the legislation they

consider the core achievement of former President Barack Obama were trying to sway more centrist Republicans from the new legislation.

Republicans "have, at best, a 50-50 chance of passing this bill," Democratic Senate leader Chuck Schumer of New York said Sunday on ABC.

Medicaid in particular is a tricky issue because GOP-controlled states split almost down the middle over whether to expand eligibility for the program—to millions of low-income, childless adults for the first time—using federal funding under the ACA. Concerns about cuts to Medicaid prompted Nevada Republican Dean Heller to say Friday he couldn't support the bill.

Their demands are pitted against those of GOP-led states that opted not to expand, citing fiscal concerns.

Of the conservative senators upset about the GOP bill's retention of insurance regulations, at least one, Rand Paul of Kentucky, is already seen as an unreliable vote even if he is mollified. Another, Ron Johnson of Wisconsin, signaled Sunday that he wanted more time to find a solution.

"What I'd like to do is slow the process down, get the information, go through the problem solving process, actually reduce these premiums that have been artificially driven up because of Obama-

care mandates," he said on NBC.

Some centrist Republicans also remain wild cards for a variety of reasons.

Susan Collins of Maine, who had previously expressed worries about the bill's cuts to Medicaid, said Sunday it would be difficult to see a bill emerging that she could support.

"I'm very concerned about the cost of insurance for older people with serious chronic illnesses, and the impact of the Medicaid cuts on our state governments," Ms. Collins said on ABC.

Mr. Heller's bind in Nevada is a particular example of the multiple forces at work on senators: Late Friday, the America First Policies nonprofit, launched by Trump allies to bolster the president's agenda, said it would launch a seven-figure ad campaign against him. Mr. Heller is up for reelection in 2018.

The health-care bill wouldn't necessarily be derailed if Mr. McConnell barks at a vote ahead of the recess, GOP strategists inside and outside of the administration have said.

"I think August is the drop-dead line, about Aug. 1," said Sen. John Cornyn of Texas, speaking to reporters in Colorado at a retreat hosted by GOP megadonor Charles Koch.

Kristina Peterson, Byron Tau and Rachel Witkowski contributed to this article.

Top GOP Leaders Join Gathering

The weekend gathering of donors at the historic Broadmoor hotel and resort in Colorado Springs, Colo., drew a number of well-known Republican elected officials, including Texas Gov. Greg Abbott, Kentucky Gov. Matt Bevin, Senators Ted Cruz and John Cornyn of Texas, Ben Sasse of Nebraska and Utah's Mike Lee, among others.

One of the key topics of discussion at the event was the Senate's health-care bill, which GOP leaders are hoping to vote on this week.

The bill aims to roll back large parts of the Affordable Care Act, including a large cut to the Medicaid program that was expanded under the 2010 law.

—Byron Tau

Hospital Industry Split on State Payments in Senate Bill

BY MELANIE EVANS

As health-care companies parse Senate Republicans' bill to undo the Affordable Care Act, a rift is emerging in the hospital industry over a provision that would award additional funds in states that didn't expand Medicaid.

The split centers around cuts the Affordable Care Act made to Medicaid subsidies known as "disproportionate share" payments, for hospitals that care for a large share of uninsured patients. Hospitals wouldn't need the subsidies as more Americans gained insurance coverage, ACA policy makers believed.

The cuts under the existing law, which take effect in 2018, total \$43 billion through 2025.

As the Obamacare repeal took shape, hospitals raced to lobby Congress to have the

funds restored, urging Republicans to give the money back should repeal roll back coverage gains.

The Senate health bill would give hospitals the money back—but not in states that expanded Medicaid.

If the Senate health bill becomes law, hospitals in expansion states would likely see rising numbers of uninsured patients, and they would still face disproportionate share cuts. In New York, those cuts would total \$6.3 billion between 2018 and 2025, according to the Greater New York Hospital Association.

Some hospitals in states that expanded Medicaid have cried foul. The Senate health bill "targets" expansion states for additional cuts, said C. Duane Dauner, president and chief executive of the California Hospital Association. "The

SAMMY JO HESTER/DAILY HERALD ASSOCIATED PRESS



The hospital industry is split over a part of the Senate bill that would send more money to states that didn't expand Medicaid.

impact on California will be severe," he said.

But in Texas, which didn't expand Medicaid, Senate provisions would "provide equity," said Ted Shaw, president and CEO of the Texas Hospital

Association.

The Affordable Care Act offered states federal funding to expand Medicaid, which the Senate bill would continue through 2024, he said. The House GOP bill would end the

extra Medicaid funds in 2020.

Texas and other non-expansion states don't receive that enhanced funding, he said. "That's not equitable." The District of Columbia and 31 states accepted the funds, while 19 chose not to.

States and the federal government jointly finance Medicaid, with states covering up to 50% of the cost. The ACA offered to pay 100% of the cost for those newly insured under expansion, with the federal share gradually falling to 90%.

In addition to restoring the Medicaid disproportionate share payments to non-expansion states, the Senate bill would increase the payments between 2020 and 2024 under a formula to address states with lower-than-average amounts.

"I know there's some intent there to provide equity," Mr.

Shaw said.

Non-expansion states would benefit from other provisions in the Senate GOP health bill.

In those states, a swath of low-income people make too little to qualify for the ACA's subsidies to buy private insurance, and are also not benefiting from Medicaid expansion.

The Senate bill would extend eligibility for premium subsidies to about 2.6 million more adults with income below the federal poverty line, according to estimates from the Kaiser Family Foundation.

But the Senate bill also eliminates subsidies to help offset deductibles starting in 2020, which could reach \$6,000 to \$7,000, said Gary Claxton, a vice president at the foundation.

High deductibles may dissuade some from buying plans, he said.

WORLD NEWS

Modi, Trump Seek to Redefine Relations

Differences on trade, immigration and climate loom over Monday's discussions

When Indian Prime Minister Narendra Modi visits the White House on Monday for his first meeting with President Donald Trump, a principle that has long underpinned relations will be at stake: that supporting the growth of a strong India is in America's national interest.

By Niharika Mandhana
in New Delhi, and
Michael C. Bender
and William Mauldin
in Washington

Mr. Trump will use the talks to "really expand his knowledge base about India and understand the importance of the Indian relationship," a senior White House official said. The Trump administration, the official said, will "roll out the red carpet" for Mr. Modi, setting an upbeat tone for the meeting.

But differences over immigration, trade and climate—topics that animated Mr. Trump's "America First" slogan—have the potential to strain relations that have been prone to rough patches. If Mr. Trump takes a more transactional stance than his predecessors, ties could hinge on India's ability to create American jobs or contribute more to maritime security.

Since the final years of Bill Clinton's presidency, U.S. leaders have chipped away at the history of distrust with India, which leaned toward the Soviet Union during the Cold War. President George W. Bush broke down barriers by championing a 2008 landmark nu-



Indian Prime Minister Narendra Modi waved as he arrived in Washington, D.C., last June before addressing the U.S. Congress.

clear agreement with New Delhi. President Barack Obama called the U.S.-India relationship "one of the defining partnerships of the 21st century" and strategic and defense cooperation between the countries grew under him, fueled by a shared wariness of China.

Mr. Trump, in a post-inauguration phone call with Mr. Modi in January, called India a "true friend," the White House said at the time. He sees India as a critical partner for stability in the Asia-Pacific region, which is being reshaped by China's rise, and for economic growth, the White House official said.

Indian officials said the meeting would be an opportunity for the leaders to get to

know each other. Both have promised economic programs rooted in increasing manufacturing in their countries, and have ridden waves of nationalistic sentiment to shake up politics at home.

As a presidential candidate, Mr. Trump assailed the skilled-worker visa program used by hundreds of thousands of Indians employed in the U.S. In office, he has ordered a review, saying the so-called H-1B visas should only be granted to the "most-skilled and the highest-paid" applicants to avoid crowding out American workers.

Indian Foreign Secretary Subrahmanyam Jaishankar in March said H-1B visas help the

U.S. economy's competitiveness and that India had conveyed its views on the subject to the Trump administration.

The White House official said there was no plan to discuss the visas during Mr. Modi's visit, but that issues relating to climate change may arise. Mr. Modi backs the Paris climate agreement from which Mr. Trump is withdrawing. This month, Mr. Trump said India made its participation in the deal contingent on receiving billions of dollars from developed nations, something New Delhi refuted.

U.S. Trade Representative Robert Lighthizer said last Wednesday that officials were working with Indian counter-

parts to address U.S. concerns about India's intellectual-property standards and barriers to foreign direct investment.

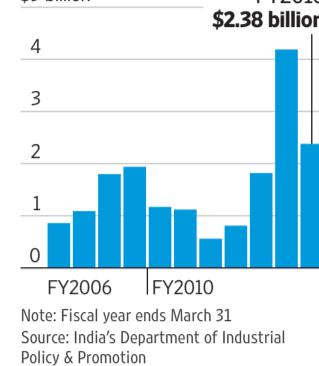
Monday's talks will have a particular focus on regional security and defense collaboration, Indian officials said. These were engines of growth under Mr. Obama as New Delhi emerged as a leading buyer of U.S. arms, and China began altering the balance of power in Asia. Although India remains opposed to a formal security alliance with the U.S., Mr. Modi, who built a personal rapport with Mr. Obama, embraced Washington more than Indian leaders before him.

—Paul Sonne in Washington contributed to this article.

Land of Opportunity

The U.S. accounted for 5.5% of foreign direct investment last year in India.

U.S. FDI in India



Note: Fiscal year ends March 31
Source: India's Department of Industrial Policy & Promotion
THE WALL STREET JOURNAL.

Defense Deals Seen As Part of Agenda

President Donald Trump and Indian Prime Minister Narendra Modi are expected to discuss defense deals this week as the countries nurture budding cooperation on security in the region with an eye toward stemming China's push in Asia.

The U.S. is working on a plan to approve India's purchase of unarmed MQ-9 maritime surveillance drones for the visit, people familiar with the matter said.

Among other deals up for discussion is Lockheed Martin Corp.'s proposal to move its F-16 aircraft production line to India as part of Mr. Modi's "Make in India" program if it wins a contract to supply the jet fighters to India's air force. A Lockheed official said the company has briefed the Trump administration on its proposals.

—Niharika Mandhana and Michael C. Bender

Suspected Indonesia Militants Kill Officer

BY I MADE SENTANA

JAKARTA, Indonesia—Two suspected militants with possible Islamic State links attacked police in western Indonesia Sunday, killing one officer, authorities said.

Police shot and killed one assailant and critically wounded the other in the predawn attack on a police post in Medan, while an officer died of stabbing injuries, national police spokesman Setyo Wasisto said.

In a raid of one of the men's houses afterward, police found an Islamic State flag and a book about the terrorist group, Mr. Wasisto said.

He added that the men likely had links to Bahrun Naim, an Indonesian based in the Middle East who police say helped channel funds from Islamic State to carry out coordinated attacks with guns and bombs in downtown Jakarta last year.

Police suspect Sunday's attack was linked to the arrest of three suspected terrorists last week in Medan, one of Indonesia's largest cities, for allegedly planning to attack police officers, Mr. Wasisto said.

Authorities have long feared a rising Islamic State influence in this country of 250 million people, the world's largest Muslim-majority nation. Several hundred Indonesians have traveled to the Middle East to support the group, while dozens more have fought alongside militants aligned with Islamic State in the southern Philippines who are seeking to establish a Southeast Asian caliphate.

In recent years, Indonesia's counterterrorism police have arrested or killed dozens of militants and disrupted their operations. The militants have generally been unable to acquire sophisticated weaponry or build powerful explosives, preventing mass-casualty attacks such as the Bali bombing in 2002, which left 202 people dead.

In May, two suicide bombers with suspected links to Islamic State killed themselves and three police officers in two explosions.



Burned motorcycles littered the ground where a fuel tanker overturned and spilled its load near Bahawalpur, leaving at least 138 people dead and nearly 150 others hurt.

Scores Die After Fuel Truck Flips in Pakistan

BY QASIM NAUMAN

At least 138 people were killed and nearly 150 others injured after gasoline spilling from an overturned fuel truck caught fire in central Pakistan on Sunday, officials said.

The truck was traveling on a highway around 300 miles south-southwest of the capital Islamabad when it flipped over, spilling its contents, police said. It was carrying thousands of gallons of gasoline north from the southern port city of Karachi.

Officials closed the highway 1.5 miles on either side of the overturned truck and warned passersby to stay away, but a large crowd, including residents of nearby villages, gathered to try to scoop up the fuel, local government officials and police said.

The fire erupted around 6 a.m. local time, rescue workers said.

Local officials said hundreds of people were at the site when the spill ignited.



THE WALL STREET JOURNAL.

sain, a spokesman for the government's Rescue 1122 in Punjab province, where Bahawalpur is located.

The deadly accident forced Prime Minister Nawaz Sharif to cut short a private visit to the U.K.

"This tragedy has saddened the entire nation a day before Eid," Mr. Sharif said, referring to the festival marking the end of the Islamic holy month of Ramadan.

Mr. Hussain, the rescue-service spokesman, said dozens of motorcyclists stopped on the side of the road and were among those gathering spilled fuel.

"We found a lot of destroyed motorcycles. They were parked and there were no bodies next to them," Mr. Hussain said.

The provincial government said 75 motorcycles and three cars were destroyed by the fire.

The fireball engulfed the crowd and vehicles nearby, killing at least 138. At least 145 more were injured, including dozens with third-degree burns, said Jam Sajjad Hus-

dent site.

A stretch of road was blackened by the fire and the charred frames of burned vehicles and the overturned fuel truck could be seen.

"At first, we couldn't understand what had happened. There were so many people and so much smoke," said Muhammad Zubair, local head of Edhi Foundation, a private charity that provides emergency services. "Everything was on fire, and it was difficult to get our ambulances in and out because traffic was choked on the highway."

A large crowd ignored repeated pleas from the highway police to move away.

"There were hundreds of people around the tanker. What could a few [policemen] do other than guide them? They couldn't remove them by force," said Shaukat Hayat, head of the National Highways and Motorway Police.

The accident overwhelmed local hospitals, which officials said weren't equipped to deal with an accident of this scale.

Military and government helicopters were deployed to transport the seriously injured to hospitals in other cities with specialized burn-treatment units.

Government officials said an investigation was underway to determine what caused the truck to overturn, and how the fire started.

Pakistan has millions of people living near or below the poverty line. Local officials said many of the victims were low-income farm laborers from the nearby villages, and brought any container they could find to store the gasoline, including cooking pots and empty plastic soda bottles.

"Farm laborers in a rural area like this start their day very early, after dawn, and the accident occurred at a short walking distance from the nearby villages," said local police official Jam Sajid.

"That's why word of the [fuel] spill spread very quickly and people arrived, despite warnings."

WORLD NEWS

More U.K. High-Rises Fail Fire Checks

Building examinations involve testing samples of their external cladding

BY WIKTOR SZARY

LONDON—U.K. authorities raised to 60 the number of residential towers in England that have failed fire-safety checks triggered by the lethal blaze in a London high-rise this month, as concerns grew over the safety of residents in social housing.

All buildings examined so far have failed the checks, which involve testing samples of their external cladding for flammability, a spokesman for the Department for Communities and Local Government said on Sunday.

The government has asked landlords to send in samples from the buildings they are most concerned about first, which means that the initial batch is likely to fail the tests, the spokesman said.

The 60 buildings that failed the tests are located in 25 areas across England, including north London, Manchester and Plymouth.

The exterior facade is suspected of having contributed to the quick spread of the fire that incinerated west London's Grenfell Tower on June 14, killing at least 79.



Grenfell Tower was incinerated in a fire on June 14. The 60 buildings that failed safety checks are located in 25 areas across England.

The government identified about 600 social-housing towers—properties owned by local authorities as well as nonprofit housing associations—across the country that had installed some form of cladding.

"We are now rapidly identifying buildings of concern: samples are being tested very quickly; fire inspectors are

checking the safety of the buildings as a whole," Sajid Javid, minister for communities and local government, said late Saturday.

The laboratory handling the samples is able to test 100 of them daily, and further capacity can be provided, he said.

The latest number comes after some 650 homes in north

London social-housing buildings were evacuated Friday night, following a discovery that their cladding wasn't fire retardant.

The authority initially planned to evacuate around 800 households from five residential towers, but one of the buildings turned out to have better fire-safety arrangements than the others and residents were al-

lowed to stay.

More than 3,000 people were being temporarily relocated, said a spokesman for the north London local authority handling the evacuation of the four residential towers.

The decision was made because of concerns that, combined with inadequate fire-safety arrangements inside the

buildings, the cladding posed too much of a fire risk.

A significant number of residents were staying with friends and family, with others being housed in two community centers or checked into hotels, the spokesman said.

A failure in testing of the cladding doesn't necessarily mean that a building will have to be evacuated, Mr. Javid said on Saturday.

The spokesman for Mr. Javid's department said on Sunday that he had no knowledge of any further planned evacuations, though the decision would be made by the relevant local authorities. "I'd stress that it was a particular set of circumstances that made the evacuations in Camden necessary," the spokesman said.

Cladding is often used to make a building more energy efficient or improve its outward appearance. In Grenfell Tower, it was installed as part of an £8.6 million (\$11 million) refurbishment last year.

U.K. officials have said the cladding on the 24-story Grenfell Tower didn't meet building standards for high-rises taller than 18 meters, or about 59 feet. But British building industry experts and the British company that supplied the material to Grenfell Tower contractors said it complied with current building codes.

Trump Emerges as Bigger Issue in German Campaign

BY ANTON TROIANOVSKI

DORTMUND, Germany—Germany's main center-left political party on Sunday attacked Chancellor Angela Merkel for what its leaders characterized as a failure to stand up to President Donald Trump, signaling that the U.S. relationship will be a prominent campaign issue ahead of the national election here in September.

The Social Democrats pounced on Ms. Merkel's

promise that Germany will move toward spending 2% of its economic output on defense—a target agreed to in 2014 by American allies in Europe and emphasized by Mr. Trump in recent months.

Mr. Trump's demand would mean "a Germany—surrounded by friends—that has armed itself to the teeth in the middle of Europe," Social Democratic chancellor candidate Martin Schulz told an arena in Germany's industrial heartland, at the party's convention. "I ask

you: Do we want this? We know from our history: More security does not come with more weapons."

Mr. Schulz amplified his months of criticism of the 2% spending goal even though the Social Democrats have served as the junior partner in Ms. Merkel's governing coalition since 2013. But the allusions to Mr. Trump at Sunday's convention showed how the new U.S. president—whose approval rating among Germans is 5%, according to a recent poll—is col-

oring European politics.

"We must be self-confident in countering President Trump," former Chancellor Gerhard Schröder said, recalling his own opposition to President George W. Bush and the Iraq war. "This seems to be somewhat lacking now."

Ms. Merkel, who is running for a fourth four-year term, represents the center-right Christian Democrats and holds a roughly 15-point lead in the polls over Mr. Schulz.

She has also sought to dis-

tance herself from Mr. Trump, but has used softer language.

Ms. Merkel last year pushed through parliament an 8% rise in German military spending to €37 billion (\$41.4 billion), a sum representing 1.2% of gross domestic product. Mr. Schulz said Germany, Europe's biggest economy, did need billions of euros more in military spending—but not a level that would give it "the biggest army of our continent."

Ralf Stegner, a deputy chairman of the party, said opposi-

tion to Mr. Trump and the 2% spending goal would become "a central issue in the campaign."

The Social Democrats' poll numbers shot up to a near-tie earlier this year with the Christian Democrats when party elders tapped Mr. Schulz, a former president of the European Parliament, to lead the campaign to unseat Ms. Merkel.

But that period of euphoria ended with a string of regional election losses this spring and the emergence of a seemingly re-energized Ms. Merkel.

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TERROR

Continued from Page One
unsophisticated weapons—such as knives or cars—are easy to get. So authorities fear the attacks will grow.

"We may be entering an era not of lone wolf, but stray dog attacks," said one Western security official.

The man who fumbled the attack in Belgium, Oussama Zariouh, attempted to prepare the hydrogen-peroxide-based explosive TATP in his Brussels apartment, the official said.

"The guy was able to build a bomb, but the bomb failed," said Claude Monique, a former French intelligence official who leads the Brussels-based European Strategic Intelligence and Security Center, a think tank. "Most of these attacks fail because these guys are not trained."

Such terrorism marks a shift from the kind of large-scale attacks carried out by extremist cells that have hit the Continent in the past, including Islamic State militants' gun-and-bomb attacks in Paris in November 2015 and March 2016 attacks on Brussels airport and subway.

Authorities across Europe say they have seen an uptick in terror activity—often of the small-scale, less-organized kind—since a May 2016 call by Islamic State for its supporters to kill non-Muslims in the West.

The changing nature of the attacks also reflects improved security in Europe, where the European Union and national governments have stepped up surveillance, tightened borders and deployed more police and soldiers. Military campaigns against Islamic State in the Mideast have also made it more difficult for terror leaders to organize and carry out attacks.

But officials warn it would be reckless to underestimate the continuing threat of extremist groups even if they may be conducting operations that are more frequently smaller-scale. "It is too easy to say they are too degraded, they are not capable anymore," said a European official. "That would be a mistake."

In May, a suicide bomber

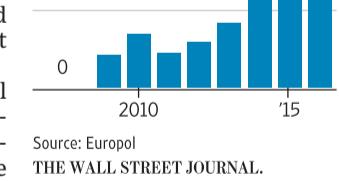


Soldiers patrolling the Brussels Central train station on Wednesday

Arrested on Suspicion

The number of people being arrested on jihadist-terror related offenses in Europe has increased amid a crackdown by police and governments.

750



Source: Europol

THE WALL STREET JOURNAL.

killed 130 people, there have been roughly a dozen terror attacks in France. More than half of those targeted police or military patrols; three police officers were killed.

Only the attacker died in Germany's first suicide bombing last July in the Bavarian town of Ansbach. A 2016 machete attack claimed by Islamic State in Charleroi, Belgium, injured but didn't kill a police officer and left the assailant dead. In March, a terrorist at Orly airport in Paris was killed by soldiers on security detail after he threw a bag containing a can of gasoline and tried to take a weapon from a soldier.

In June, three men drove a truck onto London Bridge, then went on a rampage with knives, killing eight people before they were shot dead by police. The attack was claimed by Islamic State.

Bertrand Benoit in Berlin, Valentina Pop in Brussels and Jenny Gross in London contributed to this article

WORLD NEWS



Crown Prince Mohammed bin Salman, right, on Sunday visited a police officer who was injured by a suicide bomber in Mecca on Friday.

Saudis Divided Over Prince's Rise

BY SUMMER SAID

MECCA, Saudi Arabia—In Islam's holiest city, two views of the new crown prince are emerging, breaking sharply along generational lines.

As in other Saudi cities, the young here view the 31-year-old Prince Mohammed bin Salman as a breath of fresh air; someone who will take on the conservative religious establishment, tackle corruption and transform an oil-dependent economy.

They hope his surprise elevation to crown prince last week will usher in a new era of openness, not only for foreign investors but for the latest Hollywood movies, which are still banned. It is the moment, young Saudis say, to modernize an ancient kingdom.

"We have a crown prince from our generation who is very determined, smart and wants to make real change," said Nader Mohammed, a 20-year-old power engineering student who lives in Mecca. "Saudis need someone to

shake them and get the best out of them."

Prince Mohammed's ascent has coincided with the appointment of other young princes to top positions, such as 33-year-old Prince Abdul Aziz Bin Saud Bin Nayef's promotion to interior minister this month, further exciting the youth.

But older Saudis have questioned the wisdom of ousting the former crown prince, Mohammed bin Nayef, a respected yet cautious leader, in favor of his younger, impulsive and largely untested cousin.

The move puts Prince Mohammed in a position to take over from his 81-year-old father, King Salman, before he might be ready, they say. And while most Saudis agree change is needed, not many—especially among the older generation—are ready to embrace upheaval.

"For generations Saudi Arabia has been ruled by older and experienced kings and he only surfaced on the scene a couple of years ago," said Abdulla, a 57-year-old gold shop

owner in Mecca who refused to provide his full name for fear for his safety. "Do I believe the country needs radical changes? Yes, but experience is essential here."

Khalid al-Hilali, a retired 63-year-old government employee in Mecca, also expressed reservations.

"I like the crown prince and I pledge allegiance to him but I'm worried about the future of Saudi Arabia. He rules in a more forthright way than others in the royal family but he is also confrontational, which could backfire when it comes to politics. We Saudis are used to a different approach."

Prince Mohammed, who has already overseen Saudi Arabia's economy and defense as deputy crown prince, is taking over Mohammed bin Nayef's domestic security portfolio as well.

He was given a new challenge Friday when Saudi security forces foiled a terrorist attack targeting Mecca's Grand Mosque, where worshipers were celebrating the end of

the Muslim holy month of Ramadan. A man who was planning the attacks blew himself up in a residential area near the mosque amid clashes with security forces, and five suspects were arrested, the Saudi Interior Ministry said.

"Had they been successful it would have been a disaster that would have severe implications on the kingdom and the royal family," said a former senior adviser to the Saudi government.

King Salman was in Mecca when the attempted attack was carried out, part of a long tradition of Saudi kings spending Ramadan in the holy city.

For now, there are few signs that ambivalence about Prince Mohammed among older Saudis will amount to political unrest.

Outpourings of support, by contrast, have suffused social media. A hashtag in Arabic declaring, "I pledge allegiance to Mohammed bin Salman" spread quickly among Saudi tweeters after his promotion.

U.S. Says Qatar Faces Tough Terms

By FELICIA SCHWARTZ

WASHINGTON—The U.S. sees a list of demands put forward late last week from Saudi Arabia and other governments to Qatar as a starting point for discussions to end a three-week standoff, though some conditions will be difficult to meet, Secretary of State Rex Tillerson said Sunday.

The list to Qatar from Saudi Arabia, the United Arab Emirates, Egypt and Saudi Arabia, delivered Thursday, includes demands that Qatar shutter state broadcaster Al Jazeera, curb ties with Iran and end Turkey's military presence on its soil, among others.

"While some of the elements will be very difficult for Qatar to meet, there are significant areas which provide a basis for ongoing dialogue leading to resolution," Mr. Tillerson said. "A productive next step would be for each of the countries to sit together and continue this conversation."

Last week, Mr. Tillerson called for Saudi Arabia and others to issue a list of demands that were "reasonable and actionable," after the U.S. State Department questioned the motives of the Gulf Arab countries' boycotting Qatar.

The Saudis, acting with Egypt, the U.A.E. and others, have blockaded Qatar for the past three weeks, closing borders and canceling airline flights while accusing Doha of supporting extremist movements and cultivating ties to Iran.

"We believe our allies and partners are stronger when they are working together towards one goal which we all agree is stopping terrorism

and countering extremism," Mr. Tillerson said Sunday. "Each country involved has something to contribute to that effort. A lowering of rhetoric would also help ease the tension."

He said the U.S. supports efforts to mediate the conflict by Kuwait and that the U.S. will remain in close touch with all of the parties. The U.S. has allies on all sides of the conflict, and maintains its largest military facility in the Middle East in Qatar.

Another world leader that has been trying to mediate between its allies is Turkey. On

The U.S. sees a list of demands on Qatar as a starting point to end standoff.

Sunday, President Recep Tayyip Erdogan reiterated his nation's support against the demands of its larger Gulf Arab neighbors as against international law.

"We consider these demands are against international law," Mr. Erdogan said in remakes in Istanbul after prayers during the celebration ending the religious fasting month of Ramadan. "It is a breach of Qatar's sovereignty rights."

A spokesman for Qatar's embassy in Washington said, "We are in the process of reviewing the list of demands and the Ministry of Foreign Affairs will be issuing a response soon."

—Margaret Coker contributed to this article.

FROM PAGE ONE

NESTLE

Continued from Page One decade," and that while competitors have adapted to changes in how people shop and to more competition from small, local brands, "Nestlé has remained stuck in its old ways."

The stake is Third Point's largest initial bet in its more than 20-year history and ranks among the largest in activism history as well.

Mr. Loeb played a big role in shaking up Yahoo Inc. as an activist shareholder and board member some years ago. He is also known for fiery-worded letters to executives and fights at companies like Sotheby's, though in recent years he has tamed his public image and looked to work more quietly with companies. A recent call to split up conglomerate Honeywell International Inc., for instance, found a somewhat open ear at the company, which has said it is already entertaining his idea even if it hasn't committed to a plan.

Mr. Loeb has been among the few U.S.-based activists to venture abroad for some of his biggest investments, where rules of the game are different and there's less of a track record of shareholder support for more aggressive campaigns. Activist investor Elliott Management Corp., for instance, was unsuccessful in its recent efforts to coerce Akzo Nobel NV, in which it has shares, into unwanted sale talks with PPG Industries Inc.

Nestlé in February said it was dropping a long-running sales-growth target after missing that goal for the fourth straight year. The company's new chief executive, Mark Schneider, a health-care veteran, recently said Nestlé would look to sell its U.S. confectionery business, which lags behind rivals Hershey Co., Mars Inc. and Chocoladefabriken Lindt & Spruengli AG.

Nestlé has also faced calls to consider selling its frozen-food arm, which includes brands like Lean Cuisine and Stouffer's, another business that has struggled as consumers increasingly look to fresh options.

Mr. Schneider has been



Daniel Loeb's Third Point made its largest initial bet ever on Nestlé.

working to better understand changing consumer behavior and raise Nestlé's exposure to higher-growth channels. Last week the company disclosed a stake in subscription-meals delivery firm Freshly—which sells healthy, prepared meals to U.S. consumers.

Third Point said Nestlé's stagnant per-share earnings over the past five years have translated to slowing dividend growth.

"Without addressing the company's stalled earnings, further dividend increases will be unsustainable at historical rates," said the firm. "While

Europe's different rules often discourage U.S. activists from bold forays there.

Other consumer-goods companies like Unilever, Diageo PLC and Kraft Heinz Co. have taken a hard line on cost by adopting so-called zero-based budgeting, whereby expenses have to be justified from scratch every year. But Nestlé has criticized the cost-cutting approach pioneered by Brazilian investment firm 3G Capital Partners LP. The company follows its own cost-cutting program while simultaneously investing in what it says are high-growth areas of its business such as pet food.

Mr. Loeb said he thinks Nestlé can improve its margins by as much as four percentage points over the next several years and that the company should adopt a formal margin target of 18% to 20% by 2020.

He added that the company should take on more debt to fund share buybacks and sell its stake in L'Oréal, which currently makes up 10% of Nestlé's market capitalization with a value of over \$25 billion.

While Mr. Loeb has taken a forceful approach with other companies, he indicated he will be collaborative with Nestlé, saying he "intends to play a constructive role to encourage management to pursue change with a greater sense of urgency."

He praised Mr. Schneider,

who earned a reputation while

CEO of German medical-supply

company Fresenius SE for

driving strong growth.

Nestlé's shares have

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—David Benoit in New York

contributed to this article.

Continued from Page One

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IN DEPTH

SHALE

Continued from Page One
in U.S. manufacturing, up from less than 20% in 2009, according to the Census Bureau.

Integrated oil firms including Exxon Mobil Corp. and Royal Dutch Shell PLC are racing to take advantage of the cheap byproducts of the oil and gas being unlocked by shale drilling. The companies are expanding petrochemical units that produce the materials eventually used to fashion car fenders, smartphones, shampoo bottles and other plastic stuff being bought more and more by the world's burgeoning middle classes.

"It's a tectonic shift in the hemispherical balance of who makes what to essentially feed the manufacturing sector," said Dow Chief Executive Andrew Liveris, referring to the growth of production in the U.S. His company now plans to double down on its U.S. expansion with a \$4 billion investment in a handful of projects over the next five years.

Companies are eagerly launching new U.S. petrochemical projects—310 in all according to the Chemistry Council—because at a time of uncertainty over when demand for transportation fuels may peak, due to electric cars and ride sharing, the world's appetite for plastics is expected to rise for decades to come.

That demand typically grows at least 1.5 to 2 times as fast as global gross domestic product, according to industry

Half of 2016's capital investment in U.S. manufacturing was for chemical plants.

analysts. That theoretically makes petrochemicals one of the safer fossil fuel investments, though skeptics question whether the margins on U.S.-made plastics can last.

The new investment will establish the U.S. as a major exporter of plastic and reduce its trade deficit, economists say. The American Chemistry Council predicts it will add \$294 billion to U.S. economic output and 462,000 direct and indirect jobs by 2025, though analysts say direct employment at plants will be limited due to automation.

For energy companies, the build-out creates a new market for byproducts they previously had little use for. Drillers have been flush for years with the raw materials but have left them in the gas stream to be burned off, because no one wanted them. A spike in demand in coming years could make drilling more profitable.

Petrochemical companies are betting the price of the feedstocks—their most costly expense—will remain low for years due to shale drilling. As a result, net U.S. petrochemical exports, which include plastic as well as products such as fertilizer, adhesives and solvents, will grow to \$110



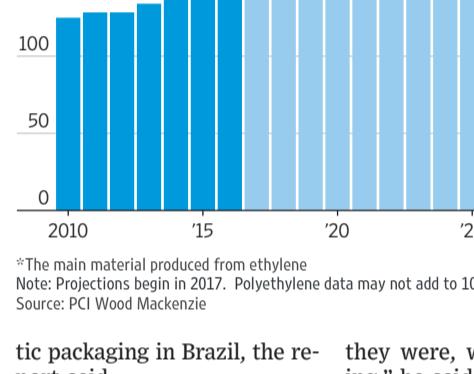
SCOTT DALTON FOR THE WALL STREET JOURNAL

A new petrochemical facility in Freeport, Texas, on the Gulf of Mexico is part of Dow Chemical's \$8 billion investment.

Plastic Model

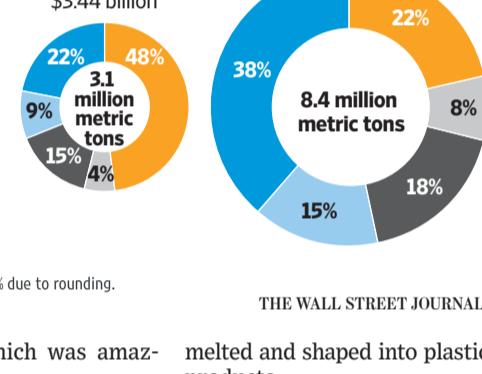
The world's consumption of ethylene has soared, and the U.S. forecasts major growth in exports.

Global ethylene consumption



*The main material produced from ethylene
Note: Projections begin in 2017. Polyethylene data may not add to 100% due to rounding.
Source: PCI Wood Mackenzie

U.S. polyethylene* exports



THE WALL STREET JOURNAL.

tic packaging in Brazil, the report said.

"We are taking advantage of population growth, the rising middle class and the on-the-go lifestyle," said Paloma Alonso, Dow's vice president of plastics in South America. "The Gulf investment is really essential for us."

The U.S. investments aren't without risk. American petrochemical facilities mostly run on ethane, a byproduct tied to natural gas prices, while counterparts in Asia and Europe primarily use naphtha, a crude oil derivative.

Ethane prices fell when U.S. natural gas prices fell in 2009, while naphtha prices increased as oil prices soared to more than \$100 a barrel in 2011. Since then oil has fallen below \$50 a barrel, making companies that use naphtha more competitive. Natural gas prices remain historically low, but the wave of new ethane demand could drive up prices.

Paul Bjacek, a chemicals expert at Accenture, said diminishing margins might push smaller companies or private-equity investors out of the second wave of investment, but larger operators will move ahead.

"The margins are still good, they're just not as good as

they were, which was amazing," he said.

Human beings have been using pliable materials found in nature, such as rubber, for centuries. But when Leo Baekeland, a Belgian-born American chemist, invented the first fully synthetic plastic derived from coal in 1907, it set off the modern consumer era, flooding the market with cheap durable goods almost entirely derived from fossil fuels.

Chemists can take the carbon atoms found in fossil fuels and rearrange them to create chains of atoms longer than those found in nature, which in turn can be used to make everything from nylon stockings to PVC piping.

Oil and gas byproducts, including ethane, butane and propane, are sent to huge furnaces called "steam crackers," which use superheated steam fed at high pressure to break apart molecules. Ethane is cracked into a smaller molecule, ethylene. The majority of ethylene in turn is used to make a plastic called polyethylene, and formed into pellets.

Millions of these U.S.-made pellets will be loaded into 25 kilogram sacks and sent via cargo ships to factories around the world, where they will be melted and shaped into plastic products.

By the end of the decade, energy consultancy PCI Wood Mackenzie estimates the U.S. chemical industry will have increased its capacity to make ethylene by 50%.

The world consumed more than 147 million metric tons in 2016 of ethylene and will need more than 186 million tons by 2023 to meet global demand, according to the consultancy. It said U.S. exports of polyethylene, the plastic pellets, are expected to reach \$10.5 billion by 2020.

China is also rushing to build new plastics factories to meet domestic demand, which is already more than double U.S. demand and is expected to grow 6% annually.

The boom in U.S. petrochemicals is a big turnaround from just a decade ago. Following a period of large investment in U.S. projects in the 1990s, U.S. ethylene manufacturers made huge cuts in the 2000s.

Instead, chemical companies invested in large projects in the Middle East and Asia, attracted by cheaper raw materials and closer proximity to manufacturers, who had also fled the U.S. because of higher costs. The tough times were

exacerbated by falling demand for plastic as the financial downturn took hold in 2009.

More than a dozen facilities on the U.S. Gulf were shut down in 2008 and 2009. Dow alone closed a half dozen plants on the Gulf and laid off 5,000 employees world-wide. Chevron Phillips Chemical, a joint venture between Chevron Corp. and Phillips 66, temporarily closed two factories and ran others at lower capacity. LyondellBasell shut down its complex in Chocolate Bayou, Texas, and declared bankruptcy in the U.S.

"The industry was really looking inward and saying 'it's not dead but it's not going to grow anymore,'" said Steve Zinger, a petrochemical consultant at PCI Wood Mackenzie.

Horizontal drilling

Then came the fracking revolution. By 2010, as U.S. drillers used horizontal drilling and hydraulic-fracturing technologies to release vast oil and gas deposits trapped in rocks, they also unlocked raw materials for petrochemicals. U.S. production of natural gas by-products has grown from two million barrels a day in 2008 to more than 3.7 million in 2016, according to energy consultant RBN Energy LLC.

The petrochemical industry was slow to react due to uncertainty about the long-term viability of U.S. shale drilling. Initially, companies invested only in adding capacity to existing U.S. facilities. By 2012, they started building.

Later this year, a new Chevron Phillips facility capable of producing 1.5 million metric tons of ethylene a year is coming online in Baytown, Texas. It covers a plot the size of 44 football fields and is made up of 350 miles of pipe, 40,000 tons of steel and 140,000 tons of concrete. It has taken four years to finish.

During the height of its construction, more than 4,500 construction workers and engineers were on site. Once operational, it will only take around 200 employees to run.

"I had told the board the U.S. was not a growth play, but by 2010 I saw things were changing," said Ron Corn, Chevron Phillips' senior vice president of projects. "Of course, once you put in the capital, you have to wait five years."

For Chevron Phillips, the biggest challenge isn't profitably making plastic pellets. It is getting them to market in a crowded Gulf Coast.

Because there is so much traffic in the Port of Houston, and a dearth of shipping containers there, the company has created a fleet of 2,750 railcars to divert many of the pellets north to Fort Worth. From there, they will be sent by train to ports in Long Beach, Calif., and Charleston, S.C., where they will be shipped to Asia and South America. Some exports will also leave from Houston and Freeport, Texas.

"Everyone has the same great idea at the same time in this industry," Mr. Corn said. "The way you win is on logistics."

The change is permeating the empire. Wal-Mart had wine and beer at a tailgate for its e-commerce team in San Bruno, Calif., when it hosted its annual day at a San Francisco Giants game in May. It is also allowing other startups it has acquired to host a weekly office happy hour—pending approval from a Wal-Mart executive vice president.

The employees at Madison Heights, Mich.-based Moosejaw, which Wal-Mart bought in February, never lost access to the "4 p.m. beer fridge" and keg, unlocked for one hour on Thursdays. "It helped that our beer fridge had always been run responsibly," with a two-beer maximum, Moosejaw CEO Eoin Comerford said.

Mr. Lore spoke to Bonobos staff in New York the day of the acquisition and cited Wal-Mart's newfound flexibility on office drinking as an example of how hard it will work to protect culture, said a Wal-Mart spokesman.

There are other aspects of Wal-Mart's traditional habits that still raise eyebrows among Jet staffers. For example, Wal-Mart asked Jet employees to be mindful of swearing in the office.

"That did not last," said Jeannie Slivensky, a marketing manager at Jet. "This is New York."

BOOZE

Continued from Page One
"Bar" didn't. Some Jet employees squirrelled away a few bottles before an outside company packed up the contraband, says one former employee.

"I would not say it's a party culture, but not the opposite of that," says another former Jet employee.

In fact, Wal-Mart had made a major concession to Jet's thousands of employees by allowing Jet to pay for an off-site happy hour. There are no champagne toasts at Wal-Mart headquarters in Bentonville, Ark., thanks to a cocktail of conservative culture and a strict low-cost ethos.

Benton County, where the company has been based since Sam Walton opened his first store in 1950, prohibited the sale of alcohol until 2012. Wal-Mart generally doesn't allow employees to expense alcohol during work outings, let alone drink in the office.

"People don't really talk about drinking at work because you don't want to have that reputation," says Bo Yarbrough, a former recruiting manager at Wal-Mart. Increasingly, employees gather at the growing number of local bars



SETH WENIG/ASSOCIATED PRESS

Wal-Mart and its new acquisition, e-commerce startup Jet.com, which has headquarters in Hoboken, N.J., above, have each compromised about allowing happy hours in the office.

for weekday happy hour after work, "but you wouldn't want to put that kind of thing on a work calendar," says Mr. Yarbrough, who left the retailer last summer.

Jet is based in Hoboken, a city where some locals brag about the high number of bars per capita. Jet founder Marc Lore, a New York native, is a

wine aficionado and owner of a small vineyard in California's Napa Valley. Lore Vineyard's 2013 Cabernet Sauvignon earned a coveted 97 points from the Robert Parker Wine Advocate for its "fabulous intensity and loads of blackberry," though recent vintages aren't sold to the public.

Wal-Mart's absorption of

Jet is part of its intensifying battle with Amazon.com Inc. After buying the company, Wal-Mart put Mr. Lore in charge of its U.S. e-commerce business and swallowed several other online startups, including San Francisco's ModCloth, which sells women's apparel, and Michigan's Moosejaw, an outdoors spe-

cialist. This month, it paid \$310 million for New York City-based Bonobos Inc., another apparel seller.

Mr. Lore and Wal-Mart CEO Doug McMillon discussed the potential culture clash in meetings before the Jet acquisition, including what to do with the startup's office drinking, says Ms. Landsman, Jet's president. The executives invented the off-site happy hour compromise to preserve "key touchstones in the culture" that made Jet's entrepreneurial talent valuable to Wal-Mart in the first place, she says.

Several months ago, Mr. McMillon asked Jet executives whether the retail giant was "hugging" Jet too tightly or not enough, she said. Jet executives said things were largely going well but many employees had stopped coming to happy hour after it was moved outside the office.

"One of the huge advantages of the office was the ability to float in and out," mingling, then going back to work at your desk, says Jack Hanlon, a Jet vice president.

Wal-Mart reversed course. In recent weeks Jet brought back Thursday night happy hour in the office—generally beer, wine and food. "It's a pretty big signal from Wal-Mart that they were able to be flexible," says Mr. Hanlon.

GREATER NEW YORK

Fresh Fuel for a Horse Fight

Group seeking to rid city of carriages hires consultants to take another run at issue

By MARA GAY

The animal-rights group that has for years unsuccessfully sought to ban the Central Park horse carriages from city streets has hired three prominent political consultants to resurrect an issue that has dogged Mayor Bill de Blasio during his first term.

Tusk Strategies, the consulting firm behind high-profile campaigns against City Hall on behalf of Uber Technologies Inc. and the city's largest police union, is leading the effort, according to the firm and the other consultants on the campaign. Suri Kasirer, a veteran lobbyist, is on the team, they say. So is Stu Loeser, former Mayor Michael Bloomberg's press secretary whose consulting firm has worked on campaigns from Uber to charter schools.

All have been hired by New Yorkers for Clean, Livable and Safe Streets, an animal-rights group that backed Mr. de Blasio in the 2013 mayoral race, during which he vowed to ban the carriage industry. About 300 people and roughly 200 horses work in the industry.

NYCLASS said it plans to spend millions on a lobbying and advertising blitz this summer in the hopes of winning over New Yorkers and forcing Mr. de Blasio to deliver at least part of his 2013 campaign promise. "We have to go out and we have to do a better job of convincing folks why in 2017, horses don't belong in Times Square," said Chris Coffey, who heads the New York City practice at Tusk Strategies.

Mr. de Blasio in 2013 said he would ban the horse-carriage industry during his first week on the job. Instead, the effort was met with intense resistance from carriage drivers and the union representing them.

The issue appeared to be laid to rest for good in February when City Council Speaker Melissa Mark-Viverito called

off a vote on legislation that would have restricted the horses to Central Park. Many city lawmakers said they hoped the issue would fade.

Now, it could make a comeback, just in time for Mr. de Blasio's re-election campaign. The mayor met with NYCLASS earlier this month, but hasn't committed to taking on the issue again, according to people familiar with the meeting. Mr. de Blasio, a Democrat, is widely expected to win re-election.

'Why do we need to re-litigate this?' a carriage-driver spokeswoman asked.

The lobbying blitz could revive an issue that spiraled into an embarrassing political distraction for Mr. de Blasio, bewildering many in the city's political world and frustrating his aides. "They hate the issue," said one person familiar with the views of his staffers.

A spokesman for Mr. de Blas-

sio declined to comment.

NYCLASS is led by Steve Nislick and Wendy Neu, wealthy developers who have said they are motivated by their love of animals, and argued horses don't belong in Midtown traffic. Together, they poured thousands into attack ads in the 2013 Democratic mayoral primary against then-City Council Speaker Christine Quinn, a de Blasio rival.

NYCLASS initially sought to completely ban the horse carriages, but Mr. Coffey recently said the group is open to a compromise. That could include, among other things, barring the horses from Times Square, or moving the line of carriages soliciting tourists inside Central Park.

Carriage drivers are unlikely to be open to curbing the industry. "Why do we need to re-litigate this?" said Christina Hansen, a spokeswoman for the carriage drivers.

A spokesman for Teamsters Local 553, the union representing the drivers, said it would be active in City Council races, but declined to comment further.

Prayers in Brooklyn



FAITHFUL: Muslims gathered on McDonald Avenue in Kensington on Sunday to celebrate Eid al-Fitr as Ramadan came to a close.

Governor Hits Impasse Over Albany Agenda

By MIKE VILENSKY

Gov. Andrew Cuomo's pledge to make government work and his knack for easing partisan gridlock are facing new headwinds ahead of his re-election campaign next year.

Mr. Cuomo, a Democrat, ended his seventh legislative session last week with important matters unresolved and lawmakers pointing fingers. Earlier in the year, lawmakers were days late in completing the budget, the longest delay of Mr. Cuomo's tenure.

It is unclear whether legislators will reconvene for a special session to try to break an impasse over a number of issues, including Mayor Bill de Blasio's authority over New York City schools and the rate of sales taxes in New York counties. On Sunday, Mr. Cuomo said he hopes to do so before July.

The stalemate marks a contrast from past years when the Democratic governor won concessions from both parties by his deadline. And it undercuts one of his top political talking points, that he can oil the wheels of government, said analysts, officials, lobbyists and others involved in state politics.

These people attributed Mr. Cuomo's new difficulties prodding legislators to his lengthening time in office and natural tensions that arise between the branches, and to changes in legislative leadership. They said it is an open question how the dynamic will affect 2018. Mr. Cuomo has said he will run again; Republicans said they plan to run on a reform platform against the two-term incumbent.

A spokeswoman for Mr.

Cuomo said: "Gov. Cuomo's record of results speaks for itself—passing more on-time budgets than any other governor in modern political history and delivering major progressive victories year after year."

At a news conference last week, Mr. Cuomo said his accomplishments for the year were largely hashed out in the state budget in April, including softening criminal penalties against minors and offering free college tuition for some middle-class families.

The governor faces new legislative dynamics as he tries to make a deal.

"It's clear the Assembly is changing its approach," said Assemblywoman Linda Rosenthal, a Manhattan Democrat. "Why should we let bad policies be enacted into law all the time?"

Throughout his tenure, Mr. Cuomo has worked closely with both parties and been credited with restoring some orderliness to state government. But legislators and political strategists said that time may be ending, and Republican critics are seizing on the tensions in Albany.

Assembly Minority Leader Brian Kolb, an upstate Republican, said this session had been rife with "chaos."

Jessica Proud, a Republican strategist who worked on Rob Astorino's 2014 GOP gubernatorial race against Mr. Cuomo, said she expects cleaning up Albany "to be a main issue in next year's election."

Still, Mr. Cuomo is a popular figure in New York with an approval rating hovering around 60% in recent polls, and he would likely be the front-runner in the 2018 governor's race.

Thousands Show Their Colors at NYC Pride March



TIME TO SHINE: Members of the Stonewall Veterans' Association made their way down Fifth Avenue in Manhattan at the Pride parade on Sunday. The annual event, like others that took place around the country, mixed a political message into celebrations.

Pitch Made On Robocalls

By LESLIE BRODY

If you hate robocalls, brace yourself. Sen. Chuck Schumer warns they could get worse.

The New York Democrat called on the Federal Communications Commission on Sunday to reject an effort by telemarketers to use new technology to skirt the rules for "do-not-call" registries.

Some telemarketers and political groups have argued that "ringless voice mails" that go straight to a cellphone's voice mail box, without ringing to prod a consumer to pick up the phone, should be exempt from do-not-call rules. Allowing such robocalls would flood unwilling consumers' cellphones, waste their time as they checked spam and obscure important messages, Mr. Schumer said.

Representatives of the FCC and telemarketing associations couldn't be reached for comment. But a March petition from an attorney for a voice-mail provider argued the commission lacks authority to regulate voice-mail services, which don't result in charges to the recipient, and that Congress never expressed an intention to regulate voice mail. The Republican National Committee has supported the company's request, and said denying it would hurt the First Amendment rights of those engaged in political communications.

Boxer Seeking Bigger Payday Gives MMA a Shot

By LAINE HIGGINS

With a perfect 20-0 record and reigning as the World Boxing Featherweight Champion, Heather "the Heat" Hardy is in the conversation as the best female boxer in the U.S. She can also barely pay the rent.

Hardy, who lives in downtown Brooklyn and trains at the borough's famed Gleason's Gym, is a single parent and supports her 12-year-old daughter, Annie, by the grace of her gloves. Since turning pro in 2012, Hardy has become one of the highest paid women in her sport with sponsorships from Dove and Adidas and the loyalty of established New York promoter Lou DiBella.

Still, she averages about \$10,000 a fight, while men with comparable resumes bring in six figures or more per bout.

"It seemed like nothing was working," she said. "I needed a backup plan."

On Saturday, she put that plan into action at Madison Square Garden in her first mixed-martial arts fight, where the money is greater, but the risks are, too.

The showdown against flyweight Alice Yauger was broadcast on Spike TV, the first fight on live TV for Hardy, something she hopes will bring national exposure to women's boxing. And more airtime means more money.

After developing big-name female fighters such as Ronda

Rousey, MMA offers more gender-equitable purses than boxing. Though neither Hardy nor DiBella would say what she made from Saturday's fight, they said it was more than what she earned in her WBC title-defense victory over Edina Kiss in March.

MMA is in some respects more violent than boxing—one reason for its popularity—and not automatically an easy transition for a 35-year-old making her first appearance in the cage.

"If I get injured, then my boxing career is over too," Hardy said before the fight.

Hardy didn't survive her MMA debut unscathed. Four minutes into the third round, the referee paused the match to let Hardy mop up the blood from her split left eyelid. Seconds after the doctor cleared Hardy to resume fighting, she pushed Yauger against the cage and began landing fist after fist in her opponent's face to win by technical knockout.

Asked afterward if she took more damage in MMA than boxing, Hardy said, "I didn't see my face yet." The final tally: seven stitches and a gnarly looking eye.



Heather Hardy, left, in a March boxing match. On Saturday, she won her MMA debut in New York.

Office Space Rent for One: About \$1,110

By KEIKO MORRIS

New York City is the most expensive big city in the world to rent a desk, according to a new report about flexible office space.

The monthly prices per person for a workstation in flexible office spaces averaged \$1,110 for the 12 months that ended in February of this year, according to a report from the Instant Group, a company that finds and manages office arrangements for companies. San Francisco came in second, at \$1,086.

Flexible office space, which includes co-working communal space, as well as private offices, usually offers shorter terms than a conventional lease and provides furnished space ready to use.

"It represents what younger people want to do and small, medium and large businesses want to do, which is build flexibility around their workplaces," said Tim Rodber, chief executive of the Instant Group.

The number of New York City flexible office-space locations grew to 330, a 24% increase between February 2016 and 2017, the report said. London had the most flexible office space locations, at 1,136.

GREATER NEW YORK



Modular units were used in the construction of NYU Winthrop Hospital on Long Island.

Hospitals Boost Modular Building

BY KEIKO MORRIS

After superstorm Sandy nearly destroyed a Brooklyn health-care clinic in 2012, officials at NYC Health + Hospitals looked to modular construction for a quick and economical replacement.

Now the municipal public health-care system is deploying the technology again, this time to build a

PROPERTY a \$28 million ambulatory-care facility on Staten Island with units made in a Pennsylvania factory and bolted together on site.

"It's going to be part of our algorithm in terms of deciding how we construct something we need," said Roslyn Weinstein, vice president of corporate operations at NYC Health + Hospitals.

As the region's health-care institutions spend billions to modernize and expand, some large providers are boosting their use of factory-made components.

Like builders in the residential and hotel sectors, health-care systems looking to expand have shown a growing interest

in modular-building technology as a possible way to deal with a shortage of skilled construction workers and rising building costs, industry officials and experts said.

Modular technology's promise of shortening development schedules, controlling and improving quality and minimizing disruptive work on site also have been a draw, especially for projects in crowded, urban settings with limited space to place building materials and accommodate workers.

Nearly 400 bathrooms for patient rooms were built in a New Jersey factory and installed in the new 830,000-square-foot Kimmel Pavilion under way at NYU Langone Medical Center in Manhattan. These factory-made components helped reduce the number of workers on site and potential delays. And it allowed for improved quality control and estimated savings of 15% to 20% for bathroom construction, said Vicki Match Suna, senior vice president for NYU Langone's real-estate development and facilities.

"When you have our project, a new clinical building which is

so complex and has so many systems, using this building component avoids some of the crowding you get," she said.

Modular construction cut as much as six months from the entire development process for NYU Winthrop Hospital's Level 1 Trauma Center in Mineola, Long Island, which made its debut last year, said Joseph W. Burke, vice president of engineering and facilities.

This technology speeds construction and helps address a worker shortage.

Ten sections were manufactured in a Midwest factory, while work to prepare the site took place simultaneously. The ambulance bays had to be relocated temporarily, not an ideal situation. So completing the project in a shorter time-frame was critical, Mr. Burke said.

"The key is the impact to the facility where you are doing this work," he said. "If it saves months, it's a home run."

To be sure, modular building in the health-care sector is still in its early stages in the New York region. The methods don't work for every project, particularly highly customized designs without repetitive, standardized features, said health-care and building-industry experts.

The factory-made components also bring challenges such as coordinating the design and manufacturing process with local and state inspections, and trucking large units on roadways, especially across bridges.

Modular-building companies, however, see room for growth, with startups such as New York City-based EIR Healthcare addressing shipping concerns with a concept for a modular hospital room packed flat and assembled on-site, among other things.

Efforts to rein in costs in the health-care industry have created a growing appetite for efficient building solutions, industry experts said. And an aging baby-boomer population has put pressure on an industry to build and upgrade facilities quickly.

PROPERTY WATCH

STARTUP SCENE

Co-Working Trend Comes to Biotech

NYU Langone Medical Center and shared-lab-space provider BioLabs have teamed up to create a biotech co-working center in Manhattan's Hudson Square neighborhood.

Called BioLabs@NYULangone, the 50,000-square-foot space at 180 Varick St. is designed to offer lab and office space, as well as educational programs and networking opportunities to help startups commercialize laboratory discoveries, according to NYU Langone and BioLabs.

New York City officials view the center, which will receive \$5 million from Mayor Bill de Blasio's LifeSci NYC initiative, as a key project in the city's efforts to create a biotech hub.

NYU Langone, which holds the lease on the space, has invested \$10 million in the past several years on upgrades and is investing an additional \$5 million, NYU officials said.

Moreover, the state's economic-development arm, Empire State Development, is providing \$2 million for the project. The center is open to applicants from all academic centers and startups, said Robert Schneider, associate dean for biomedical innovation and commercialization at NYU Langone.

MERGERS & ACQUISITIONS

More Deals Expected In Real-Estate Tech

Investors and startups in the real-estate technology sector are anticipating a wave of mergers and acquisitions in the coming year, according to a new global survey of investors and startup companies.

The survey showed 76% of those polled in the second quarter said they expected more purchases and mergers of companies in the sector in the next 12 months. That was up from 58% in the fourth quarter of last year, according to the report issued by MetaProp NYC, a real-estate technology investment and advisory firm. The report surveyed 1,700 investors and startup founders and chief executives.

Startup founders and executives expressed optimism about deal making. Almost a third said it is likely or very likely their companies would be acquired, go public or have some other type of major liquidity event in the next two years.

Some investors expressed caution. In the second quarter, 23.8% of them said they anticipated making fewer investments in the next 12 months, up from less than 8% at the end of last year, the survey showed.

—Keiko Morris.



A BioLabs facility in Cambridge, Mass. BioLabs and NYU Langone Medical Center plan to create a co-working center in Manhattan.

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LIFE & ARTS

HEALTH

When Are Doctors Too Old?

Hospitals that test older physicians for mental and physical ability raise issues of fairness, scientific validity—and ageism

BY LUCETTE LAGNADO

IN FEBRUARY, Robert Brown received an email that left him troubled. The New Jersey hospital where the 71-year-old pediatrician was practicing informed him that doctors age 72 and older would have to take a test to assess their physical and mental health—or risk losing their privileges.

"Who are they to tell me I can't practice medicine?" he thought. He was going to fire off an angry response—then took a deep breath. Instead, he did some soul-searching about his abilities, while considering the new policy at Cooper University Health Care in Camden. What was physician competence, Dr. Brown wondered, and how could it be measured?

Testing older physicians for mental and physical ability is growing more common. Nearly a fourth of physicians in America are 65 or older, and 40% of these are actively involved in patient care, according to the American

'I am 76 years old, so I could retire, but I don't want to retire because I really love what I do.'

-Dr. William Sharrar, pediatrician

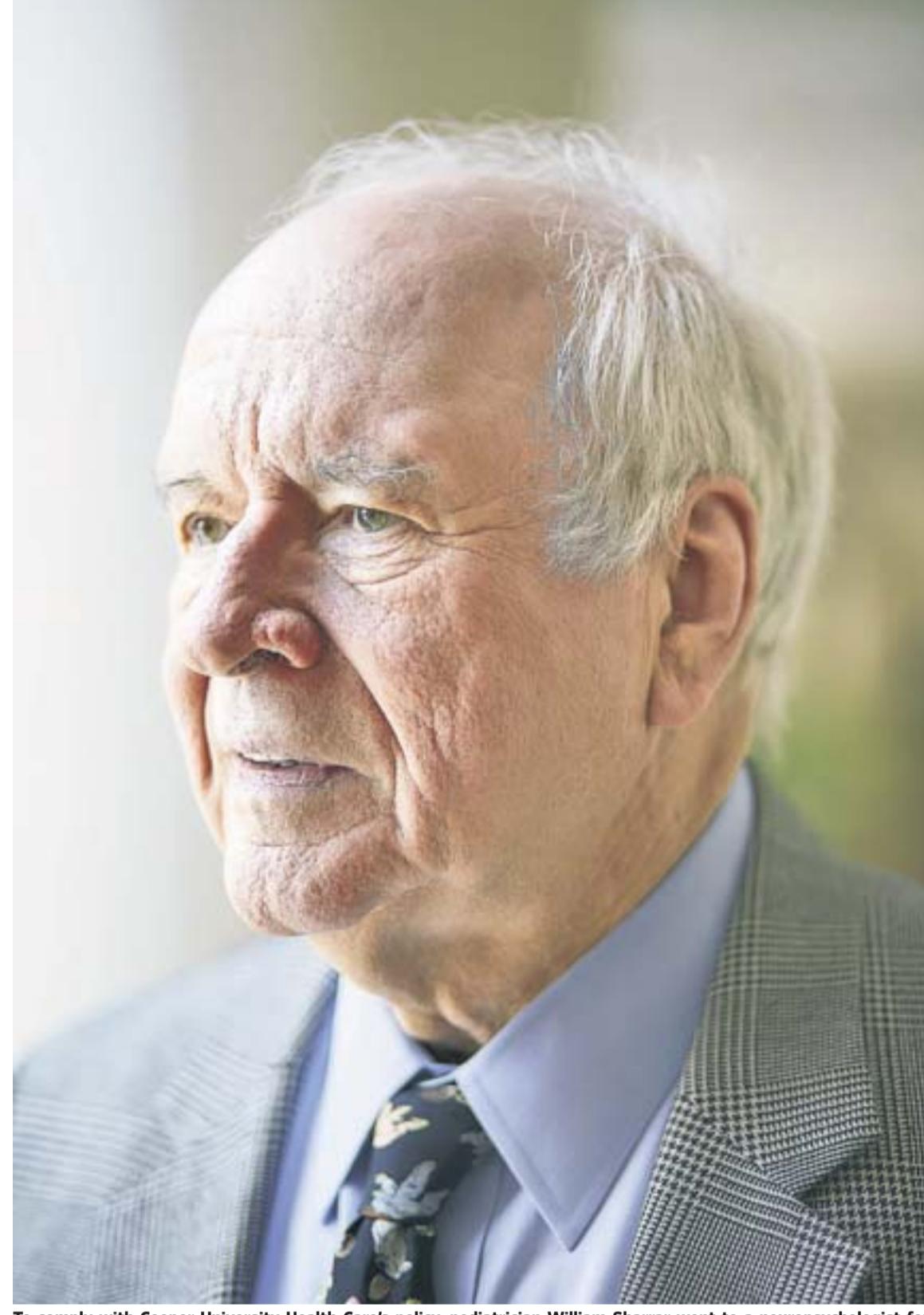
Medical Association. Experts at the AMA have suggested that they be screened lest they pose a risk to patients. An AMA working group is considering guidelines.

Concern over older physicians' mental states—and whether it is safe for them to care for patients—has prompted a number of institutions, from Stanford Health Care in Palo Alto, Calif., to Driscoll Children's Hospital in Corpus Christi, Texas, to the University of Virginia Health System, to adopt age-related physician policies in recent years. The goal is to spot problems, in particular signs of cognitive decline or dementia.

Now, as more institutions like Cooper embrace the measures, they are roiling some older doctors and raising questions of fairness, scientific validity—and ageism.

"It is not for the faint of heart, this policy," said Ann Weinacker, 66, the former chief of staff at the hospital and professor of medicine at Stanford University who has overseen the controversial efforts to implement age-related screening at Stanford hospital.

A group of doctors has been battling Stanford's age-based physician policies for the past five years, contending they are demeaning and discriminatory. The older doctors got the medical staff to scrap a mental-competency exam aimed at testing for cognitive impairment. Most, like Frank Stockdale,



To comply with Cooper University Health Care's policy, pediatrician William Sharrar went to a neuropsychologist for cognitive exams that lasted about three hours, with breaks. The results are not yet known.

an 81-year-old breast cancer specialist, refused to take it.

Stanford hasn't budged and indeed strengthened one aspect of what it calls the Late Career Practitioner Policy, which involves getting several peer reviews of physicians ages 75 and over by people with whom they work. Dr. Stockdale, who organized the doctors opposing the policies, asks why Stanford can't apply the policy to all doctors, not simply the older ones?

He noted that the physicians in his group of dissidents have made major contributions to medicine.

One helped find a cure for a form of cancer; another is a pioneer in genetic engineering. More than 50 years ago, Saul Rosenberg, an 89-year-old oncologist, along with a Stanford radiologist, developed the cure for Hodgkin lymphoma, a cancer of the lymph nodes that had been 100% fatal.

"I am quite elderly, and I know what I know and I know what I don't know," said Dr. Rosenberg, who still sees patients. "It is very upsetting that they make it difficult for me to get my hospital privileges."

He noted that among younger colleagues, there are "physicians who are alcoholics or drug addicts." Yet his institution targets older physicians for special screening.

Dr. Weinacker acknowledges, "we have some of the most amazing physicians in the world. But none of us is immune to the effects of aging, and as we age, lots of us function less well, including in some of us the ability to think critically and solve complex problems."

She said there were policies to screen younger physicians "when we have concerns that someone



'It is very upsetting that they make it difficult for me to get my hospital privileges,' says Saul Rosenberg, an 89-year-old Stanford oncologist.



'None of us is immune to the effects of aging,' says Ann Weinacker, 66, a physician and Stanford University professor of medicine.

is impaired." The idea of screening all physicians, she added, is not practical.

Older physicians who have mild cognitive dysfunction typically don't realize it, she said, and their colleagues don't report them. In a paper published last year in the Journal of Continuing Education in the Health Professions, a group of authors led by an AMA vice president cited studies showing how "increasing years in practice is associated with decreasing knowledge; lower adherence to evidence-based standards of care for diagnosis, prevention and treatment; and worse patient outcomes."

Studies have found that, on average, knowledge declines over time, but it varies significantly among individual physicians, the AMA says.

Meanwhile, a study published in May in the British Medical Journal that looked at the outcomes of hospitalists—doctors who work at in-patient hospital units—found that patients treated by older hospitalists who are over 60, have higher mortality than patients cared for by

Please see DOCTOR page A10

WSJ BOOK CLUB

MARY GAITSKILL READS 'CLOUDSPLITTER'

Russel Banks's historical novel about abolitionist John Brown is up next for The Wall Street Journal Book Club

BY CHRISTOPHER JOHN FARLEY

The WSJ Book Club will be reading "Cloudsplitter" over the coming weeks. Follow along on the club's Facebook page.

Next month, Ms. Gaitskill will join us for a Q&A. An edited interview.

For almost two decades, author Mary Gaitskill put off reading "Cloudsplitter," a historical novel by Russell Banks about real-life abolitionist John Brown, because she didn't like the title.

"I thought it sounded pretentious," Ms. Gaitskill told The Wall Street Journal in a recent phone interview. Spurred by a recommendation from her husband, writer Peter Trachtenberg, she finally finished the book last summer and

she concluded that it was the best novel she had read in more than a year. "Once I started it, I realized 'Cloudsplitter' is just a name of a mountain that John Brown lives near and that took away from the feeling of pretension."

Ms. Gaitskill, the author of such works as the short-story collection "Bad Behavior" and the novel "Two Girls, Fat and Thin," is the guest host of the WSJ Book Club and she selected "Cloudsplitter" for the members of the club to read over the next month.

Brown was a white anti-slavery crusader who in 1859 led an attack on a federal arsenal in Harpers Ferry, W.Va., with the larger aim of sparking a slave rebellion. He was captured and executed that same year, but his martyrdom

Please see BOOKS page A10



FROM LEFT: DEREK SHAPTON; UFL ANDERSEN/GETTY IMAGES
Author Mary Gaitskill in 2015, above. 'Cloudsplitter' author Russell Banks in 2015, right.

LIFE & ARTS



NATE RYAN FOR THE WALL STREET JOURNAL

WHAT'S YOUR WORKOUT? | By Jen Murphy

Your Spin Class Isn't Like This

How a Minnesota teacher keeps up with competitors half her age on the log rolling circuit; 'I can stay on all day'

JENNY ATKINSON grew up in Stillwater, a Minnesota city rooted in the lumber industry. As a child, she begged her parents to balance on a log instead of a gymnast beam.

At age 10 she was taking log rolling lessons, and by 17 she turned pro. Now 44, she's a three-time log rolling world champion. She's won another three world titles in boom running, an offshoot of log rolling where two contestants race across floating logs. Ms. Atkinson is considered a veteran lumberjill, double the age of most of her competition. She believes she would have been in close contention for a few more titles had she not been diagnosed with breast cancer in 2009, eight months after giving birth to her son. She competed throughout treatment and is now cancer-free. "I plan to be log rolling into my 80s," she says.

Ms. Atkinson teaches elementary school in Stillwater, which allows her summers off to compete. The U.S. Log Rolling Association's professional circuit kicked off June 10 and includes six stops, culminating July 20 to 22 at the Lumberjack World Championships in Hayward, Wis. These days, Ms. Atkinson only competes in log rolling. She trains year round.

A log rolling match consists of two people running on the same log at the same time with the objective of outlasting one's opponent. Whoever's foot is on the log last wins the fall, the term used for scoring. A match is best three out of five. Women typically start competitions on a 12-foot-long, 14-inch-wide log, and the match progresses onto smaller logs, which sink lower and spin faster. Some matches can last for 30 minutes.

"The sport encompasses all things athletic," Ms. Atkinson says. "It's an aerobic and anaerobic workout utilizing strength, power, agility, balance and endurance."



At 44, Jenny Atkinson, above and top, is one of the oldest competitors in the sport of log rolling.

Ms. Atkinson is ranked ninth in the U.S. Log Rolling Association's elite rankings. She says a podium spot is always the goal, but her motivation these days is to be a role model for newcomers to the sport and her 8-year-old son, Bear, who started log rolling last summer.

The Workout

During the summer season Ms. Atkinson log rolls for one to two hours, five days a week with other elite-level log rollers or up-and-coming teenagers, usually men. "If I'm on a log alone, I can stay on all day," she says. "A second person's weight and movements contradict what you do and challenge you. It's the only way to reach the next level."

Ms. Atkinson has a cabin with a man-made pond stocked with various types of logs and booms for training. She often does intervals

on her logs. "In competition you have spurts of really fast rolling where your heart rate spikes," she says. "You need to be able to calm down after those spurts so you can anticipate your opponent's next move."

She complements her training with cycling, weightlifting and yoga. In the off-season, she takes a break and stays fit with alpine and Nordic skiing and plays forward on a hockey team.

The Diet

Ms. Atkinson's diet focuses on fruits, vegetables, lean protein and complex carbohydrates. "After a tournament or hard workout I just listen to what my body craves," she says. In the morning she often has eggs, an English Muffin topped with peanut butter and homemade jam and tea. A favorite dinner is

chicken alfredo with salad. Ms. Atkinson drinks water with lemon throughout the day.

The Gear & Cost

With help from sponsors, Ms. Atkinson trains on two full booms. One is 14 logs long, the other nine, and a Key Log, a 65-pound synthetic log (\$2,150) that fills with water. "Logs are typically 400 to 500 pounds, which has really held our sport back," Ms. Atkinson says. "The Key Log is easy to transport, like a kayak, and has made log rolling much more accessible." She often trains in soft-soled shoes, like Tevas.

The Playlist

"Log rolling is a social sport and I like to practice with music in the background, usually U2 or anything from the '80s."

All the Conditioning Your Body Needs ... On a Floating Log



Ms. Atkinson, left, practices with log roller Alicia Diether.

Log rolling might seem like a quirky regional hobby, but according to a 2015 study by the American Council on Exercise, running on a log can actually deliver a great workout.

Shana Verstegen, a six-time world-champion log roller and boom runner and personal trainer based in Madison, Wis., says aspects of every pillar of fitness—strength, coordination, balance, aerobic and anaerobic conditioning, and mobility—are called into play during log rolling.

"A log rolling match can be likened to an interval run," she says. To be able to move your feet very fast on a piece of wood that is only 12 to 14 inches in diameter and keep your body centered and controlled takes extreme coordination and body awareness, she says.

Ms. Verstegen says the ability to move well in the hips and shoulders is key for some of the quick, long strides and far reaches need to control balance. "Throw in the need for absolute concentration and patience and you have yourself one of the most challenging workouts around," she says.

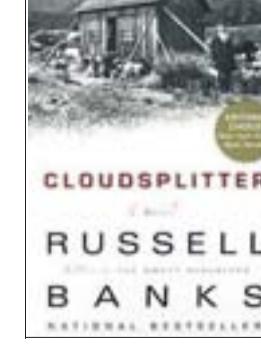
BOOKS

Continued from page A9
helped galvanize the abolitionist movement and inspired songs like the Union Army marching number "John Brown's Body." "Cloudsplitter" tells the story behind Brown's exploits and is narrated by his adult son, Owen. Ms. Gaitskill said she didn't know much about Brown before reading "Cloudsplitter" but she was quickly won over by the 758-page novel's "scope and quality and depth."

Ms. Gaitskill, who recently published an essay collection titled "Somebody With a Little Hammer," talked to The Wall Street Journal in a phone interview. An edited transcript follows.

What makes "Cloudsplitter" special?

One of the reasons I liked it was for the complexity of the characterization. Banks portrays Brown as not exactly crazy but as emotionally stupid. His son comments repeatedly that there are things that [his father] does not understand emotionally. Also he's a very rigid egomaniac and yet at the same time he's presented as genuinely outraged over slavery. He's very mixed morally and that's how I see most people as being.



In an author's note at the beginning of "Cloudsplitter," Banks writes that while some of the characters and incidents in the book are real, he's altered and rearranged facts "to suit the strict purposes of storytelling." Do you think there are any rules to writing historical fiction that authors need to follow?

My basic feeling is if it's a novel, you have a lot of leeway. Because novels don't represent themselves to be factually true. I know that Banks made up certain things. There is a scene where Owen Brown meets

a woman on a ship

who he really has a

profound conversation

with and he thinks

they have perhaps

shared a romantic mo-

ment and she kills her-

self that night. I was

haunted by the idea

that this might have

actually happened, and

so I looked it up and it

didn't and I was a lit-

tle disappointed. But if

[a book] is calling itself a novel, right

away, it isn't bound to

represent what's literally true.

How do you go about selecting titles for your books?

"Bad Behavior" honestly wasn't my title. The only reason I accepted it was because it was my first book and I was not confident in my ability to pick a title. It was actually my editor's boyfriend that picked it and I didn't like it, but

they didn't like my title, which

was "Daisy's Valentine," and which I actually think is better. The title ["Somebody With a Little Hammer"] is from a quote from Chekhov that's in my essay in the book. There are some translations where the line reads "there ought to be a man with a hammer" and I thought that seemed almost threatening. When I realized it was "somebody with a little hammer," that was just right for my title.

Why is there an image of the indie comic book character Cerebus the Aardvark on the cover of "Somebody With a Little Hammer"?

I actually designed that cover. That design was originally the cover of a journal that I did. I felt like decorating. I showed it to my editor and she really liked it and it's Cerebus the Aardvark because I really like the image and I'm a Cerebus fan.

What should readers look for as they read "Cloudsplitter"?

If I'm reading for enjoyment, I'm not really reading that critically. If something works for me, it's very intuitive and natural. I'm not reading with a fine-tooth comb or looking for things they might be doing wrong or looking for things they might be doing right. I'm just receptive to it, and if I enjoy it I'm going to keep reading. I don't even care if it's good or not, frankly. If I enjoy it I'm going to keep reading. And if it isn't enjoyable, I don't care if someone thinks it's great. I'm not going to keep reading it.



'Cloudsplitter,' published in 1998, is about abolitionist John Brown, above.

LIFE & ARTS

EXHIBITION REVIEW

Come to See the Sound

A sound-focused exhibition at the Rubin Museum of Art illuminates the Buddhist tenets of impermanence and change

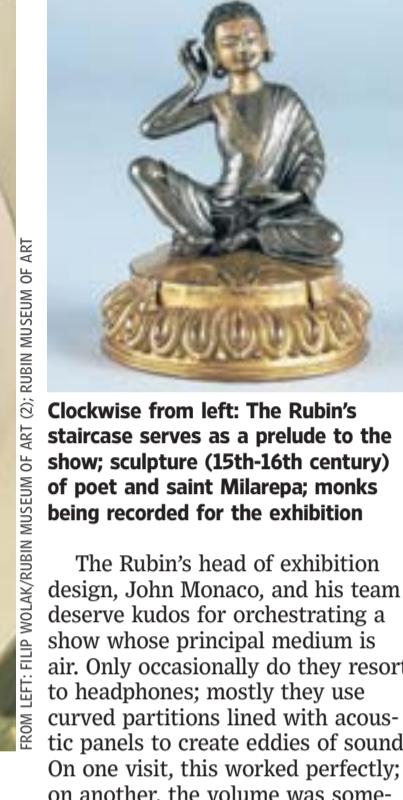
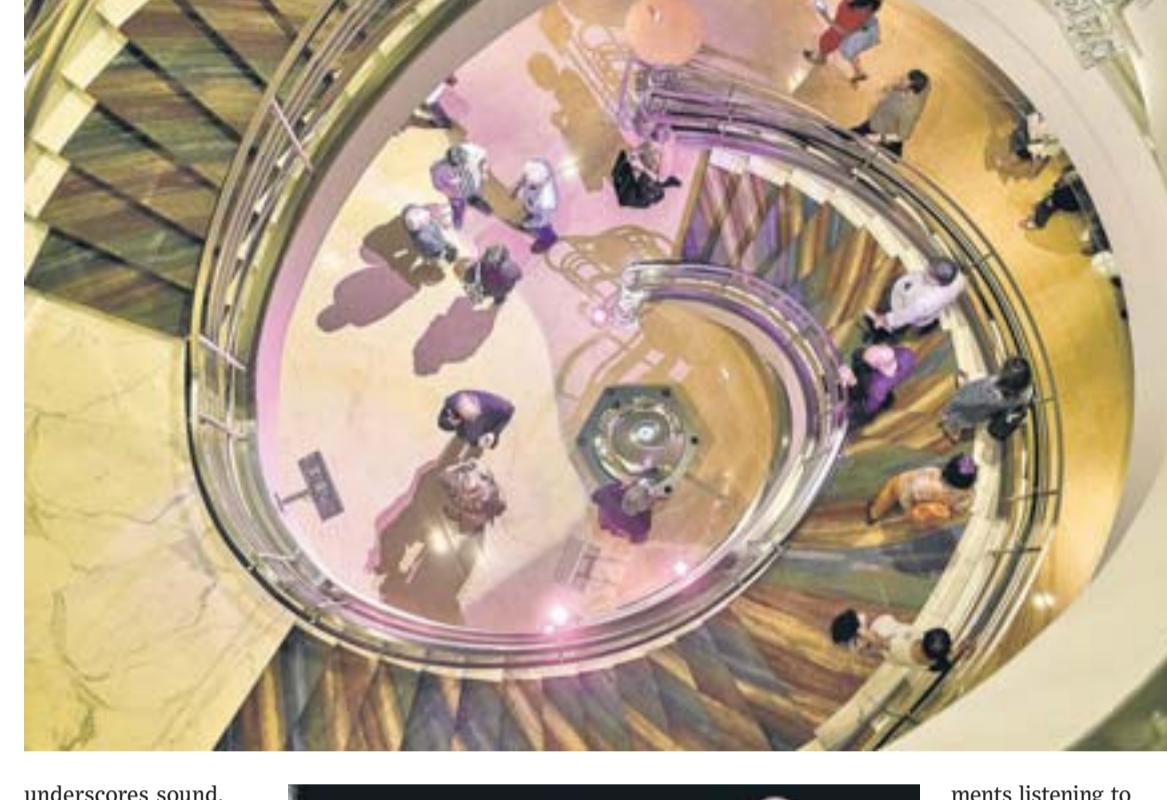
BY LEE LAWRENCE

New York

WE ALL KNOW that music is sound and sound is vibration. But unless we're at a rock concert getting our rib cages rattled by the percussion, most of us generally associate listening with the delicate mechanisms in our ears. By the same token, rarely do we engage with a statue or painting with more than our eyes. A bold and engaging show at the Rubin Museum of Art gives us the chance to broaden our understanding and experience of art.

The museum's spiral staircase serves as prelude to "The World Is Sound," which fills the sixth floor. From a concave disk at the base emanates an orchestration of man-made and natural sounds by Laetitia Sonami and Bob Bielecki. As we ascend, this interacts with a succession of tracks from Elaine Radigue's well-known "Labyrinthe Sonore." Together, they form "Le Corps Sonore" or "Sound Body," which washes over us in waves and, with the persistent gentleness of mist, fills our minds. (If you opt for the elevator, you might stop at each floor and pause by the railing.) By the time we reach the top, Rubin curator Risha Lee's wall text exhorting us to "listen with your whole body" makes sense.

So what has this to do with Himalayan art, the Rubin's stock-in-trade? The answer is just about everything. Whether the painting of a bodhisattva or the statue of a wrathful deity, most objects in the museum's collection serve as aids in a religious practice that involves hearing (bells, horns, mantras), smelling (incense, burning ghee), touch (ritual objects). The underlying premise is that it is through all our senses—Hindu and Buddhist scriptures include the mind as a sixth—that we perceive reality. While most shows at the Rubin focus on the visual, this one



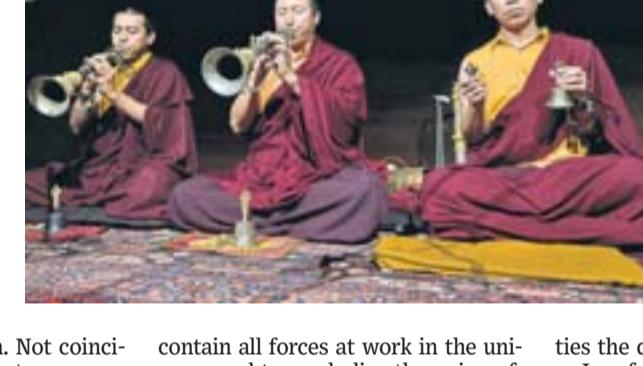
FROM LEFT: FILIP WOLAK/RUBIN MUSEUM OF ART (2); RUBIN MUSEUM OF ART

Clockwise from left: The Rubin's staircase serves as a prelude to the show; sculpture (15th-16th century) of poet and saint Milarepa; monks being recorded for the exhibition

underscores sound, which by its very nature embodies Buddhist tenets of impermanence and change.

Ms. Lee has created a compelling combination of recorded Tibetan rituals, objects from the collection, and contemporary audio and video installations that respond to fundamental themes of creation, infinity, interconnectedness, death. Not coincidentally, many of the contemporary artists appear to take a Buddhist approach to life and spirituality.

In one room, we are immersed in a vocal drone using the Rubin's recording of 10,000 visitors uttering Om or Aum, a powerful Sanskrit "seed syllable" variously believed to



contain all forces at work in the universe and to symbolize the union of body, speech and mind. The sound envelops us, its strands weaving an ever-changing fabric. Elsewhere, we step up to, say, a statue or painting and experience it as part of a ritual that includes a chant or mantra. We stand before a display of instru-

ments listening to their voices work together. We recline and hear instructions on how to navigate what Tibetan Buddhists believe are stages, or *bardos*, we journey through after death. The text is a translation from the "Tibetan Book of the Dead," and its words follow us as we contemplate depictions of colors and deities the deceased encounter.

In a few instances, displays bring in yet a third sense. Looking at a small, 19th-century mandala, for example, we listen to a monk and, placing our palm on the wall, feel the vibrations of his voice as our eyes take in red and yellow geometrics and the deity at their center.

The Rubin's head of exhibition design, John Monaco, and his team deserve kudos for orchestrating a show whose principal medium is air. Only occasionally do they resort to headphones; mostly they use curved partitions lined with acoustic panels to create eddies of sound. On one visit, this worked perfectly; on another, the volume was sometimes poorly calibrated, probably to account for visitors' voices. It may be impossible to achieve perfection, so a word of advice: Go at quiet times or, if there's too much competing noise, wait it out in one of the other shows. Any sound spilling from the stairwell's installation will only add to that experience.

When I ducked into the fourth-floor Shrine Room, the deep-throated chants of monks interacted with the subtleties of "Le Corps Sonore," together creating forms as physical as the rows of gleaming statuary filling the altar.

The World Is Sound
Rubin Museum of Art,
through Jan. 8, 2018

Ms. Lawrence writes about Asian and Islamic art for the Journal.



Cooper University Health Care wants older doctors tested for physical and mental health.

DOCTOR

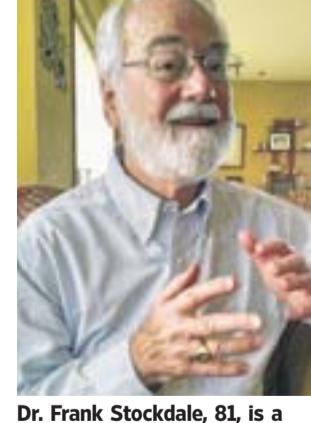
Continued from page A9
hospitalists under 40 except for physicians with high patient volumes, where there were no age-related differences in mortality.

Yet even the study's senior author, Anupam Jena, a 38-year-old associate professor of health-care policy at Harvard Medical School, calls age a "crude" measure of performance. He argues that hospitals should be analyzing outcomes of all doctors.

Dr. Jena also questions the emphasis on mental competence. Poor outcomes are due to outdated skills, he said, not dementia: "They need to focus on older doctors not because of cognitive impairment but because of their relative lack of familiarity with current treatments."

Martin Makary, a surgeon and health-quality expert at Johns Hopkins Medicine, found that older physicians have lower paid-malpractice claims than younger doctors. "Let us not make blanket generalizations about age and quality," said Dr. Makary, who is 44.

Dr. Makary looked at so-called "never events"—catastrophic mistakes such as operating on the wrong patient or the wrong organ, or leaving behind a foreign object in the patient. In a study published in the April 2013 issue of *Surgery*, he found that physicians 60 and older had the fewest never-events claims.



Dr. Frank Stockdale, 81, is a breast-cancer specialist.

At Cooper University Hospital, Anthony Mazzarelli, a physician and senior executive vice president, said the new policy requiring the mental and physical exams "wasn't meant to target physicians to not practice. It was to help them practice longer" by reassuring both the hospital and the doctor.

That is exactly what William Sharra, a pediatrician, is hoping. "I am 76 years old, so I could retire, but I don't

want to retire because I really love what I do," Dr. Sharra said. He wasn't particularly worried about the competency test, he said; he looked at it as a challenge, like the puzzles and jumbled-word games he loves.

Last week, Dr. Sharra reported to a neuropsychologist for cognitive exams, which took about three hours, with breaks. Sample question: How are a giraffe and an elephant alike? (They are both animals.) "I am not sure the testing correlates with your ability based on 45, 50 years of experience," he muses. "How does it correlate with the practice of medicine?"

David Libon, the neuropsychologist who administers the tests at Rowan University's New Jersey Institute for Successful Aging, counters: "I am not asking the questions physicians take to get licenses." The test, typically for the aged, assesses cognitive function.

Dr. Sharra's colleague, Dr. Brown, took a different route. The new policy made him confront some physical realities. Numbness in his hands made it hard for him to examine his patients; he worried about missing a mass, and felt he couldn't practice medicine safely.

Now 72, Dr. Brown chose to retire and not take the competency tests. He still questions their validity. The exams may be useful to assess elderly people "to see if they are failing," he said, but that is different from figuring out if a physician is competent.



PERFECT HARMONY NORMAN ROCKWELL



Peerless artist. Humorous subject. Incredible draftsmanship. A masterful composition alive with humor and nostalgia, Rockwell created this study for the cover of the September 26, 1936 *Saturday Evening Post*. In it, the artist expresses an unparalleled command of his medium, proving once again why Rockwell is heralded among America's most beloved artists. Charcoal and graphite on paper. Circa 1936. Signed and inscribed (lower right). Paper: 36 1/2" h x 27 1/2" w; Frame: 41" h x 32" w. #30-6488

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SPORTS



AMERICA'S CUP

KIWIS ARE ON EDGE OF GLORY

BY AARON KURILOFF

BERMUDA—Emirates Team New Zealand won a pair of America's Cup races on Sunday to move within a single victory of capturing sailing's flagship trophy from Larry Ellison's Oracle Team USA.

Racing in shifty breezes off Bermuda in front of a fleet of hundreds of spectator boats, the Kiwis were faster off the starting line in both races, leaping ahead on the early legs and maintaining comfortable leads around the course.

New Zealand was aided along the way by a series of mistakes from the U.S. team, which stalled before one start, incurred a penalty for sailing outside the course boundary and executed some maneuvers poorly during both heats. New Zealand can capture the nearly 166-year-old "Auld Mug" with one win in races scheduled for Monday.

The twin victories for the Kiwis came after Oracle won its first race of the regatta Saturday, raising hopes for a U.S. comeback.

"We showed today that we're a pretty tough bunch," said Peter Burling, helmsman for New Zealand. "We got asked some questions yesterday and I feel like we answered them with our performance."

The U.S. can look to recent history for some hope of a rebound. Oracle also stood one race from elimination during the last Cup off San Francisco in 2013 before winning eight in a row to seize the trophy in one of the greatest comebacks in sports.

Clearly, the plan wasn't to be in this position again, Oracle skipper Jimmy Spithill said on Sunday.

A victory by New Zealand on Monday would return the trophy to a country that prides itself on sailing prowess and has been a perpetual Cup contender in recent decades, but which hasn't won the regatta since 2000. Kiwi fans on the water and on shore cheered Sunday's wins, honking boat horns and waving flags in celebration.

There is a case to be made for accelerating the beloved but dawdling sport—at least on weeknights

IS BASEBALL DEAD AGAIN?

Every season, there's a fresh wave of worry that the grand American sport of baseball is in terminal decline—that the summer game is too boring, too slow, too long, too out-of-sync with our hectic, over-scheduled, very, very, very important modern lives.

Baseball is an old, unhurried game played without a clock—how does it possibly fit into an efficiency-crazed, on-demand, instant gratification society, in which—behold the miracle—a magic handheld space phone can be used to order same-day delivery of one battery, one avocado, and one shower curtain to the house, in three separate packages?

Baseball can't win in go-go times like these. The latest alarm comes via Sports Illustrated, and its admired baseball dean Tom Verducci, who paints a fretful portrait of a sport overly dominated by swing-and-miss home-run sluggers and strikeout pitchers, with not a lot of action in between:

The quaint interludes between balls regularly put in play have become yawning gaps of nothingness. Major League Baseball is concerned how the trends of more velocity, more relief pitchers and more all-or-nothing hitters are slowing the game. While the game prospers economically, baseball officials worry about where the sport is headed."

Then there's this: As of Sunday, the average Major League game in 2017 is clocking in at three hours, four minutes, which is four minutes slower than last year and, if the season ended today (dare to dream!) would be the longest average game time in baseball history. In the early 1980s, the average MLB game lasted two-and-a-half hours. Through World War II and some years later, the average was just over two—and those folks didn't even have Netflix queues to watch.

Baseball fans can be sensitive about this complaint. The Journal's excellent baseball writer, Jared Diamond, chases me around the newsroom with a tattered copy of Roger Kahn's "Boys of Summer" whenever I needle him about baseball's relevancy. As both Jared and Verducci note, the game is thriving as a business—TV ratings for the Cubs-Indians World Series last year were a total smash.

It gives a bit of a "Monty Python and the Holy Grail" quality to the "Baseball is Dead" talk:

I'm not dead yet.

He says he's not dead.

Well, he will be soon, he's very ill.

And baseball is an easy target. Compared with the NFL's slick futuristic packaging and the NBA and its youthful emoji wars, base-

ball can seem like a piece of hard candy on your grammy's shelf. And three hours is a problem. Nothing should be more than three hours: no movie, no hike, no dinner, no graduation ceremony, no meeting, no wedding, no sport.

(This is the part where Jared would interrupt to tell me the average NFL game was more than three hours, eight minutes last season—four minutes longer than baseball. And he's right!) So cut football, too! I'm a radical when it comes to sports duration. Baseball should immediately shrink from 162 to its former 154. I think the NBA and NHL season could easily cut 25 games and nobody would complain (besides, you know, owners, TV networks and player unions.) Malcolm Gladwell was on Bill Simmons's Ringer podcast arguing that with all we know about injuries and recovery, every sport should be cutting games, because players would play better, and it would create sharper, more satisfying contests. He's right. That's why he's Malcolm Gladwell.

Simmons replied that sports are far too beholden to money to make schedule cuts like that—and Simmons is also right, which is why I embrace employing all in-game ideas to accelerate play, too. Clocks for pitchers, cutting time outs, eliminating coaching visits, on-screen commercial breaks—let's do it now. But my favorite idea I've heard out there in the baseball universe is something I've endorsed here before: Seven inning games on weeknights.

I think it's a winner, people. You

want a classic nine inning baseball experience, long enough to roast a turkey, do your taxes on your phone, and take an hour-long nap—you can get it Friday through Sunday. But a game Monday through Thursday—we're going to play seven innings.

Stop me when you think any of this sounds like a dumb idea. You're not stopping me! Even the Blue Jays general manager seemed open to it. Everyone recognizes that no game should be an endurance contest, especially on a work

Nothing should be more than three hours: no movie, no meeting, no wedding, no sport.

who would disagree with that.)

Yes: I know there's an argument that slashing innings could simply cause "game creep"—that all the things that make an interminable nine-inning game would make an interminable seven-inning game. That's why I'd also add the pitch clock (Why 20 seconds? Make that baby 10!), eliminate stepping out of the batters box, no more than one pitcher switch per half-inning, and, if it goes into extra innings, there's this: *We're going to three balls for a walk, and two strikes for a strikeout.* If you want to stick a runner on second base at the start of an extra inning to make it even spicier, do it.

I'm going to win a Nobel for this, aren't I?

I know some of you might be thinking: *Don't you like bike racing and tennis—those sports have five and six hour events! Doesn't that make you a hypocrite?*

Yes! I'm a sports columnist! Rampant hypocrisy is in the job description!

The good news for baseball is that it has a commissioner Rob Manfred who recognizes these problems, who doesn't appear wedded to tradition, and is open to adaptation and acceleration. What baseball's confronting isn't much different from what every workplace in America is confronting. Anyone in a business amid a siege of modernization and cutbacks will recognize management's favorite double-talk maxim:

Do more, but with less.

That's really all baseball needs. So play ball! (Just faster.)



Dodgers pitcher Clayton Kershaw, center, yawns in the dugout during an extra-innings game against the Padres in 2011.

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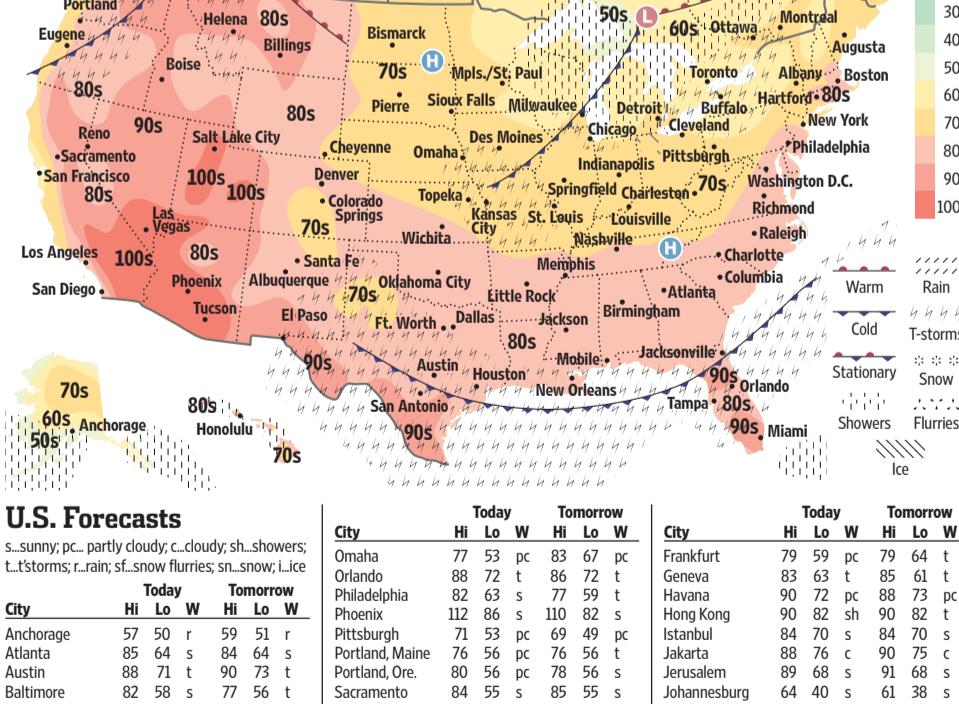
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FROM LEFT: CLIVE MASON/GETTY IMAGES; LENNY/GLENZ/ASSOCIATED PRESS

Weather



U.S. Forecasts

S=sunny; pc=partly cloudy; c=cloudy; sh=showers; t=tstorms; r=rain; sf=snow flurries; sn=snow; i=ice

Today Tomorrow

City Hi Lo W Hi Lo W

Anchorage 57 50 r 59 51 r

Atlanta 85 64 s 84 64 s

Austin 88 71 t 90 73 t

Baltimore 82 58 s 77 56 t

Boise 98 64 s 87 60 s

Boston 80 62 s 79 61 t

Burlington 71 55 pc 71 55 t

Charlotte 86 61 s 83 57 t

Chicago 72 52 pc 77 58 s

Cleveland 73 56 pc 72 57 t

Dallas 88 72 pc 90 75 pc

Denver 72 51 sh 74 54 pc

Honolulu 87 74 pc 87 74 s

Houston 88 73 t 88 74 t

Indianapolis 73 52 pc 74 54 s

Kansas City 74 56 t 82 69 pc

Las Vegas 109 81 s 107 79 s

Little Rock 83 63 pc 85 66 s

Los Angeles 87 63 pc 79 62 pc

Miami 91 79 pc 89 78 t

Milwaukee 70 52 pc 76 61 s

Minneapolis 72 54 pc 78 62 pc

Nashville 80 59 pc 82 58 s

New Orleans 85 73 t 86 74 t

New York City 78 63 s 76 60 t

Oklahoma City 86 65 pc 89 71 pc

International

Today Tomorrow

City Hi Lo W Hi Lo W

Amsterdam 67 54 pc 74 61 t

Athens 91 74 s 92 74 s

Bahrain 114 86 s 117 89 s

Bangkok 91 80 t 91 78 t

Beijing 94 69 pc 94 71 pc

Berlin 70 50 pc 73 61 pc

Brussels 73 56 pc 75 61 pc

Buenos Aires 73 63 pc 69 50 r

Dubai 103 89 s 103 91 s

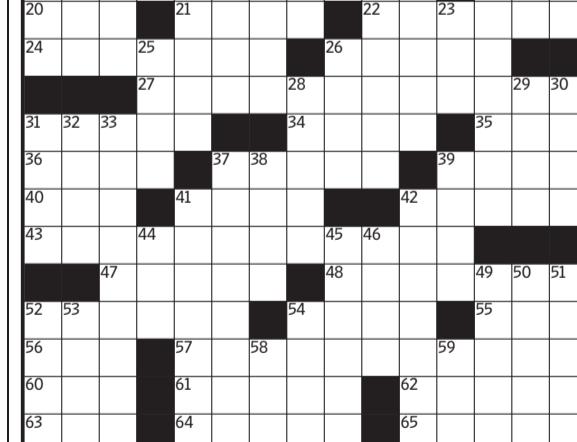
Dublin 59 53 r 67 52 s

Vancouver 70 54 pc 68 53 s

Zurich 75 52 pc 75 58 pc

Edinburgh 63 51 c 58 51 r

The WSJ Daily Crossword | Edited by Mike Shenk



H.O.T. STUFF | By Dan Fisher

- Across**
- 1 Like the smell of burning plastic
 - 6 Book makeup
 - 11 Letter after epsilon
 - 14 Pop singer Mars
 - 15 Rust or lime, for example
 - 16 Lend a hand
 - 17 1981 hit for ELO
 - 19 One, for Juan
 - 20 Have unpaid debts
 - 21 Clearasil target, informally
 - 22 Prom chaperones, usually
- Down**
- 1 Really hate
 - 2 "Gladiator" star
 - 3 Occupied the throne
 - 4 Alternative to Dem. and Rep.
 - 5 Humdingers
 - 6 Like most indoor plants
 - 7 Imaginary line through the Earth
 - 8 Combo's engagement
 - 9 Star of TV's "Westworld"
 - 10 Preordained occasion
 - 11 "Slip Slidin' Away" singer
 - 12 Suggestion
 - 13 Wedding exchange
 - 18 Ship of 1492
 - 23 Nation between Can. and Mex.
 - 25 Sharpen
 - 26 Songwriter Porter

- 28 Canonized person
- 29 Appearance
- 30 Bartender's mixer
- 31 Lively party
- 32 In addition
- 33 Idyllic spot
- 37 Popular sunning spot
- 38 Hay storage site
- 39 Cavalry base
- 41 "Gosh!"
- 42 Hurt
- 44 Aromatherapy place
- 45 7UP, in bygone ads
- 46 Goal of negotiations
- 49 Lift up
- 50 Crowning points
- 51 City of

OPINION

An Academia-Big Pharma Truce

By Marc Siegel

Scott Gottlieb, the new Food and Drug Administration commissioner, is focused on scientific innovation and "finding better treatments for a lot of costly diseases." In Senate testimony last week, he talked about facilitating approval of targeted genetic cancer therapies and medications for rare diseases, known as orphan drugs. To streamline the discovery process and avoid duplication, Dr. Gottlieb has told me, the FDA will emphasize the need to "better integrate academic discoveries with industry."

That won't be easy—academia, government researchers and industry have long been rivals. But Dr. Gottlieb can shed light on the positive accomplishments of industry scientists while encouraging more open communication among the three groups and reducing redundancy.

Most Americans are unaware how many great scientists, trained in academia, now work in private pharmaceutical laboratories. A 2010 paper in the peer-reviewed journal *Nature Reviews Drug Discovery* confirmed that the vast majority of pharmaceuticals now in use were discovered in drug-company labs, where a process known as high-throughput screening allows

computer analysis of thousands of compounds to determine those with the best activity against certain diseases.

Big Pharma pioneered this process in the late 1980s before its use began to expand to academia in the early 2000s.

Once a promising drug has been discovered, it moves first to animal testing and then to human clinical trials. It is here that the corporate

The corporate and scholarly research worlds could learn much from each other.

and academic worlds must work together. For decades, research funded by pharmaceutical companies has exceeded what the National Institutes of Health spends. According to a 2010 study in the *Journal of the American Medical Association*, of the approximately \$100 billion spent in biomedical research in 2007, close to 60% came from the pharmaceutical industry and a little more than 30% from the government. In 2011, the industry spent \$39 billion on research in the U.S. while the NIH spent \$31 billion. Drug-company-funded

clinical trials at major medical centers produce the majority of publications in the medical literature.

A laboratory scientist has many incentives to leave academia and come over to the "dark side" of private industry. The money is better, of course, but the profit motive in well-equipped private labs often leads to an emphasis on creative solutions. One downside: the loss of prestige that goes along with an academic affiliation.

A few years ago I visited Pfizer Laboratories in Groton, Conn., to meet with a chemist (trained at a top university) who had discovered a novel use for the antibiotic azithromycin. He told me he was about to abandon his research because the drug seemed ineffective. Following an impulse, he measured tissue levels of azithromycin, which stayed elevated for several days. He realized a patient could take a five-day course of the drug and it would remain effective much longer. The popular and effective Zithromax Z-Pak was born. "I would never have felt the freedom to go the extra step in my previous life in academia," he said.

Collaboration between academia and industry has helped along several new Ebola vaccines in development at the NIH, including VSV-Zebov.

Discovered by Canadian scientists and licensed by New Link Genetics and Merck, VSV-Zebov was studied in a clinical trial in Guinea. The results, published in the journal *Lancet* in December, look promising.

Even Microsoft is entering the world of academic medicine. The technology giant has developed a prototype of a watch it calls Emma that senses and temporarily quiets tremors caused by Parkinson's disease. If trials confirm the watch's promise, Emma could help diagnose patients and treat symptoms without the side effects of common Parkinson's medications.

The process of developing a new vaccine or bringing a new device to market is complex and exacting. Manufacturers are generally motivated by profit, and their top scientists operate with a creativity rare among the protocol-heavy, prestige-driven scientists of academia. But both sides share a goal: curing people. Dr. Gottlieb, with his background in clinical medicine and biotechnology, is well-suited to help them do it.

Dr. Siegel, a professor of medicine and medical director of Doctor Radio at New York University's Langone Medical Center, is a Fox News medical correspondent.

BOOKSHELF | By John Steele Gordon

Enterprising Bostonians

Brahmin Capitalism

By Noam Maggor

(*Harvard*, 284 pages, \$39.95)

One of history's ironies is that, even though New England birthed the abolition movement, many of Boston's most prominent families offered less than total support for freeing the slaves. Their prosperity required a steady supply of cotton to feed New England's growing textile industry. Even after slavery ended in 1865, wealthy Bostonians were reluctant to abandon their traditional business. Henry Lee Higginson, 30 years old and freshly discharged from the Union Army, bought with his partners a 5,000-acre plantation in Georgia with the goal of turning a profit by growing cotton. But the 60 former slaves living on the plantation thought the wages and terms offered to be grossly inadequate; the land they had worked in chains for generations, they believed, should belong to them. The enterprise soon collapsed.

As similar episodes played out across the South, Boston's business elites looked for new places to invest their money.

"They began to reenvision American capitalist development, not in modifying and salvaging the arrangements of earlier decades but in a far more ambitious program of continental industrialization," Noam Maggor writes in "Brahmin Capitalism." "They retreated from cotton and moved into a host of groundbreaking ventures in the Great American West—mining, stockyards, and railroads."

This reinvention, Mr. Maggor argues convincingly, undermines prevailing stereotypes of Boston's elite in the 19th century. Far from being a conservative, inward-looking sort who settled into soft decline, the Brahmins crisscrossed the continent and took bold risks in search of higher yields than New England's manufacturing businesses could provide. In the process, they turned Boston into an interconnected financial hub that supplied the capital that the growing West needed for development. They also remade the economy of the United States, turning it from a largely agricultural exporter into the greatest industrial country in the world, out-producing Britain, France and Germany combined.

In the hands of Charles Francis Adams, a grandson and great-grandson of presidents, Boston capital turned the sleepy Kansas City stockyards into a center of the fast-growing meat industry. Between 1868 and 1883, the investment portfolio of Thomas Jefferson Coolidge—great-grandson of the third U.S. president—more than doubled its investment in Western industry, including allocations to stockyards, mining companies and railroads. Among them was the Atchison, Topeka & Santa Fe, of which Coolidge briefly served as president.

Contrary to stereotype, the Brahmins of New England crisscrossed the continent and took bold risks in search of higher yields.

Especially representative of the Bostonians' transformative influence was Higginson's next enterprise. Far removed from Georgian cotton, his interests landed on a copper mine in northern Michigan's remote Keweenaw Peninsula. Copper had been discovered there 20 years earlier, but extraction had been small-scale and labor intensive; the high cost per unit meant that mining was profitable only for veins that contained at least 40% copper. In a short time, high-yield mines in the area began to show signs of depletion. But with Higginson's capital—alongside investments from other Brahmins—large-scale copper extraction could take place as a continuous operation, making mining profitable on belts that contained only 2%-4% copper. In this way, Higginson's Eastern capital transformed Western mining and launched a career that would make him one of Boston's leading financiers.

"Brahmin Capitalism" is rich with such vignettes, although they are not always integrated into the context and the book suffers somewhat as a piece of storytelling. What Mr. Maggor, a fellow in the Charles Warren Center for Studies in American History at Harvard, has really produced is a work of scholarship; about a fourth of the text consists of research notes.

This research is used to present an informative chronicle and to advance a few novel, and often persuasive, hypotheses, among them the notion that America's Gilded Age isn't as uniquely American as many would think. The Brahmins plowed establishment money into exploiting the resources of an underdeveloped region to increase their own fortunes; in doing so, they followed the same process as investors around the world who "mobilized to intensify their domination of continental hinterlands and pull vast territories in India, Egypt, Asia, Africa, and Latin America into the world economy." In Mr. Maggor's telling, this places the changing American economy of the late 19th century within the more universal story of the transformation of global capitalism.

Mr. Maggor also finds evidence that the Brahmin capitalists shaped politics far beyond the borders of Massachusetts. The rush of Eastern capital into the territories made more urgent the need for state governments capable of developing the regulations, rule of law and infrastructure that burgeoning industries required. Western populist voters, for their part, pushed against policies that privileged faraway investors. The tensions between the Brahmins and the settlers, and their ultimate resolution, determined the expanding nation's laws on everything from water rights to railroad regulations to worker-safety rules.

Similar battles were waged in the Brahmins' backyard, particularly in the debate over whether Boston should annex outlying communities like Dorchester and Roxbury. These annexations were championed by the area's middle class, who sought to raise taxes on the Brahmins in order to free up land for lower-cost housing and to finance the extension of urban infrastructure into less affluent districts. The Brahmins, meanwhile, opposed such plans, concerned that fiscal recklessness and high taxes would cause capital to flee the city.

The Brahmins lost and, as Mr. Maggor writes, Boston was "plunged . . . into ever-growing expenditures and rising property taxation," which, to the elites, "threatened the status of the metropolis as an attractive place for business." Today, Boston has been eclipsed as a financial and economic center not only by New York but also by upstarts like Houston and San Francisco. Perhaps Mr. Maggor's tale is above all a cautionary one.

Mr. Gordon is the author of "An Empire of Wealth: The Epic History of American Economic Power."

Urban Terrorism Returns to Colombia



A terrorist attack on June 17 in the upscale Bogotá, Colombia, shopping mall Centro Andino left three dead and nine injured, one critically. The bombing marks the return of urban terrorism to Colombia's capital city even while the ink is barely dry on the "peace" settlement President Juan Manuel Santos signed in Havana last year with the narcoterrorist group FARC.

Mr. Santos immediately declared the perpetrators of the crime "enemies of peace." Thank you, Captain Obvious. But Colombians are asking who did it, and the answers they're getting are suspiciously murky.

That has given rise to rumors of a cover-up. Yet one thing is certain: Granting impunity for crimes against humanity, as Mr. Santos did for the FARC, has invited more terrorism.

Centro Andino is a national symbol of capitalism and has long been considered a possible terror target. Vehicles entering the parking garage are inspected by police and bomb-sniffing dogs. The areas in and around the mall are blanketed with surveillance cameras. Colombian forensic teams excel at terrorism investigations and count on U.S. technical support for anything

they lack. Yet this investigation appears amateurish at best.

Investigators initially said witnesses spotted two suspicious males entering the ladies' room not long before the bomb went off. Normally video footage would be urgently released to enlist the public in finding the suspects.

Instead the investigation team recruited sketch artists to make composite drawings of the men. The Twitter handle @Oskar_Sc captured the ridiculousness of this: "If you spit a piece of chewing gum" in Andino, "security can show the image from four different angles. They make a composite sketch of the attack?"

The sketches were released Tuesday. A day later the government withdrew them and said they weren't official.

No group has claimed responsibility for the attack, but that's not unusual. After the FARC bombed Club El Nogal in 2003 it denied paternity until authorities uncovered documents five years later that proved its guilt for a massacre that killed 36.

The only one to die instantly in the Andino blast was a 23-year-old French national, Julie Huynh. She had been in Colombia for six months doing social work for a nongovernmental organization with links to former FARC guerrillas ostensibly demobilized under the Santos agreement. On June 8 she reportedly took a trip to Cuba. She was at the mall with her

mother and planned to leave Colombia within days.

Counterterrorism 101 teaches that in any terrorist attack, those closest to the explosion are prime suspects until they can be cleared. Huynh had to have been near the bomb; the other two women died from their wounds at the hospital.

Investigators have said the bomb used ammonia nitrate, a notoriously unstable compound. Whoever took it into a closed area like a bathroom probably was not an explosives expert.

On Wednesday the Colombian news outlet RCN reported in vague terms that the medical examiner found no traces of bomb residue on any of the bodies, a claim that is not credible. When asked, the medical examiner wouldn't confirm that claim, saying only that he made a report to the attorney general's office. No one answered that office's public-affairs lines when I called on Friday, and no report has been made public.

The FARC's reaction to Huynh's death has been intriguing. It has oozed sympathy on

Y

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The FARC's reaction to Huynh's death has been intriguing. It has oozed sympathy on

social media for her but has not mentioned the other victims. A photo of her posted by the FARC contains its seal in the lower left corner. Perhaps unfairly, Colombians are recalling the story of Tanja Niemeijer, the Dutch national who arrived in Colombia in 2000 under a "social worker" cover and turned out to be a ruthless terrorist.

On Wednesday the police announced arrest warrants for five men and one woman who it said are members of People's Revolutionary Movement (MRP), an offshoot of the Marxist National Liberation Army (ELN). On Saturday it said it arrested four men and four women alleged to be MRP members involved in the crime. Some were reportedly captured in a town known as a FARC stronghold. It is worth noting that MRP bombings until now have been low-power, nonlethal events in which pamphlets were left behind—very different than Andino.

Huynh's proximity to the bomb may have been pure coincidence. But the failure to conduct a professional investigation muddies the waters.

Mr. Santos warned Colombians last year that if the FARC isn't appeased, it will return to urban warfare. Recently the attorney general said that the FARC's wealth has been uncovered and will be confiscated to compensate its victims. Colombians could be forgiven for fearing that at Centro Andino the FARC responded.

Write to O'Grady@wsj.com.

Congressman, Defend Thyself

By Thomas Massie

When Republican lawmakers came under fire during a June 14 baseball practice in Virginia, they were trapped by a tall fence with one exit. Thanks to armed officers guarding House Majority Whip Steve Scalise, only five people were wounded.

But although members of the congressional leadership are provided security details, the rest of us have to count on luck. "When congressmen and senators are off the Capitol Hill campus, we are still high-profile targets, but we have zero protection," Rep. Mo Brooks of Alabama told John Lott of the Crime Prevention Research Center.

Mr. Lott, who worked with me on this article, and I have talked to some of the congressmen and staffers who were there during the attack. They uniformly want to change the District of Columbia's gun-control laws.

Rep. Steve Pearce of New Mexico described to me how a security officer's shots put the attacker into a defensive position, causing him to come out

from behind a wall to fire before taking cover again. Had the attacker "taken even six steps forward," Mr. Pearce said, he would have seen several exposed people concealed from his line of sight.

At least five congressmen at the baseball practice have concealed handgun permits in their home states. At least one aide also has a permit. Others may be reluctant to announce publicly that they do, since

Many lawmakers have gun permits, but we can't use them in D.C.

part of the benefit of carrying a concealed weapon is that potential attackers do not know who is armed. That's why uniformed police have an almost impossible job stopping terrorist attacks. A uniform is like a neon sign flashing: "I have a gun. Shoot me first."

In 2015 the Daily Caller surveyed 38 conservative members of Congress, asking whether they held a concealed-carry permit. Thirty

declined to answer. Of the eight who did respond, six had permits. Jerry Henry, executive director of Georgia Carry, says that as of last year nine of the 10 Republican congressmen from his state had a concealed-carry permit.

An aide says that when Rep. Barry Loudermilk is speaking at public events in his district, "they always have someone with the congressman who is carrying." Likewise, when I'm home in Kentucky, my staff and I carry weapons.

But the District of Columbia's gun regulations mean no one had a permitted, concealed handgun at the congressional baseball practice. Virginia, where the attack occurred, honors permits from any other state. But as Mr. Brooks explained: "My residence is in the District of Columbia, which means that it would have been illegal for me to take my weapon with me to the ballpark—about a 9-mile bike ride—and it would have also been illegal for me to come from Virginia back into D.C. with my weapon."

Both Rep. Brooks and the

Loudermilk aide say they believe the attack could have been ended much earlier. The aide, who asked to be unnamed, has received active-shooter training and remained behind a car 15 to 20 yards from the attacker. He believes he could have shot the attacker from his position and ended the attack "probably four minutes earlier."

Mr. Brooks believes he was much better-positioned than the two officers guarding Mr. Scalise, who were on the opposite side of the field: "If I had a weapon in my backpack in the dugout, I would have had an opportunity to stop him."

That's why I have introduced legislation to allow people with concealed handgun permits from any state to carry their permitted firearms into the District of Columbia. It's a miracle that only five were wounded at the Republicans' baseball practice. Next time the results might be even more devastating.

Mr. Massie, a Republican, represents Kentucky's Fourth Congressional District and is chairman of the Second Amendment Caucus.

OPINION

REVIEW & OUTLOOK

The Missile Defense Imperative

Liberal opposition to missile defense has persisted since the 1980s, but the politics may be changing with technological progress and the rising threat from North Korean dictator Kim Jong Un's nuclear weapons. Congress has an opportunity this summer to notch a rare bipartisan deal that enhances U.S. security.

Kim has already overseen more nuclear and missile tests than his father and grandfather combined, and the Defense Intelligence Agency warns that "if left on its current trajectory" Pyongyang will develop a capacity to hit Japan, Alaska, Hawaii or even the U.S. West Coast. The Trump Administration is pleading with China to stop the North, but Chinese leaders never seem to act and they're even trying to block regional missile defenses in South Korea.

Meanwhile, the U.S. last month successfully tracked and shot down a mock intercontinental ballistic missile, akin to a bullet hitting a bullet. The Ground-based Midcourse Defense (GMD)—first fielded in 2004 but untested since 2014—has a success rate of nine in 17 intercept trials. But even the failures show the GMD is increasingly effective.

Alaska Senator Dan Sullivan wants to build on this progress with an amendment that would fund a more integrated system, add new interceptors and sensors and increase research. The legislation has united conservatives such as Ted Cruz and Marco Rubio and liberal Democrats such as Gary Peters and Brian Schatz, no small feat in the Trump era.

Systems like the Aegis Ballistic Missile Defense at sea and the Terminal High Altitude Area Defense (Thaad) on the ground can shoot down regional threats within earth's atmosphere. Only the GMD can hit long-range threats targeting all 50 states, bringing the missiles down in space. All of these systems have separate radars, which have to be coordinated to get a complete picture of a target. The bill aims to create a better integrated system that provides what Mr. Sullivan calls "an unblinking eye."

This would include advanced space-based sensors. An improved system in space could provide a persistent picture—from launch to interception. If the systems can communicate

As nuclear threats grow,
the U.S. needs more
advanced protection.

more efficiently, military brass can make better choices faster.

By the end of 2017 there will be 40 ground-based interceptors at Alaska's Fort Greely and four at California's Vandenberg Air Force Base, where the May test was conducted. The bill provides for 28 more interceptors for Fort Greely. Extra interceptors

mean more tests and more available to take out threats. This is crucial as the North builds mobile launchers and tries to develop multiple warheads on a single missile.

Some Senators suspect that the Sullivan amendment is little more than home-state pork, but all states would benefit from preventing an attack and the fact of geography is that the trajectory of intercontinental missiles usually requires them to fly over Alaska. The Pentagon is studying whether to place another interceptor site in the Midwest or East Coast.

Opponents say missile defenses are too expensive given that interception might fail, so better to trust arms control and the deterrence of mutual-assured destruction. But arms talks with North Korea have been a fool's errand since negotiator Robert Gallucci and Bill Clinton bought its promises in 1994.

Even a 50% chance of interception might increase deterrence by making the success of an enemy first strike more doubtful. North Koreans or other rogues also may not be rational actors who fear their own annihilation. U.S. leaders have a moral obligation to do more than let Kim Jong Un hold American cities hostage, and without defenses a pre-emptive military strike might be the only alternative.

The price for the space-based system is classified but no doubt expensive, and it's difficult to score technologies still under development. But Congress ought to be able to find money to save Seattle from annihilation while arming U.S. troops against conventional threats. If it can't, voters should at least be able to see who voted against their protection.

The Senate will take up the National Defense Authorization Act in the coming weeks. Mr. Sullivan's missile-defense amendment would be a down payment on a safer America in an ever more dangerous world.

Trump's 'Tapes' Trick

His Twitter bluff
led to the special
counsel appointment.

Mr. Trump's suggestion that someone else might have taped those conversations looks like more misdirection because it's highly unlikely that the National Security Agency or anyone else is taping the President in the Oval Office. If someone is taping without Mr. Trump's knowledge, the U.S. has bigger problems than presidential

trolling.

But we do know that Mr. Trump's original "tapes" tweet caused Mr. Comey, by his own testimony to Congress, to leak via a buddy a memo of one conversation with Mr. Trump. Mr. Comey said his goal was to trigger the appointment of a special counsel to investigate Mr. Trump, and he succeeded. Far from keeping Mr. Comey quiet, Mr. Trump's "tapes" tweet led to the creation of a mortal threat to his Presidency.

The episode is further proof that the biggest obstacle to an effective Trump Presidency is Mr. Trump. The tweeting by itself isn't the problem. The problem is that he thinks he can use the platform to spread misinformation as often as he tries to communicate facts about his agenda. He shouldn't be surprised if Americans conclude they therefore can't believe him even when he is telling the truth.

Nevada's Solar Subsidy Resurrection

Gov. Sandoval restores
the net-metering
regulatory scheme.

electricity prices have been falling due to lower fuel costs. Over the past two years Nevada's electricity rates have dropped 12%.

Mr. Sandoval at the time supported the utilities commission's decision to end net metering and instead pay solar customers the wholesale rate for their power. But solar-leasing companies subsequently fled the state because their business was no longer profitable. They claimed thousands of jobs were lost as a result, though many workers who installed panels were freelancers and have been able to find other work in construction.

Nevada's green-energy ambitions haven't suffered. In the past year solar generation in Nevada has increased by 71%—more than in Arizona, California and Hawaii—due to expanding solar farms, which are more economical than rooftop panels. Yet Mr. Sandoval says that restoring net metering would ensure that rooftop solar owners get fairly credited for their green energy.

Solar customers will now be compensated at 95% of the retail rate and be protected from future regulatory changes. You'd think the green lobby would be thanking the sun gods, but they're still raging at the Governor for vetoing an increase in the state's renewables mandate to 40% of electric-power generation by 2030 from 25% in 2025.

The solar lobby and its media friends keep telling us how sun power is taking over the world, but we'll believe it when it can compete without subsidies that fleece consumers.

LETTERS TO THE EDITOR

Debating Mark Zuckerberg's Universal Income

In his critique of Mark Zuckerberg's universal basic income (UBI) proposal ("Zuckerberg's Opiate for the Masses," op-ed, June 19), Andy Kessler seriously misrepresents the nature of the proposal. It is not "paying people not to work," but paying people whether they work or not. The strongest arguments for universal income center on its elimination of work disincentives by the unconditional nature of such grants. Current methods of income-support either create distortions by high marginal effective tax rates or phasing out benefits or they directly distort through interventions like the minimum wage. There is much to debate about the proposal for a universal income, and I am skeptical as to whether it would in fact replace other policies because of political temptations to meddle. It is not, however, possible to conduct a rational debate over how best to approach serious social problems when straw men are deployed to ridicule a well-considered argument that deserves a well-considered response.

EM. PROF. RICHARD WALLACE
*Wofford College
Spartanburg, S.C.*

The lure for liberals of a UBI is obvious. Those who view the state as the best steward of collective well-being would have the state take care of us all. UBI produces game, set and match for statists, bringing an end to what remains of rugged individualism and small government. What political party could possibly launch a successful UBI repeal-and-replace campaign in an America teetering on the edge of fiscal collapse? And if the U.S. has a problem with illegal immigration now, imagine what happens when statists push through the UBI and soften border-security enforcement. Some wealthy conservatives have hopped on the UBI bandwagon as well, partly out of compassion and partly as a "give the left-behind

ROBERT SOMMERS, PH.D.
Jacksonville, Fla.

The ideas of Messrs. Zuckerberg, Elon Musk and Robert Reich are evidence that educational intelligence and the ability to make money have no correlation with having common sense. There can be no universal basic income to give anybody unless somebody is working to create what is to be given away. Who do they think will do that? It's just like the minimum wage. You can set the minimum wage at whatever amount you want, but it will always be the minimum wage.

TIM BALDWIN
San Antonio, Fla.

Public Accounting: Don't Try This at Home

Regarding Steven Malanga's "A Town's 'Creative Accounting' Leads to a Fraud Conviction" (Cross Country, June 17): If I used "creative accounting" to obscure my true taxes owed, I'd find myself fined, in jail or both. The IRS tracks over 150 million tax-payers using an audit rate of less than 1%. Surely the SEC can track 44,000 filings of local public officials responsible for managing public (i.e., taxpayers') funds. Similarly, if the SEC required federal, state and local government institutions to employ the same established accounting standards required of individuals and public companies, along with similar civil and criminal penalties for deliberate violations, creative accounting among municipalities would dramatically decrease. This isn't rocket science.

KENT EISELE
Madison, Ala.

At Truth in Accounting we believe that state and city budgeting is done using "political math." The ways budgets are calculated allow elected officials to meet their balanced-budget requirements, while putting their governments into debt. Our 50-state study found that most states "balance" their budgets while overestimating revenues and underestimating expenses. In some states, loan proceeds are considered revenue and

hundreds of billions in costs aren't included.

The largest budgeting gimmick relates to deferred compensation. Each year employees earn their compensation, which includes their salaries and portions of their pension and retiree health-care benefits. Over the years, to avoid including the true compensation costs in the budgets, elected officials have chosen not to fund more than \$800 billion of pension benefits and more than \$600 billion of retiree health-care benefits.

These budgeting shenanigans have made it impossible for the voters to hold their elected officials accountable. State legislators, city council members and other elected officials have been re-elected based on voters believing that the governments' budgets were balanced. But the budgets weren't balanced. Would voters have voted differently had they understood their governments were running deficits? Would voters have changed their minds if taxes had been increased to cover the true costs of government?

Would the electorate have been happy if government services or benefits had to be cut to cover the true costs?

SHEILA A. WEINBERG
*Truth in Accounting
Chicago*

Harvard Progressives Are Sly

Humans Becoming Junior Partner in Robot Alliance

Ken Goldberg notes in "The Robot-Human Alliance" (op-ed, June 12) that some human players have begun playing alongside computers in the challenging and ancient game of Go.

Sadly, the experience of chess suggests that such happy harmony may not last long. By 2006 chess computers had firmly supplanted humans as the world's best players. Nevertheless, like Go now, "centaur" teams (as we then called them) of humans and computers were stronger than computers alone. That changed in 2013 with the advent of superstrong chess computers like Rybka, Komodo and Stockfish. All of these computers find human assistance unnecessary and unhelpful, playing best when they play alone. Komodo and Stockfish are now so skilled that no human player, including World Chess Champion Magnus Carlsen, has ever been able to even draw a game, even at odds. I hope this experience isn't predictive for the ultimate impact of machine learning on society and the economy.

CORY EVANS
*Brown University
New York*

Regarding your editorial about the new conservative dean of Harvard Law School ("Are You Sitting Down?", June 7): A conservative dean at any American law school is worth noting. What is surprising, however, is that there are not more. A primary task of today's law school dean is to raise money. Conservatives, unlike their liberal colleagues, often share the values of those who have the money. And the liberals gain the added benefit of one less professor spreading conservative ideas in the classroom.

JAMES HUFFMAN, EM. DEAN
*Lewis & Clark Law School
Portland, Ore.*

Pepper ... And Salt

THE WALL STREET JOURNAL



"I'm the first to admit
I have faults."

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OPINION

Trump, Mueller and Arthur Andersen

By Michael B. Mukasey

What exactly is Special Counsel Robert Mueller investigating? The basis in law—regulation, actually—for Mr. Mueller's appointment is a finding by the deputy attorney general that "criminal investigation of a person or matter is warranted."

According to some reports, the possible crime is obstruction of justice. The relevant criminal statute provides that "whoever corruptly . . . influences, obstructs or impedes or endeavors [to do so], the due and proper administration of the law under which any pending proceeding is being had," is guilty of a crime. The key word is "corruptly."

Did the president act 'corruptly'? Not from what we know—but then neither did the accounting firm.

President Trump's critics describe two of his actions as constituting possible obstruction. One is an alleged request to then-FBI Director James Comey that he go easy on former national security adviser Michael Flynn, who was under investigation for his dealings with Russia and possible false statements to investigators about them. According to Mr. Comey, Mr. Trump told him, "I hope you can see your way clear to letting this go, to letting Flynn go," because "he is a good guy."

An obstruction charge based on that act would face two hurdles. One is that the decision whether to

charge Mr. Flynn was not Mr. Comey's. As FBI director, his job was to supervise the investigation. It is up to prosecutors to decide whether charges were justified. The president's confusion over the limits of Mr. Comey's authority may be understandable. Mr. Comey's overstepping of his authority last year, when he announced that no charges were warranted against Hillary Clinton, might have misled Mr. Trump about the actual scope of Mr. Comey's authority. Nonetheless, the president's confusion could not have conferred authority on Mr. Comey.

The other is the statutory requirement that a president have acted "corruptly." In *Arthur Andersen LLP v. U.S.* (2005), the U.S. Supreme Court accepted the following definition: that the act be done "knowingly and dishonestly, with the specific intent to subvert or undermine the integrity" of a proceeding. Taking a prospective defendant's character into account when deciding whether to charge him—as Mr. Comey says Mr. Trump asked him to do—is a routine exercise of prosecutorial discretion. It is hard to imagine that a properly instructed jury could decide that a single such request constituted acting "corruptly"—particularly when, according to Mr. Comey, Mr. Trump also told him to pursue evidence of criminality against any of the president's "satellite" associates.

The second act said to carry the seed of obstruction is the firing of Mr. Comey as FBI director. The president certainly had the authority; it is his motive that his critics question. A memorandum to the president, from the deputy attorney general and endorsed by the attorney general, presented sufficient grounds for the firing: Mr. Comey's usurpation of the



AP/GETTY IMAGES

Then-FBI Director Robert Mueller testifies before the Senate in 2013.

prosecutor's role in the Clinton matter and his improper public disclosure of information unfavorable to Mrs. Clinton. But the president's detractors have raised questions about the timing—about 3½ months into the president's term. They have also cited the president's statement to Russian diplomats days afterward that the firing had eased the pressure on him.

The timing itself does not suggest a motive to obstruct. Rather, coming a few days after Mr. Comey refused to confirm publicly what he had told Mr. Trump three times—that the president himself was not the subject of a criminal investigation—the timing suggests no more than an understandable anger. The statement to Russian diplomats, which might have been intended to put the Russians at ease, collides with the simple fact that an investigation—conducted by agents in the field—proceeds regardless of whether the director continues

in office, and thus hardly suggests the president acted "corruptly."

One of Mr. Mueller's early hires among the dozen-plus lawyers already aboard has a troubling history with the word "corruptly." Andrew Weissmann led the Enron prosecution team that pressed an aggressive interpretation of "corruptly," which permitted a conviction even absent the kind of guilty knowledge the law normally associates with criminal charges. As a result, the accounting firm Arthur Andersen was convicted. By the time the conviction was reversed on appeal to the Supreme Court in 2005—in large part due to the erroneous application of "corruptly" in the statute at issue—Arthur Andersen had already ceased operation.

What if—for some reason not apparent to the public now—Mr. Mueller were to conclude that the president did act "corruptly"? Could he

initiate a criminal prosecution? The Office of Legal Counsel at the Justice Department, which sets policy for the department and other agencies of government, has already opined more than once—starting in 1973, during Watergate—that the answer is no. It would offend the Constitution for the executive branch to prosecute its head.

What else might Mr. Mueller do? Some have suggested that if he finds criminal activity occurred he could report his findings to the House so as to trigger an impeachment proceeding, as Independent Counsel Kenneth Starr did in 1998. But the law under which Mr. Starr was appointed has lapsed, and the regulations governing the special counsel provide for only two kinds of reports—either to Justice Department leadership when some urgent event occurs during the investigation, or to the attorney general to explain the decision to prosecute or not. Reports of either type are to be treated as confidential.

Mr. Mueller could simply take the bit in his teeth and write a public report on his own authority, or write a confidential report and leak it to the press. If he did either, he would be following Mr. Comey's lawless example.

Or if, as appears from what we know now, there is no crime here, Mr. Mueller, notwithstanding his more than a dozen lawyers and unlimited budget, could live up to his advance billing for integrity and propriety and resist the urge to grab a headline—not necessarily his own urge but that of some he has hired.

Hold fast. It may be a rough ride.

Mr. Mukasey served as U.S. attorney general (2007-09) and a U.S. district judge (1988-2006).

For the U.S. and India, a Convergence of Interests and Values

By Narendra Modi

Last June in my address to a joint session of the U.S. Congress, I stated that the relationship between India and America had overcome the "hesitations of history." A year later, I return to the U.S. confident in the growing convergence between our two nations.

This confidence stems from the strength of our shared values and the stability of our systems. Our people and institutions have steadfastly viewed democratic change as an instrument for renewal and resurgence.

In an uncertain global economic landscape, our two nations stand as mutually reinforcing engines of growth and innovation. Confidence in each other's political values and a strong belief in each other's prosperity has enabled our engagement to grow. A vision of joint success and progress guides our partnership.

Our bilateral trade, which already totals about \$115 billion a year, is poised for a multifold increase. Indian companies are adding value to the manufacturing and services sectors in

the U.S., with total investments of approximately \$15 billion and a presence in more than 35 states, including in the Rust Belt. American companies have likewise fueled their global growth by investing more than \$20 billion in India.

The transformation of India presents abundant commercial and investment opportunities for American businesses. The rollout of the Goods and Services Tax on July 1 will, in a single stroke, convert India into a unified, continent-sized market of 1.3 billion people. The planned 100 smart cities, the massive modernization of ports, airports, and road and rail networks, and the construction of affordable housing for all by 2022—the 75th anniversary of India's independence—are not just promises of great urban renewal within India. These plans also showcase the enormous fruits of our relationships with enterprising U.S. partners—worth many billions of dollars over the next decade alone—together with concomitant new employment opportunities across both societies.

India's rapidly expanding aviation needs, and our increasing demand

for gas, nuclear, clean coal and renewables, are two significant areas of increasing convergence. In coming years, Indian companies will import energy in excess of \$40 billion from the U.S., and more than 200 American-made aircraft will join the private Indian aviation fleet.

Our two nations stand as mutually reinforcing engines of growth and innovation.

The combination of technology, innovation and skilled workers has helped forge an exciting digital and scientific partnership between our two countries. The creative and entrepreneurial energy of our engineers, scientists and researchers, and their free movement between both countries, continue to help India and the U.S. retain their innovation edge and maintain competitiveness in the knowledge economy.

A new layer in our engagement is our partnership for global good.

Whenever India and the U.S. work together, the world reaps the benefits—be it our collaborative efforts to find affordable vaccines for rotavirus or dengue, our joint studies of gravitational waves, observations of distant planets, establishing norms for cyberspace, providing humanitarian assistance and disaster relief in the Indo-Pacific region, or training peacekeepers in Africa.

Defense is another mutually beneficial sphere of our partnership. Both India and the U.S. have an overriding interest in securing our societies, and the world, from the forces of terrorism, radical ideologies and nontraditional security threats. India has four decades' experience in fighting terrorism, and we share the U.S. administration's determination to defeat this scourge.

We are already working together to address the existing and emerging strategic and security challenges that affect both our nations—in Afghanistan, West Asia, the large maritime space of the Indo-Pacific, the new and unanticipated threats in cyberspace. We also share an interest in ensuring that sea lanes—critical

lifelines of trade and energy—remain secure and open to all.

The logic of our strategic relationship is incontrovertible. It is further underpinned by faith in the strength of our multicultural societies that have defended our values at all costs, including the supreme sacrifices we've made in distant corners of the globe. The three-million-strong Indian-American community, which represents the best of both our countries, has played a crucial role in connecting and contributing to our societies.

The past two decades have been a productive journey of engagement for our mutual security and growth. I expect the next few decades to be an even more remarkable story of ambitious horizons, convergent action and shared growth.

The U.S. and India are forging a deeper and stronger partnership that extends far beyond the Beltway and the Raisina Hill. That partnership has become our privileged prerogative and our promise for our people and our world.

Mr. Modi is prime minister of India.

Health-Reform Principles That Can Cross Party Lines

By Lanhee J. Chen
And Ron Pollack

The current congressional debate about health reform focuses on two closely linked issues: how to structure subsidies and the future of Medicaid. We write to support two propositions that can better serve economically vulnerable families, while also ensuring that public dollars are spent effectively. First, we believe public subsidies for private insurance premiums should be means-adjusted to make coverage affordable for lower-income people. Second, we believe states should be given new flexibility to streamline coverage options in Medicaid, the Children's Health Insurance Program (CHIP) and other publicly supported insurance, so that families can obtain the cover-

age that best suits their circumstances and serves their needs.

We, along with Sara Rosenbaum, Gail Wilensky, Joe Antos, John McDonough, Grace-Marie Turner and Stuart Butler—a group of health policy researchers who join in this article—hold diverse political views and policy outlooks. But we believe these propositions transcend partisanship and ideology.

Most Americans receive employer-sponsored health insurance, which is heavily subsidized through the tax system. Many millions of others are enrolled in Medicaid and CHIP, funded jointly by the federal government and the states, and Medicare, funded through federal tax revenue and individual contributions. Until 2014, individuals who were not eligible for employer-sponsored insurance or public programs

could buy their own insurance, but most did not receive any financial help. As a result of the Affordable Care Act, millions more people receive subsidies to help pay for their insurance premiums.

Public support for health coverage should be spent as effectively and efficiently as possible. Toward that end, we agree that the existing tax exclusion for employer-sponsored health benefits should have reasonable limits. We also agree that it is prudent to provide subsidies for people who need help to purchase adequate insurance. While hundreds of billions of taxpayer dollars reduce the cost of health coverage and care for most Americans, until recently those with limited financial means seeking individual coverage were left out. This lack of access to affordable care drove many uninsured Americans to skip medical treatment that would have averted suffering and higher costs over time.

If we expect low-income families to purchase health insurance, we must structure the subsidies to make affordable coverage a realistic possibility. That means providing greater subsidies to those who can least afford the premiums.

While we have differing perspectives about the level and structure of Medicaid funding, we all believe that carefully developed state testing can be a primary engine for reforming Medicaid and providing care to low-income families. The improved use of waivers, for example, can help states develop fiscally sound and affordable coverage options for their most vulnerable citizens.

States should be given greater authority to configure and redirect revenue streams from Medicaid, CHIP and private insurance to improve and strengthen coverage. Integration of

funding streams would make it easier for individuals to keep the same coverage and providers when their employment or other life circumstances change. It would also allow all family members to share the same health plan. Experimentation would enable states to integrate health-care options better so that families could choose the best plan for their needs.

Experts don't always agree—but eight of us found common ground despite our other differences.

To ensure cost-effectiveness, states seeking waivers should be required to meet an overall federal budget-neutrality standard. Neutrality should be required for the cumulative budget impact of a proposal involving multiple programs and subsidies, not for each program. States should be allowed to align better the federal subsidies available to their citizens, even if allowing them to do so would require specific changes to one or more forms of coverage.

This additional flexibility, however, must be subject to safeguards. While we differ about the extent of the federal safeguards needed to protect state coverage and benefits, we all agree that flexibility should not allow funds for health-care services to be diverted to other purposes. Furthermore, funding for low-income populations must not be diverted to cover higher-income individuals.

With this new authority, states could simplify their insurance markets and enable children to receive

coverage with their parents. This would allow parents to shop for better and more integrated coverage for their children while retaining the protections established by CHIP. Lawmakers should also consider altering Medicaid, CHIP and tax-subsidy rules to ensure that families without employer coverage for their children can receive support to buy affordable child-only plans. Similarly, states could help healthy adults buy private insurance.

We believe that these incremental policies would establish a more equitable health-care system and help families of limited means secure the care they need to remain healthy.

Mr. Chen is a fellow at the Hoover Institution and director of domestic policy studies in the Public Policy Program at Stanford University. Mr. Pollack was founding executive director and is chair emeritus of Families USA. They and their colleagues who join this article participate in the Convergence Center for Policy Resolution's Health Reform Roundtable.

Notable & Quotable

Justice Neil Gorsuch dissenting in Perry v. Merit Protection Board, June 23:

I just cannot find anything preventing us from applying the statute as written. . . . The only thing that seems sure to follow from accepting [the appellant's] invitation is all the time and money litigants will spend, and all the ink courts will spill, as they work their way to a wholly remodeled statutory regime. Respectfully, Congress already wrote a perfectly good law. I would follow it.

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WORLD NEWS

Rescuers Hunt China Landslide Victims

Nearly 100 people remain missing after deadly incident in area of 2008 earthquake

BY TREFOR MOSS

SHANGHAI—Nearly 100 people were missing after a deadly landslide in an area of southwestern China that had been the focus of geologic concern since a devastating 2008 earthquake.

Sichuan province authorities said Sunday that more than 3,000 rescue workers were combing through the rubble after the landslide swept through the remote mountain village of Xinmo in Maoxian county Saturday morning, swallowing 62 homes. Authorities said there was little chance of finding any survivors, citing the depth of the layer of fallen rock.

Amid the confusion of the emergency rescue operation, authorities in Sichuan said that 10 people were confirmed dead and 93 were missing, downgrading the number of recovered bodies released by state media Saturday. The Sichuan provincial government said through its social-media account that 15 people, including two children, thought to have been buried in the landslide had been found



NG HAN GUAN/ASSOCIATED PRESS

Rescue workers searched on Sunday for survivors of a landslide in Xinmo, Sichuan province. At least 10 people are confirmed dead.

safe and well.

Local TV reports showed that authorities were also working to unclog a local river that had been blocked by rocks and de-

bris from the landslide.

The landslide followed persistent seasonal rains, though geologists said Maoxian has been vulnerable ever since a

devastating earthquake struck Sichuan in 2008, killing over 87,000 people and weakening the mountainous region's geology. Maoxian is 25 miles from

Wenchuan, the epicenter of the 2008 quake.

The Maoxian region has long been prone to earthquakes and landslides, but the 2008

disaster left some of Sichuan's mountains dangerously unstable, Tian Tingshan, deputy director of the Center for Geological Emergency Technical Guidance of the Ministry of Land and Resources, told local media on Sunday.

The Chinese government relocated people from towns and villages hit hardest by the 2008 earthquake, and has been known to move residents from disaster-prone areas.

Since 2008 the authorities have surveyed large areas of Sichuan to identify potential hazards and formed emergency-response plans, said Fan Xiao, a geologist based in Sichuan's capital, Chengdu. But the remoteness and high altitude of many of Sichuan's peaks, including the one above Xinmo village in Maoxian, make it difficult to conduct a comprehensive risk assessment, he said.

Moreover, some villagers in at-risk areas are reluctant to be moved from their homes, despite official warnings that they could be in danger, Mr. Fan said.

A landslide also claimed 10 lives in Maoxian during the summer monsoon three years ago, state media reported.

—Kersten Zhang in Beijing contributed to this article.

Satellites Help Reel In Fish Poachers

BY ROB TAYLOR

CANBERRA, Australia—Researchers in Australia and the U.S., backed by Microsoft Corp. co-founder Paul G. Allen, are using satellites to fight illegal fishing—which causes billions of dollars a year in commercial losses and depletes stocks.

With the world's third-largest fishery zone covering 3.5 million square miles, Australia is at the forefront of efforts to combat poaching. Its patrol ships have chased illegal trawlers almost as far as South Africa, a distance of 4,600 miles, to stop the plunder of prized Patagonian toothfish—sold in the U.S. as Chilean sea bass.

Australian government scientists and Vulcan Inc., Mr. Allen's private company, have developed a notification system that alerts authorities when suspected pirate vessels from West Africa arrive at ports on remote Pacific islands and South America.

The system relies on anti-collision transponders installed on nearly all oceangoing craft as a requirement under maritime law. These devices are detectable by satellite.

A statistical model helps identify vessels whose transponders have been intentionally shut off. Other data identify fishing boats that are loitering in risk areas, such as near national maritime boundaries.

"We can shine a spotlight on vessels acting suspiciously based on factors including the vessel's history, movement and whether its transmitter has been intentionally disabled," said Chris Wilcox, who helped develop the system for Australia's Commonwealth Scientific and Industrial Research Or-



AUSTRALIAN BORDER FORCE/XINHUA/ZUMA PRESS

Australian officers prepared to board an illegal fishing vessel at Dianne Bank, 250 nautical miles northeast of Cairns, in September.

Hook, Line and Sinker

The global fishing fleet, much of it from Asia, is expected to have nearly 10 billion mouths to feed by 2050.

Biggest fisheries catches, 2014

China	14.8 million metric tons
Indonesia	6.0
U.S.	5.0
Russia	4.0
Japan	3.6

Source: U.N. Food and Agriculture Organization

Motorized fishing vessels, 2014



Source: U.N. Food and Agriculture Organization

one-third of all fish sold in the U.S. is believed to be caught illegally.

Seafood consumption in wealthy nations has soared in recent decades, increasing reliance on imports.

Illegal fishing can be highly lucrative because violators don't pay duties or taxes on their illegal catches. And it is nearly impossible to detect illegally caught products when they enter the global seafood market, Dr. Wilcox said.

Poachers ignore catch quotas intended to protect species from overfishing and use outlawed equipment, including nets stretching 15 miles or more that scoop up everything in their path. Illegal fishing causes commercial losses of as much as \$23 billion a year worldwide, according to the U.N.

Nearly half the world's population relies on seafood as a primary source of protein, the Commonwealth Scientific and Industrial Research Organization says, and demand is expected to grow. Fish exports were valued at about \$148 billion in 2014, U.N. statistics show.

The researchers' satellite-based tracking tool will begin operating in October and will be free to access. It was set up in response to a treaty aimed at eradicating illegal fishing that came into force last June. The Agreement on Port State Measures had agreement from 29 countries, including African nations previously linked to illegal fishing.

"Countries that use this new tool will now be able to reverse the tide of illegal fishing and help rebuild depleted fish stocks," said Mark Powell, illegal fishing program officer for Vulcan.

China is the world's largest seafood producer, followed by Indonesia, the U.S. and Russia.

The most critical area for poaching is off the coast of West Africa, where illegal, unauthorized and unregulated fishing accounts for an estimated 40% of fish caught, according to the World Ocean Review.

Other areas of concern include the western and southern Pacific and the southwest Atlantic. Illegal trawlers contribute to overfishing that threatens marine ecosystems and food security in some of the poorest countries.

Beijing Seeks Jail For Labor Activist

BY CHUN HAN WONG AND JOSH CHIN

A Chinese activist who for years has documented worker unrest was charged with "picking quarrels and provoking trouble," in a trial seen as a bellwether of Beijing's approach to containing labor tensions.

A former migrant worker, Lu Yuyu roamed around China with his girlfriend, collecting information about public protests that he then tallied online. The couple's detention last year closed a rare window on social unrest in China by putting a key provider of such data out of commission.

Mr. Lu's one-day trial in the southwestern city of Dali formally concluded on Friday, with prosecutors recommending he be sentenced to between three and five years in prison, one of Mr. Lu's lawyers, Xiao Yunyang, told The Wall Street Journal.

Prosecutors accused Mr. Lu of spreading rumors. The court is likely to find Mr. Lu guilty and accept the prosecutors' suggestion despite the activist maintaining his innocence in court, Mr. Xiao said.

"The events he wrote about were all real, none of it was fake. He insisted he wasn't guilty," the lawyer said.

"Picking quarrels" is a vague legal term that authorities have used to prosecute dozens of activists and political dissidents since Chinese President Xi Jinping came to power in late 2012. Many of the accused have been released on bail after confessing. Nearly all who declined to confess have been convicted and sentenced to prison.

Calls to the Dali prosecutors' office weren't answered.

The government tracks the

'Wickedonna' Used Blog to Spread Word

Born in 1979 in the southern province of Guizhou, Lu Yuyu started documenting public protests in 2012 by tracking posts on Chinese social-media platform Weibo as well as photos and videos of unrest, his acquaintances say.

Mr. Lu made trawling the internet for information about public protests across China a full-time commitment. Many know Mr. Lu only by his web moniker, "wickedonna," and his blog, "Non News."

Li Tingyu, a university student who later became his girlfriend and partner, joined him in 2013, acquaintances say.

—Chun Han Wong

number of so-called mass incidents but no longer publicizes it. The Labor Ministry discloses regular tallies on labor arbitration and mediation cases, but labor groups and other activists largely relied on Mr. Lu to provide the broad picture.

A harsh sentence for Mr. Lu would send a signal to activists and labor groups that the Communist Party doesn't intend to allow independent advocacy or monitoring of workers' rights. Mr. Xiao, the lawyer, said it wasn't clear when the court would hand down its decision.

In June 2016, authorities detained Mr. Lu and his girlfriend, Li Tingyu, in Dali, where they had been living since 2014. Ms. Li was tried in April and later released without a verdict, according to human-rights group China Human Rights Defenders.

WORLD WATCH

COLOMBIA

Tour Boat Sinks in Lake Near Medellín

A tourist boat packed with about 160 passengers capsized on a reservoir near the Colombian city of Medellín, leaving at least six people dead and 31 missing, officials said.

Rescuers including firefighters and air force pilots searched for survivors at the Guatape reservoir where the El Almirante ferry sank. A flotilla of recreational boats and jet skis rushed to the scene, pulling people from the boat as it went down.

Videos circulating on social media show the turquoise and yellow trimmed party boat rocking back and forth as people crawled down from a fourth-floor roof as it began sinking.

Survivors described hearing a loud explosion near the men's bathroom that knocked out power a few minutes after the boat began its cruise around the giant

lake. As water flooded on board, pressure built and people were sucked under by the sinking ship.

Late Sunday, President Juan Manuel Santos arrived in Guatape and said 122 people were either rescued or found their way to shore. It is unclear what caused the boat to sink.

—Associated Press

Egypt

President Ratifies Disputed Islands Pact

Egyptian President Abdel Fattah Al Sisi ratified a disputed 2016 agreement under which his country would transfer control of two strategic Red Sea islands to Saudi Arabia, following through on his assertion that the matter was closed.

The surrender of the islands, which the Egyptian government insists have always been Saudi, had prompted street protests.

Parliament approved the agreement on June 14 amid chaotic

scenes of shouting matches by lawmakers arguing over the deal.

—Associated Press

BRITAIN

Parliament Network Hit by Cyberattack

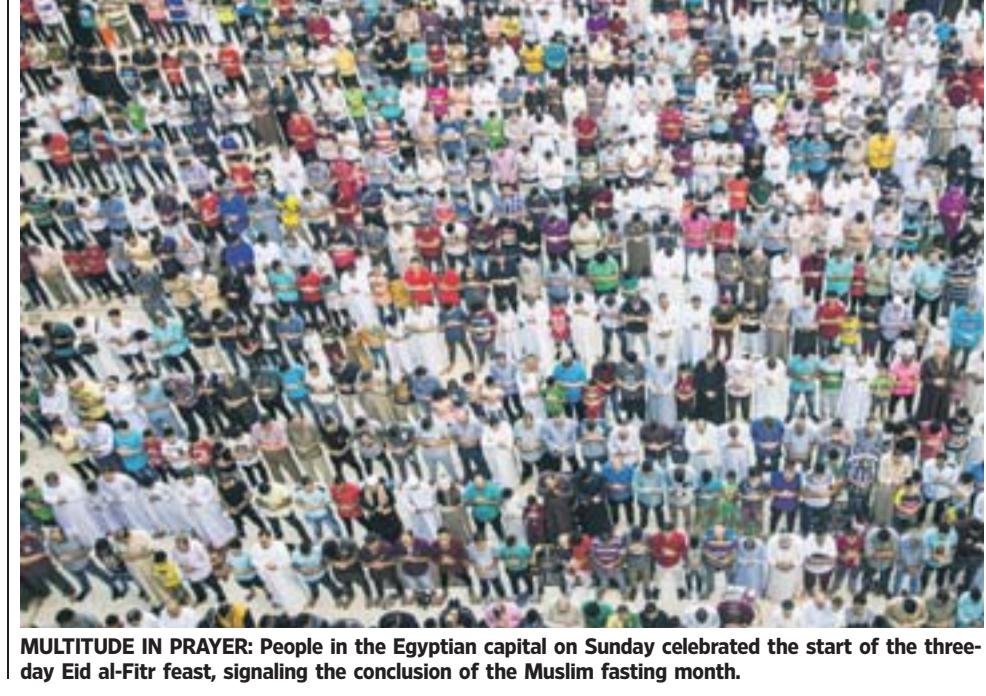
Parliament said a cyberattack targeting user email accounts hit its computer network, just weeks after Britain's health service was caught up in a giant internet pandemic that swept the globe.

A parliamentary spokesperson said the legislative body had discovered unauthorized attempts to access user accounts, and that it was investigating the incident in coordination with the National Cyber Security Center, part of Britain's intelligence agency.

"We have systems in place to protect member and staff accounts and are taking necessary attempts to protect our systems," the spokesperson said.

—Michael Wright

Cairo Marks the Close of Ramadan



IBRAHIM ELZAT/NURPHOTO/ZUMA PRESS

MULTITUDE IN PRAYER: People in the Egyptian capital on Sunday celebrated the start of the three-day Eid al-Fitr feast, signaling the conclusion of the Muslim fasting month.

BUSINESS & FINANCE

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THE WALL STREET JOURNAL.

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Last Week: S&P 2438.30 ▲ 0.21% S&P FIN ▼ 1.71% S&P IT ▲ 2.27% DJ TRANS ▼ 0.27% WSJ\$IDX ▲ 0.27% LIBOR 3M 1.293 NIKKEI 20132.67 ▲ 0.95%

See more at WSJMarkets.com

Takata Seeks Bankruptcy Shield

Maker of millions of defective air bags to sell assets to rival, capping sharp decline

Takata Corp. filed for bankruptcy protection in Japan and the U.S. and said it would sell most of its operations to a rival, capping the steep decline of an 84-year-old Japanese company nearly nine years after it began a global recall of rupture-prone automotive air bags.

At least 16 deaths and more

By Sean McLain in Tokyo and Mike Spector in New York

than 180 injuries have been linked to the defect, which causes the air bags to explode and spray shrapnel.

What began as a limited recall in some parts of the U.S. in late 2008 expanded globally and would eventually grow to cover millions of vehicles. The recall of 42 million vehicles in the U.S. is the largest ever.

Takata's bankruptcy protec-

tion filing by the parent company in Japan early Monday and a chapter 11 filing for its U.S. subsidiary in Delaware late Sunday allow the company to attempt to stabilize its finances. Takata also unveiled a preliminary agreement to sell almost all its assets to **Key Safety Systems Inc.**, a Michigan supplier owned by a Chinese company, **Ningbo Joyson Electronic Corp.**, for nearly \$1.6 billion.

The sale would help Takata meet its \$850 million payment obligation to auto makers early next year, part of a \$1

billion plea deal with the U.S. Justice Department to settle a criminal investigation into the parts maker. Takata said its estimated liabilities range from \$10 billion to \$50 billion.

The bankruptcy filing marks a bitter chapter in one of Japan's postwar industrial success stories. Takata began as a textile company and eventually grew into one of the largest automotive safety companies with operations in more than 20 countries.

Founded in western Japan
Please see TAKATA page B2

Deflating

Takata ADRs* since the nationwide recall in May 2015



*American depositary receipts
Source: FactSet
THE WALL STREET JOURNAL.

Banking Stress Tests Less Stressful

BY RYAN TRACY

WASHINGTON—"Stress tests," long dreaded by executives at the nation's largest banks, are getting easier.

The Federal Reserve on Wednesday will release the final results of this year's tests, which probe firms' ability to withstand a severe financial shock. Officials made the tests easier for some banks this year, and for the next time around they are preparing to further change the exams in fundamental ways.

The most significant shift would remove a major risk for banks: failing the tests purely for subjective reasons. The qualitative part of the tests has in past years created embarrassing failures for firms such as **Citigroup Inc.**, **Deutsche Bank AG**, and **Banco Santander SA**.

Fed officials now envision a system where firms would generally only fail the test if their capital levels falls below the level the Fed views as healthy—in other words for quantitative reasons, not qualitative ones.

That likely means fewer test failures. Between 2014 and 2016, the Fed gave banks a failing grade nine times. Only once did a bank fail the test because of a low capital ratio: **Zions Bancorp.** in 2014.

The tests will continue to matter to investors. The Fed will still use them to audit banks' plans to boost dividends and buybacks for shareholders, and the numerical part of the exams will still be crucial to determining those payouts.

Nevertheless, a reduced emphasis on the subjective aspects of the exams could make the tests far less tense for bankers.

"The qualitative [part of the tests] is a lot of process work," William Demchak, chief executive of **PNC Financial Services Group Inc.**, said in a June interview.

He said the risk committee of the bank's board discusses aspects of the exams at each regular meeting, even though sometimes "there is no reason to" do so because there haven't been significant changes to the firm's program. "But we do, to prove [to the Fed] we have a quality review."

PNC has never failed the tests.

The idea of a bank supervisor publicly calling out a bank's failings has always made some policy makers nervous. After all, one of supervisors' primary

Please see STRESS page B2

No Shelter: Exxon, Shell Gas Field Rattles Dutch With Quakes



BRACING EFFECT: Supports prop up a home in Middelstum damaged by earthquakes. Authorities are considering tightening curbs they placed on gas production. B3

Facebook Makes Pitch to Hollywood Studios

BY JOE FLINT
AND DEEPA SEETHARAMAN

Facebook Inc. to Hollywood: Let's do lunch.

The social-networking giant is talking to Hollywood studios and agencies about producing TV-quality shows with an eye toward launching original programming by late summer, people familiar with the matter said.

In meetings with major talent agencies including

Creative Artists Agency, United Talent Agency, William Morris Endeavor and ICM Partners, Facebook has indicated it is willing to commit to production budgets as high as \$3 million per episode, people familiar with the situation say.

That's the price range of high-end cable-TV shows. Facebook is also interested in more moderate-cost scripted shows in the mid-to-high six-figure-per-episode range,

these people say. The company will be aggressive about trying to own as much of that content as possible.

The push for TV shows is part of a two-track effort at Facebook to up its game in video and target the tens of billions of ad dollars spent on television.

Facebook also is seeking short-form content, primarily unscripted, that could run for 10 minutes in the Spotlight section for videos, the

people familiar with the matter say.

The social network is guaranteeing creators of short-form fare a minimum \$5,000 to \$20,000 share of ad revenue per episode, a person familiar with the company's strategy said. Companies working on such content for Facebook include BuzzFeed, ATTN and Refinery 29, according to people familiar with the situation.

Facebook declined to com-

ment on specifics of its content plans. In a statement, Vice President of Media Partnerships Nick Grudin said,

"We're supporting a small group of partners and creators as they experiment with the kinds of shows you can build a community around—from sports to comedy to reality to gaming.

We're focused on episodic shows and helping all our partners understand what

Please see TV page B2

KEYWORDS | By Christopher Mims

In 10 Years, iPhone Won't Be a 'Phone'

It's 2027, and you're walking down the street, confident you'll arrive at your destination even though you don't know where it is. You may not even remember why your device is telling you to go there.

There's a voice in your ear giving you turn-by-turn directions and, in between, prep ping you for this meeting. Oh, right, you're supposed to be interviewing a dog whisperer for your pet-psychiatry business. You arrive at the coffee shop, look around quizzically, and a woman you don't recognize approaches. A display only you can see highlights her face and prints her name next to it in crisp block lettering, Terminator-style. Afterward, you'll get an automatically generated transcript of everything the two of you said.

As the iPhone this week marks the 10th anniversary of

its first sale, it remains one of the most successful consumer products in history. But by the time it celebrates its 20th anniversary, the "phone" concept will be entirely uprooted: That dog-whisperer scenario will be brought to you even if you don't have an iPhone in your pocket.

Sure, **Apple** may still sell a glossy rectangle. (At that point, iPhones may also be thin and foldable, or roll up into scrolls like ancient papyri.) But the suite of apps and services that is today centered around the physical iPhone will have migrated to other, more convenient and equally capable devices—a "body area network" of computers, batteries and sensors residing on our wrists, in our ears, on our faces and who knows where else. We'll find ourselves leaving the iPhone behind more and more often.

Trying to predict where technology will be in a decade may be a fool's errand,

Please see MIMS page B4

INSIDE



U.S. MOVIES DO BETTER ABROAD

ENTERTAINMENT, B5



MOZAMBIQUE MISPLACES \$1 BILLION

BANKING, B8

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BUSINESS NEWS

SpaceX Completes Launch Milestone

BY ANDY PASZTOR

Elon Musk's SpaceX completed an impressive, bi-coastal demonstration of launch capability Sunday, successfully executing the second of two unmanned missions within a roughly 48-hour period in a high-water mark for the company's operational prowess.

Parts of both rockets returned safely to floating platforms, repeating what has become a signature feature of company launches. The back-to-back launches went off without a hitch, with all engines and navigation equipment performing as expected and the SpaceX team, for the first time, smoothly juggling the demands of coordinating blastoffs and recoveries from opposite coasts of the U.S. on such a compressed timetable.

After using previously flown main engines to blast a Bulgarian telecommunications satellite into orbit Friday from a Florida launchpad, the closely held company on Sunday afternoon used a California Air Force base to send a batch of 10 smaller satellites into space for **Iridium Communications** Inc., SpaceX's largest commercial customer.

Sunday's blastoff marked the shortest time between launches in SpaceX's history. As the ninth launch of 2017, it also was a record for annual launches by the company, officially called **Space Exploration Technologies** Corp. SpaceX had eight successful launches in 2016 before an explosion during routine ground testing temporarily halted Falcon 9 launches.

SpaceX has rebounded

SpaceX is looking to rack up roughly two dozen launches by the end of the year.

strongly since that accident, alleviating many of the reliability concerns expressed privately by government and industry officials.

But perhaps more than any previous benchmark, this weekend's activities provided the strongest sign yet that SpaceX is on track to overcome years of nagging schedule slips by continuing to ramp up its launch tempo. Amid cheers from company officials at SpaceX's mission control center in suburban Los Angeles, Sunday's blastoff paved the way for gradual deployment of the Iridium satellites over a 15-minute stretch that resembled an automated and graceful ballet in space.

Seven minutes after blast-off, the floating platform in the Pacific Ocean started receiving signals from the used booster streaking back toward the landing area. Video cameras captured the soft touchdown.

With an aggressive summer and fall launch schedule, SpaceX officials are looking to rack up a total of roughly two dozen launches by the end of the year. Previous internal projections showed as many as 27 launches for all of 2017, nearly doubling to a total of 52 in 2019.

But the financial results of flying used boosters remain uncertain. Mr. Musk and some of his top lieutenants initially projected huge price cuts. Then SpaceX officials talked about price reductions of slightly more than one-tenth of the \$62 million official Falcon 9 launch price tag. Internal financial documents prepared more than a year ago projected that the combination of reduced prices and refurbishment costs would trim the company's net income by roughly 20% between 2016 and 2020.

Sunday's mission from Vandenberg Air Force Base, on the central California coast, comes at a particularly hectic time for SpaceX. After years of delays, the company plans to launch its significantly beefed-up derivative rocket, called the Falcon Heavy, for the first time later this year.

Dutch Quakes Rattle Exxon, Shell

Big gas field is causing tremors, exposing energy firms to criminal probe and rising bills

BY SARAH KENT

GRONINGEN, Netherlands—For decades, the giant Groningen gas field beneath the flat farmland in the north of this country counted among the greatest prizes for **Exxon Mobil** Corp. and **Royal Dutch Shell** PLC.

Then the earthquakes started.

The exploitation of Groningen—the biggest gas field in Europe—has been causing tremors for over two decades, rattling a bucolic province with no previous history of quakes and exposing two of the world's biggest energy companies to a criminal probe and rising reconstruction bills.

Amid a public outcry, the Dutch government has imposed increasingly strict limits that have more than halved Groningen's gas production since 2013. Now, authorities are proposing another 10% cut in hopes of further reducing earthquakes. And a Dutch public prosecutor is preparing to open a criminal investigation into responsibility for the earthquakes.

Shell and Exxon are pushing back through their joint venture, **Nederlandse Aardolie Maatschappij** BV, or NAM. The venture says cutting output even more is "out of proportion and not effective," and would create uncertainty about the legal framework for its operations. It warns that continuous changes to the production level might ultimately threaten the business's profitability.

NAM said it is considering formally contesting the government's decision. It also expressed surprise at the Dutch court order to the prosecutor to open a criminal investigation this year, because the authorities had previously found no grounds for such action. The state will make a decision on whether to prosecute once the investigation is complete.

Groningen was expected to be one of the world's largest gas producers for decades to come. Last year, it made up almost 10% of both Exxon and Shell's total gas production globally and its reserves are among the companies' largest undeveloped resources.

Moreover, the field's profit



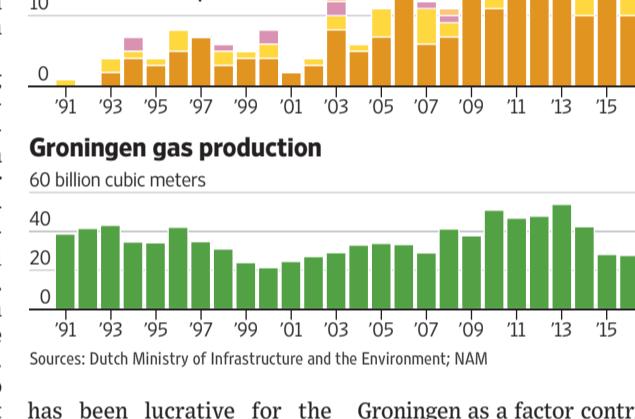
This historic farmhouse in the Dutch province of Groningen was damaged by earthquakes. Repair work has continued for years.

Shaken Up

Decades of extraction from Europe's biggest gas field have led to earthquakes and forced production cuts.

Earthquakes in Groningen

Magnitude 1.5-2 ■ 2-2.5 ■ 2.5-3 ■ 3-3.5 ■ 3.5-4



Sources: Dutch Ministry of Infrastructure and the Environment; NAM

has been lucrative for the Dutch government, which not only collects taxes from NAM but is also a 40% stakeholder in the field. Since production began, the field has generated almost €300 billion (\$336 billion) for Dutch coffers.

Exxon named restrictions on

Groningen as a factor contributing to a nearly 4% decline last year in its global natural-gas output. Shell said Groningen issues were largely responsible for a decline of 636 billion cubic feet in proven reserve estimates for its European joint ventures, equivalent to nearly

2% of the company's total gas reserves at the end of 2016.

Under the current arrangement, the government bears 64% of the costs related to compensation to residents, efforts to reinforce buildings, lawsuits and other items.

It isn't the first time seismic activity has caused controversy in the energy industry. A U.S. debate has raged for years over whether water injection related to drilling has caused earthquakes in Oklahoma and Texas.

Earthquakes like the ones in Groningen are less known.

Groningen's quakes were first officially linked to gas production in the 1990s, nearly 30 years after work on the field began.

The tremors have caused widespread damage, though no deaths, in a province of nearly 600,000 people. A large majority of the temblors registered low magnitudes of between 1.5 and 2. But authorities snapped to attention in 2012, when a quake of magnitude 3.6 hit.

The homes and infrastructure weren't designed to withstand even such low seismic instability. The tremors occur where Groningen's gas lies—just under 2 miles below ground level.

In a 2015 report, the Dutch Safety Board said NAM and

the country's Ministry of Economic Affairs failed to "act with due care for citizen safety" and didn't adequately research the risks posed by earthquakes.

The government has implemented the report's recommendations.

NAM hasn't disputed the findings and has made several public apologies. It has acknowledged liability for earthquake-related damage and paid out hundreds of thousands of euros in compensation, poured millions more into a fund to stimulate the economy and put aside more than €1 billion, mostly for a program to strengthen and repair buildings in the area.

The gas company could also be on the hook for nearly €8 billion to fully compensate residents throughout the region for losses to property value and psychological damage, said Pieter Huitema, a Groningen lawyer who brought two successful civil suits on those issues.

NAM is appealing both lawsuits and said all numbers relating to the size of potential liabilities are unsubstantiated.

Both Shell and Exxon said they are confident NAM could produce gas safely.

Groningen Field Disrupts Bucolic Farm Life

BY SARAH KENT

GRONINGEN, Netherlands—Irma de Joode was talking on the phone with her brother when she heard what sounded like thunder and felt her entire house jump beneath her feet.

The Aug. 16, 2012, earthquake was the biggest ever to rock the flat, green plains of this northern Dutch province. The source was Europe's biggest natural-gas field.

The earthquake was one of more than 300 temblors since 1991 that **Royal Dutch Shell** PLC, **Exxon Mobil** Corp. and the Dutch government acknowledge were caused by

their activities at the Groningen gas field.

The quakes have led to nearly 80,000 damage claims by residents here, prompted a court to order a criminal investigation into the Shell-Exxon joint venture, and led to government limits on gas production to which the companies object.

The quakes have disrupted life in this once wealthy agricultural region, which spools across the north of the Netherlands to the sea in a verdant band punctuated by country villages, brick farmhouses and medieval churches.

Many of those historic

structures are now scarred with cracks and ugly support struts; some have been torn down entirely. Property values have plummeted. Buildings here are sturdy, but they weren't made to withstand earthquakes, which were virtually unheard of in this part of the world until the early 1990s, when the gas quakes were first acknowledged.

In early 2013, after another quake shook her house, Ms. de Joode noticed serious structural damage to her home, a historic 19th-century farmhouse. She and her family put in a claim for compensation from Shell's and Exxon's joint

venture and pressured government officials for help to reinforce the building.

The process has taken five years of constant work, Ms. de Joode said.

"The stress you have every day," she said. For months after the damage, she lived with uncertainty over the house's stability. "I was very scared. When I had my grandchildren over, I tried to stay in safe parts of our house."

Shell's and Exxon's joint venture, **Nederlandse Aardolie Maatschappij** BV, or NAM, has vowed to pay for any earthquake-induced damage. It has settled thousands of compen-

sation claims and poured money into government efforts to reinforce local buildings and stimulate the local economy. Efforts are under way to try and improve the claims process.

Some residents see the benefits. Cees de Vries received financing through the economic fund that NAM helped establish to boost his business—a landmark hotel in the village of Loppersum. "People don't like that I say this," Mr. de Vries said. "I think without the earthquakes this whole region would have been going downhill anyway, and now there's a lot of activity."

Asian Fund Does First U.S. Buy

BY JULIE STEINBERG

A Hong Kong-based private-equity fund co-founded by one of China's best-known investment bankers is making its first acquisition in the U.S., in a deal that shows China's continued appetite for overseas assets despite recent hurdles.

AGIC Capital, a \$1 billion fund co-founded in 2015 by veteran China banker Henry Cai, said it would acquire **Ritedose** Corp., a Columbia, S.C.-based pharmaceutical manufacturer, from U.S. private-equity firm **Olympus Partners** in a deal worth between \$600 million and \$800 million, including debt. Chinese pharmaceutical company **Humanwell Healthcare (Group)** Co. will take a minority position, AGIC said.

The deal could be announced as soon as Monday.

The deal marks an expansion to the U.S. in investments for AGIC, whose chairman, Mr. Cai, became known for arranging some of the first listings of private Chinese companies in

Hong Kong, including Tsingtao Brewery Co. in 1993. Mr. Cai previously worked at Deutsche Bank AG and UBS Group AG and founded AGIC with partners in Germany. He initially aimed the fund at investments in European companies. AGIC looks for smaller or midsize companies with technology that could be helpful for Chinese industry.

AGIC, which counts Chinese sovereign-wealth fund **China Investment** Corp. as an investor, was part of a consortium including China National Chemical Corp. that agreed last year to buy Germany's Krauss-Maffei Group, a maker of processes plastics and rubber, for \$1 billion.

AGIC's planned purchase of Ritedose follows stricter scrutiny of China's overseas deals by the country's regulators, who are trying to curb runaway debt levels and keep money from flowing out of the mainland.

Chinese regulators late last year tightened rules on the sorts of deals that can get

done, and earlier this month asked commercial banks to review loans made to a handful of particularly aggressive conglomerates, The Wall Street Journal reported last week.

Chinese outbound acquisitions have fallen this year from last year's record levels.

Sam Sun, AGIC's head of greater China, said he believes the Ritedose purchase will get Chinese regulatory approval because it is strategic and the amount of onshore cash involved "is not that significant."

The deal will be funded by a mixture of debt and equity, with debt financing from a U.S. lender and equity largely in U.S. dollars, with a small portion from cash from mainland China, Mr. Sun said.

Ritedose specializes in a manufacturing process for liquid-filled containers that is known for lessening the likelihood of accidental contamination.

The demand for such technology is increasing in China and Japan, Mr. Sun said.

NOTICE OF REDEMPTION BY PUBLIC STORAGE OF ALL OUTSTANDING DEPOSITORY SHARES REPRESENTING INTERESTS IN ITS 5.90% CUMULATIVE PREFERRED SHARES, SERIES S

NOTICE IS HEREBY GIVEN that, pursuant to paragraph (c)(1) of the Articles Supplementary of the 5.90% Cumulative Preferred Shares, Series S ("Preferred Shares") of Public Storage and Section 2.8 of the Deposit Agreement dated as of May 31, 2007 (the "Deposit Agreement") by and among Public Storage, Computershare Trust Company, N.A., as Depository (the "Preferred Shares Depository") and the holders from time to time of the depositary receipts issued by the Preferred Shares Depository under the Deposit Agreement, Public Storage has called for redemption, and will redeem, on July 26, 2017 (the "Redemption Date"), all of the Preferred Shares, and, in accordance with the Deposit Agreement, the Preferred Shares Depository will redeem, on the Redemption Date, all of the outstanding depositary shares (the "Depositary Shares") representing interests in the Preferred Shares.

On the Redemption Date, (1) Public Storage will deliver, or cause to be delivered, out of funds legally available therefor, to the Preferred Shares Depository \$460,000,000 in redemption of all of the 5.90% Cumulative Preferred Shares, Series S and (2) the Preferred Shares Depository will pay to the holders of record of the Depositary Shares, in exchange for each Depositary Share, \$25.00 plus a sum equal to all accrued and unpaid dividends from July 1, 2017 through the Redemption Date (the "Redemption Price").

Depositary Receipts representing the Depositary Shares, accompanied by proper instruments of assignment and transfer if payment is to be made other than to the registered holder(s), shall be surrendered for redemption at any of the following places:

By Mail
Computershare
Attn: Corporate Actions
P.O. Box 43014
Providence, RI 02940

Delivery of the foregoing instruments and documents to any other address shall not constitute valid delivery.

On or before the Redemption Date, Public Storage will deposit with Computershare Inc., a Delaware corporation, the Redemption Price, for the pro rata benefit of the holders of the Depositary Shares called for redemption. On and after the Redemption Date, all Depositary Shares and Preferred Shares shall be deemed no longer to be outstanding; dividends thereon shall cease to accrue; and all rights with respect to the Depositary Shares and Preferred Shares called for redemption shall forthwith at the close of business on the Redemption Date cease and terminate, except only the right of the holders thereof to receive the Redemption Price of the shares so redeemed, but without interest, upon surrender of their Depositary Receipts.

Any moneys deposited by Public Storage and unclaimed at the end of five years from the Redemption Date shall, to the extent permitted by law, be repaid to Public Storage, after which repayment the holders of the Depositary Shares called for redemption shall look only to Public Storage for the payment thereof.

June 26, 2017

PUBLIC STORAGE

TECHNOLOGY

WSJ.com/Tech

Gender Pay Ruling Looms for Google

Alphabet unit's refusal to give government years of wage data ensnares it in debate

BY JACK NICAS
AND YOREE KOH

Google, which has long portrayed itself as one of the world's best workplaces, faces government accusations that it underpays women and is resisting pressure to turn over salary data to disprove them.

The U.S. Labor Department sued Google in January after the company refused to submit 19 years of pay data for more than 21,000 employees for a routine audit into its pay practices. The department needs more Google salary data because an initial review of 2015 figures "found systemic compensation disparities against women pretty much across the entire workforce," according to testimony from a Labor Department official in April.

Google, a unit of **Alphabet Inc.**, says its annual salary analyses show no gender pay gap among its 74,000 employ-

ees. "So we were quite surprised" by the Labor Department's accusations, "which came without any supporting data or methodology," Google said in an April blog post. Google has declined to release the numbers behind the company's analyses.

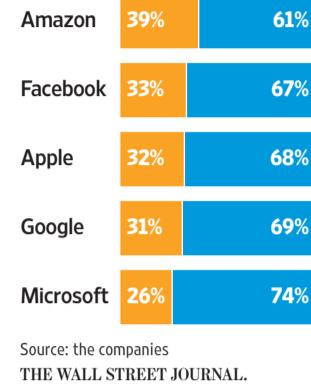
Google argued the Labor Department's request was overly broad, a violation of its employees' privacy and costly to comply with. An administrative law judge at the Labor Department is expected to rule soon. The department can investigate Google because the company provides advertising and cloud services for the federal government.

Generous compensation and perks have made Google one of the world's top places to work. But the company's resistance to release more pay data has further ensnared it in a larger debate about whether women and some minorities have the same shot at success in tech as the white and Asian men who dominate the industry.

Google says "Trust us, there is no gender pay gap. We've got everything under control," said Natasha Lamb,

High-Tech Divide

Gender breakdown at top technology companies



Source: the companies
THE WALL STREET JOURNAL.

managing partner at Arjuna Capital, a boutique investment firm that has pressed technology companies to release salary information.

"A trust-us approach is no longer helpful or useful when other companies are disclosing the data," she said. "It makes it look like they have something to hide."

Large tech companies—Google, Facebook Inc., Apple Inc., Amazon.com Inc., Micro-

soft Corp. and others—are under pressure to balance their workforces. In their struggle to attract more women and underrepresented minorities, many have highlighted that their internal analyses show they pay men and women equally—but many don't make the data public.

Facebook said in an April blog post that "men and women are paid the same for the same work" and its "compensation is intentionally formulaic and reflects individual performance." The company declined to comment beyond the post.

The Labor Department sued Oracle Corp. in January, accusing the software giant of paying white men more than their counterparts, and favoring Asians for certain technical roles. Oracle declined to comment.

Google has fought earlier efforts to lift the veil on pay. In 2015, then-Google engineer Erica Baker said she faced retaliation from her managers for starting a crowdsourced spreadsheet, in which approximately 5% of employees shared their salaries, that showed disparities. Ms. Baker said the spreadsheet

helped some employees negotiate improved salaries, but she left Google that year. Google declined to comment.

For the past two years, Arjuna Capital has requested that Google disclose the percentage of female pay to male pay. Seven other firms complied last year, including Apple, Amazon and Microsoft.

Google abruptly reneged on an agreement with Arjuna last year to reveal the figure if Arjuna withdrew a shareholder proposal requesting the tech firm to do so, according to emails reviewed by The Wall Street Journal. "After further consideration, we are not able to agree to the proposal," a Google executive wrote in April to Ms. Lamb, according to the emails. Google declined to comment on the emails.

Facebook didn't comply to a similar request from Arjuna to release its pay data. Earlier this month at Alphabet's shareholder meeting, Ms. Lamb again pressed executives for data. A Google human-resources executive answered that in-depth analyses of 52 separate job categories last year showed the company has

no gender pay gap. "We are really committed to this and absolutely confident in our processes," he said. Google then moved the meeting along.

Google said it has already provided the Labor Department with two years of data among 740,000 pages of documents. The department hasn't filed formal charges of pay discrimination against Google, and it is unclear if it will. The Labor Department didn't respond to a request for comment.

Even with the additional data, it isn't certain if the question of whether Google has a gender pay gap will be put to rest. Experts say a continuing debate over what equal pay looks like has stalled progress on the issue, exacerbated by a paucity of data from employers.

It is possible that where employees or regulators see discrimination, the company sees equal pay, experts say.

Levels of responsibility and job titles could vary even as employees are considered to be doing similar work, leading to pay gaps, said Joelle Emerson, chief executive of Paradigm, which advises tech firms on diversity.

MIMS

Continued from page B1
but how often do we get to tie up so many emerging trends in a neat package?

Apple is busy putting ever more powerful microprocessors, and more wireless radios, in every one of its devices. Siri is getting smarter and popping up in more places. Meanwhile, Apple is going deep on augmented reality, giving developers the ability to create apps in which our physical world is filled with everything from Pokémon to whatever IKEA furniture we want to try in our living rooms. All these technologies—interfacing with our smart homes, smart-cars, even smart cities—will constitute not just a new way to interact with computers but a new way of life. And, of course, worrisome levels of privacy invasion.

Apple's acquisitions—it buys a company every three to four weeks, Chief Executive Tim Cook has said—tend to be highly predictive of its future moves. Since it first bought Siri in 2010, Apple has continued to make acquisitions in artificial intelligence—Lattice Data, Turi and Perceptio among them, all of which specialize in some form of machine learning. The company is reportedly working on its own chips for AI.

Apple's preview of iOS 11, with deeper integration of Siri than ever, suggests it hopes to make Siri capable of doing nearly everything on an iPhone that we currently do through its touch interface.



DANIEL HERTZBERG

Apple has also made many acquisitions related to augmented reality—the overlay of computer interfaces and three-dimensional objects on a person's view of the real world—including PrimeSense and Metaio. Mr. Cook has said he is so excited about AR he wants to " yell out and scream."

By 2027, the problem of bulky AR headsets like Microsoft's HoloLens should be solved, which means Apple and others are likely to release some sort of smart eye-

glasses. With their ability to convincingly supplement our visual and auditory reality, delivering information at the time and place most appropriate, they'll occasion a cultural change as big as the introduction of the smartphone itself.

"What you're going to see with all this augmentation is the psychology of using your phone could change dramatically," says Ryan Walsh, a partner at venture-capital firm Floodgate who from 2014 to 2016 directed prod-

uct management for media at Apple. "Instead of using your phone to get away from the world, you'll use it to join in the world in a much deeper and more meaningful way," he says.

Augmented reality and artificial intelligence will also benefit from the Internet of Things trend: everyday gadgets getting sensors, actuators and a wireless internet connection. Apple controls smart-home products with HomeKit. It aggregates health

information with HealthKit, and ties in the car (CarPlay), cash register (Apple Pay) and even the StairMaster (GymKit). Apple clearly wants its devices to connect to everything on Earth.

With our every action mapped to every outdoor and indoor space we inhabit—combined with the predictive power of AI and distributed across a suite of devices for which Siri has become the default interface—the result could be a life directed by our

gadgets, a sort of "Choose Your Own Adventure" for our daily routines.

At first, this will be straightforward. Having automatically filled our calendars using the kind of scheduling AI that already exists, our devices will direct us from one task to another, even suggesting transportation—ride-sharing, mass transit or flying car. But the relationship will change as the AI gets to know more about you.

"You might be walking by someplace and it might tell you, 'Hey, you should go in here, they make a great cup of coffee and there's also this person you really would like, too,'" says Jonathan Badeen, co-founder and chief strategy officer of dating app Tinder, where he leads teams that think about how to incorporate Apple's latest technology into apps.

By 2027, Apple and its competitors will also have cemented a world of trade-offs: If you want your life enhanced by AI and all the rest of this tech, you're going to have to submit to constant surveillance—by your devices or, in many cases, by the tech giants themselves. Apple's bet is that you will trust it to do this: The company's privacy stance is that it isn't going to look at or share your data, and it will be encrypted so others can't look at it, either.

Getting used to that won't be easy. Just as getting in a stranger's car or sleeping in a stranger's home seemed crazy before Uber and Airbnb, the 2027 iPhone's most important differentiator may be our willingness to accept things we can't even fathom today.

BUSINESS WATCH

GLENCORE

Rio Tinto Unit Gets Sweetened Offer

Glencore PLC said Friday it has submitted a sweetened all-cash offer of \$2.68 billion for **Rio Tinto** PLC's Australian coal assets, days after its previous attempt to scotch an acquisition by a Chinese suitor was rejected.

The Anglo-Swiss mining-and-commodities trading giant said its bid for **Coal & Allied Industries Ltd.**, which includes a royalty linked to coal prices, is fully funded and is at least \$225 million greater than an offer made by **Yancoal Australia Ltd.**, a unit of China's **Yanzhou Coal Mining Co.**

Anglo-Australian mining company Rio Tinto last Tuesday rebuffed a \$2.5 billion offer Glencore made earlier this month and recommended that shareholders approve Yancoal's \$2.45 billion bid.

Rio Tinto said Friday its board will consider Glencore's proposal and provide an update ahead of its general meeting on Tuesday.

—Tapan Panchal

plans to acquire U.S.-listed rival **Gener8 Maritime Inc.**, a person familiar with the matter said.

A deal with Gener8 would have created the world's largest fleet of supertankers, with 43 of the largest crude carriers. The Journal reported last month that Frontline was in talks with Gener8, whose shares have risen 18% in the past month, leaving it with a market capitalization about \$525 million.

It would be the second time this year that Frontline has abandoned a deal that would have made it one of the biggest players in oil transport by sea.

Earlier this month, Mr. Fredriksen said he would drop a months-long hostile takeover push for Oslo-based rival **DHT Holdings Inc.**

The person familiar said market conditions had changed and that Frontline would hold off on M&A activity for now.

—Costas Paris

SAMSUNG BIOEPIS

Version of Humira Is Near Green Light

A Samsung group arm is on track to win European regulatory approval for a near-replica version of the world's top-selling drug, **AbbVie Inc.'s rheumatoid-arthritis treatment Humira**, as the deep-pocketed South Korean conglomerate tries to shake up the pharmaceutical market.

Samsung Bioepis Co., the group's new biotechnology company, said in a written statement Friday that it had received a positive opinion from the European Medicines Agency for its treatment, known as Imraldi. That decision clears the way for approval from the European Commission, whose judgment typically mirrors that of the EMA.

If it gets the green light, Imraldi would represent the third Samsung-developed medication to win government approval in Europe and the U.S.—an unusually fast start for a five-year-old company, industry analysts say.

All three Samsung treatments are close imitations of rheumatoid-arthritis drugs that rank among the world's biggest sellers.

—Timothy W. Martin
and Jonathan D. Rockoff

SEAWORLD ENTERTAINMENT

Subpoenas Issued Regarding Trading

SeaWorld Entertainment Inc. said it received subpoenas from the government related to trading in its securities and statements made by its executives, including those discussing the impact of "Blackfish," a critical documentary that sent ripples through the company.

The company said in a securities filing late Friday that subpoenas arrived earlier in June from the Justice Department

and the Securities and Exchange Commission. In a statement, SeaWorld said it "has cooperated with these government inquiries and intends to continue to cooperate with any government requests or inquiries."

SeaWorld didn't disclose Friday the nature of the trading being probed or specific statements made by executives. The Justice Department probe is targeting statements made on or before August 2014, the company said.

The theme-park operator has navigated turbulent waters in recent years, following the release of "Blackfish," the 2013 documentary that claims orcas, also known as killer whales, suffer in captivity, and the December 2014 ouster of its chief executive as the company launched a restructuring plan.

SeaWorld also said Friday board chairman David D'Alessandro will step down Dec. 31 after he failed to secure enough votes at a shareholder meeting earlier in June.

—Bowdyea Tweh
and Nathan Becker

FRONTLINE

Billionaire Ends Pursuit of Gener8

Frontline Ltd., the tanker firm owned by Norwegian billionaire John Fredriksen, has abandoned



SeaWorld's orca show in San Diego in May. SeaWorld has faced criticism over past treatment of orcas.

MEDIA

Hollywood's Misses Are Hits Overseas

Americans are losing interest in big sequels, which is cutting into studios' bottom lines

BY BEN FRITZ
AND ERICH SCHWARTZEL

LOS ANGELES—Hollywood's most important movies are posting big numbers this summer—in all the wrong places.

American moviegoers are losing interest in some of Hollywood's biggest franchises, depriving studios of their most profitable ticket sales even as international audiences in some foreign markets keep showing up.

"Transformers: The Last Knight" became the latest example of the lopsided performance this weekend, disappointing stateside with a five-day, franchise-low debut of \$69.1 million while collecting a franchise-best \$123.4 million in China. Its box-office sales are a pattern set this year by the eighth "Fast & Furious," fifth "Pirates of the Caribbean" and Tom Cruise's reboot of "The Mummy," all of which performed similarly at the box office.

Such results have become the norm for some of Hollywood's so-called tentpole movies, which regularly cost more than \$200 million to produce and are expected to serve as studios' biggest moneymakers. A poor showing in the U.S. no longer necessarily discourages studio executives from approving yet another installment in a long-running series if enthusiasm from overseas moviegoers is high enough.

But where grosses originate can have a major impact on studios' bottom line.

Studios keep about 60% of every dollar spent on movie tickets for major hits in the U.S., compared with less than

half in many foreign countries and just 25% in China. In addition, China and other developing nations have far smaller DVD, digital and television businesses that can generate ancillary revenue.

"The amount that comes back to the studio changes dramatically, so while the global number can look pretty good, the math of it isn't the same," said an executive at one studio experiencing the phenomenon.

"There's real impact to what that [international] business brings to the overall profitability of a movie," said Megan Colligan, president of world-wide marketing and distribution at Viacom Inc.'s Paramount Pictures, which released "Transformers." The movie's dismal domestic opening is 31% below the last installment of the series, released in 2014 over four days. Its global gross stands at \$265 million.

"Fast" grossed less domestically than the previous two movies in the auto-adventure series, while the new "Pirates" and "Mummy" were the worst performers yet in their franchises.

Together, the three movies have grossed a disappointing \$454 million in the U.S. and Canada but a total of \$1.79 billion overseas, with \$654 million coming from China alone. Previous films in each franchise earned a higher proportion of their global box office from domestic ticket sales.

"The franchise fatigue we're seeing in some other markets isn't so prominent in China," said Duncan Clark, president of international distribution for Comcast Corp.'s Universal Pictures, which released "Fast" and "The Mummy." China is the world's second-largest box-office market.

The mix of foreign ticket sales is changing too, with grosses typically falling in



"Transformers: The Last Knight" stumbled in the U.S., with a franchise-low debut of \$69.1 million, while collecting \$123.4 million in China.

Estimated Box-Office Figures, Through Sunday

FILM	DISTRIBUTOR	SALES, IN MILLIONS		
		WEEKEND*	CUMULATIVE	% CHANGE
1. Transformers: The Last Knight	Paramount	\$45.3	\$69.1**	—
2. Wonder Woman	Warner Bros.	\$25.2	\$318.4	-39%
3. Cars 3	Disney	\$25.2	\$99.9	-53%
4. 47 Meters Down	Entertainment Studios	\$7.4	\$24.3	-34%
5. All Eyez On Me	Lions Gate	\$5.9	\$38.6	-78%

*Friday, Saturday and Sunday. Source: comScore

**Cumulative total since Wednesday's opening

Source: Box Office Mojo

THE WALL STREET JOURNAL

more mature markets like Europe and Australia but staying strong, or growing, in East Asia and Latin America.

Lower profits from ticket sales are partially offset by cheaper marketing expenses in other countries, said Ms. Colligan. Studios often have only a few weeks to market a movie in China, as opposed to many months in the U.S. China also offers digital promotions that cost millions less than state-side campaigns.

Studios are rethinking their creative approaches to future sequels in hopes of reviving interest among Americans in light of the recent box-office flops. In addition, some fear that audiences in foreign countries such as China will soon grow as weary of these long-running franchises as Westerners have.

For American audiences, many of these franchises are too familiar, as are stars like Mr. Cruise of "The Mummy" and Johnny Depp of "Pirates," say studio executives.

"People are looking for something that really reimagines what they're expecting and yet they want the things that are very familiar to them."



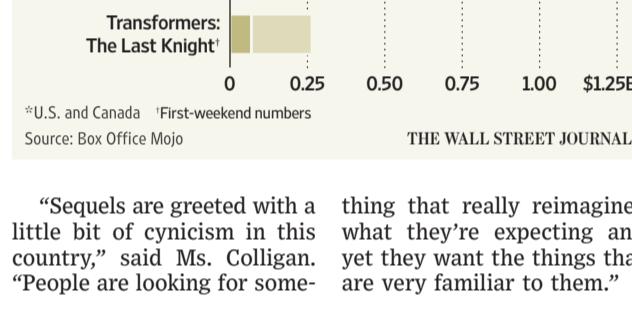
A scene from 'The Mummy'

Universal Pictures

Poor Showings

American moviegoers are losing interest in some of Hollywood's biggest franchises, even as international audiences keep showing up.

Box office revenue, in billions, through June 25



*U.S. and Canada *First-weekend numbers

Source: Box Office Mojo

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CLOSED-END FUNDS

wsj.com/funds

Listed are the 300 largest closed-end funds as measured by assets.

Closed-end funds sell a limited number of shares and invest the proceeds in securities. Unlike open-end funds, closed-end funds generally do not buy their shares back from investors who wish to cash in their holdings. Instead, fund shares trade on a stock exchange.

a-The NAV and market price are ex dividend. b-The NAV is as of Wednesday's close. c-NAV is adjusted for fully subscribed t-Right offerings process. g-Rights offering announced. h-Lower data has been adjusted for rights offering. i-Rights offering has expired, but previous day's NAV was not yet adjusted. j-NAV as of previous day, o-Tender offer in process. v-NAV is converted at the commercial Rand rate. w-Convertible Note-NAV (not market) conversion value. y-NAV and market price are in Canadian dollars. NA signifies that the information is not available or not applicable. NS signifies that fund is not in existence or entire portfolio consists of cash. z-Cash dividends paid during the previous twelve months for periods ending at month-end or during the previous fifty-two weeks for periods ending at any time other than month-end) by the latest month-end market price adjusted for capital gains distributions.

Source: Lipper

Friday, June 23, 2017

52 wk

Prem Ttl

Ret

Fund (SYM)

NAV Close/Disc

Ret

General Equity Funds

Adams Divers Equity Fd ADX 17.00 14.36 -15.5 25.5

Boulder Growth & Income BIF 11.58 9.55 -17.5 26.0

Central Securities CET 30.04 25.25 -15.6 36.8

Coh Steer Oppty Fd FOI 13.72 12.78 -6.9 23.1

Cornerstone Strategic CLM 13.24 15.09 +14.0 17.2

Etn Vnc Tax Adv/Pwr Evt 22.29 21.91 -1.7 18.8

Gabelli Dividend & Genl GDV 23.21 21.85 -5.9 23.6

Gabelli Equity Trust GAB 6.17 6.14 -0.5 24.8

Genl American Investors GAM 40.54 34.13 -15.8 25.2

Hnck John Tax Adv/Hdt HD 26.46 25.48 -3.7 11.6

Liberty All Star Equity USA 6.54 5.66 -13.5 26.9

Royce Micro-Cap RMT 9.88 8.60 -12.2 29.5

Royce Value Trust RVT 16.23 14.33 -11.7 32.9

Source Capital SOR 43.31 38.74 -10.6 10.6

Tri-Continental TY 27.64 24.22 -12.4 26.9

Specialized Equity Funds

Fiduciary/Clym Opp/Fd FMO 12.94 13.07 +1.0 7.3

52 wk

Prem Ttl

Ret

Fund (SYM)

NAV Close/Disc

Ret

General Equity Funds

Adams Natural Rsrcs Fd PEO 21.36 18.53 -13.3 -1.3

Allnrg GI NFt Div Interest NFJ 14.35 13.09 -8.8 18.3

AlpnGbl PrProp AWP 7.13 6.37 -10.7 30.8

ASA Gold & Precrds ASA 11.87 NA -13.8

BirkR Enh Cap Incg CII 15.87 14.90 -6.1 21.2

BirkR Enq Rgs Tr BGR 13.85 12.91 -6.8 -1.1

BlackRock Enh Eq Div Tr BDJ 9.45 8.76 -7.3 22.9

BlackRock Enh Gl Div Tr BOE 14.53 13.35 -8.1 24.3

BrkR Int'l Grwth&Inco BGY 6.80 6.29 -7.5 20.2

BirkR Health Sci BMS 37.52 36.25 +1.5 13.7

BirkR Rcs Comm It CII 9.23 7.92 -12.3 11.7

BlackRock Sc & Tech BST 24.54 22.76 -7.3 49.9

BlackRock Utility & Infra BUI 20.78 20.73 -0.2 12.0

CBRE Clarion/GblRltfcn IGR 8.76 7.71 -12.0 5.1

Cit Coast MLP & Infra Fd CEN 10.24 20.91 NA NA

Civco Core Eq Div Alpha JCE 13.55 14.74 -4.6 17.9

ClearBridge Amerg Yng CBA 9.17 8.56 -6.7 10.6

ClearBridge Engy MLP Fd CEM 15.25 14.67 -3.8 1.8

ClearBridge Engy MLP Opp FMO 12.33 NA 2.1 7.8

CleStrGbln INB 10.32 9.46 -8.3 23.4

Cohen & Steers Fd CTF 25.11 23.36 -7.0 20.2

Cohen & Steers Pnln & Engg Opp MIE 10.92 10.28 -5.9 12.2

Cohen & Steers Qual Inc ROI 13.83 12.91 -6.7 7.7

Cohen Strs Pfdncl Fd CEN 10.24 12.91 -8.9 14.5

Cohen & Steers TR CTF 13.66 12.84 -6.0 3.8

ClsLsgm Pnln Tech & Fd STK 20.98 21.72 +3.5 48.2

Diversified Asset Fd STK 20.98 21.72 +3.5 48.2

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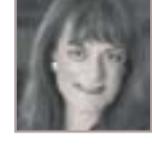
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Chairman and CEO
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Mondelēz International



John Haugen

VP and General Manager, 301 Inc.
General Mills, Inc.



Joe Stone

Chief Risk Officer
Cargill, Incorporated



Tom Hayes

President and CEO
Tyson Foods, Inc.



Tj Tate

Director, Sustainable Seafood Program
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A.G. Kawamura

Owner, Orange County Produce
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Rice Family Rallies From Gas Bust

Group behind energy company stands to gain a big payday from the buyout by EQT

BY RYAN DEZEMBER
AND TIMOTHY PUO

Eighteen months ago, the Rice family was pressured to sell shares in their family gas company at record-low prices as the natural-gas market tanked.

Now, the family is selling again. But this time, it is selling the entire company and under much more favorable circumstances.

Last week, rival Appalachian gas producer EQT Corp. said it would buy **Rice Energy Inc.** for \$6.7 billion in a deal that is poised to deliver more than \$1 billion to the family, whose members make up much of Rice's management and control roughly 18% of the company's shares, according to securities filings.

The merger, which will create one of country's largest natural-gas producers, shows how the shale boom continues to mint great fortunes even after the bounty of oil and gas around the world depressed energy prices.

With gas in particular, timing is everything. Prices for the fuel, which is used in heating and to generate electricity, are prone to wild swings as unpredictable as the weather.

In late 2015, the warmest winter on record pulled down gas futures to all-time, inflation-adjusted lows, dragging down Rice's stock. To avoid a margin call, the family sold a slug of shares they had borrowed against. Had they been able to hang on to those five

million shares, the family would now be nearly \$100 million richer.

Under terms of the EQT deal, Rice shareholders are due \$5.30 in cash and about one-third of an EQT share. Based on EQT's closing stock price the day before the deal was announced, that equates to about \$27.05 for every Rice share.

Still, the family is likely one of the gas boom's biggest winners just a decade after Daniel Rice III and his sons created the company from scratch. Their expertise in oil and coal helped them scout land in the early days of the shale-gas boom in Pennsylvania.

Mr. Rice honed his expertise at BlackRock Inc., where he was a mutual-fund manager specializing in energy, when his family started the gas company. One early move was a deal to drill in areas controlled by a coal company that Mr. Rice's BlackRock fund invested in.

After the arrangement was brought to light by The Wall Street Journal, Mr. Rice resigned. Rice executives declined to comment and Mr. Rice, who is now a Rice board member and a portfolio manager for Boston money manager GRT Capital Partners LLC, didn't respond to requests for comment.

"While there were no actual conflicts of interest, BlackRock and I both understand the desire to avoid even the appearance of one," he said at the time.

Although Mr. Rice played a large role in funding and founding the company, he largely left management to three of his sons, who are in their 30s. Daniel Rice IV is its chief executive. Toby is opera-

Reversal of Fortune

Rice Energy's founding family is poised to reap more than \$1 billion in its sale to rival EQT, after the gas producer's shares rebounded from depths that forced the family to sell stock at an all-time low.

RICE ENERGY SHARE PRICE



NATURAL-GAS FUTURES PRICE



Sources: WSJ Market Data Group (prices); securities filings (sale)

THE WALL STREET JOURNAL

tions chief and Derek is executive vice president of exploration.

Their younger brother, Ryan, works there as a petroleum engineer, according to the company's proxy. Toby's wife, Aileen, is vice president of land.

Toby was the first to move to Pittsburgh while he was still in his 20s. He started the company from a downtown apartment working with a former classmate from Texas A&M University who was an early partner. They sandwiched data-mining sessions and trips to scout oil and gas deals at local courthouses between rounds of beer and the

videogame "Call of Duty," according to people familiar with the early days of the company.

One early success came from the deal with coal mining firm Alpha Natural Resources Inc. Then expansion into Ohio accelerated the company's growth. Drilling rights it scooped up there turned out to be in the heart of the Utica Shale, another gas-rich formation under the more popular Marcellus.

The company did an initial public offering in 2014, debuting with a 4% gain over its IPO price of \$21 a share. The family owned one-third of the company's shares at the time, and the offering valued them

at \$900 million. Those shares ran up an additional 50% in gains by that summer when Rice announced a historic find.

It drilled a Utica well called Bigfoot 9H that by one measure ranks among the most successful in U.S. history. It hit an initial production of 41.7 million cubic feet a day, enough to power every home in Pittsburgh for 36 hours.

The brothers commemorated many of the company's big wells and landmarks with custom-made championship belts from the same craftsman who makes belts for World Wrestling Entertainment Inc.

The Rice brothers developed a reputation as colorful characters even in an oil and gas business known for eccentricities. They have used wrestler Hulk Hogan's theme song as hold music at the company's headquarters and named the company's wells after monster trucks and comic book characters, including Captain Planet and Gold Digger.

The company included on news releases a disclaimer: "Despite their size and strength, our wells are in no manner affiliated with such superheroes or monster trucks."

When Alpha Natural filed for bankruptcy protection and sold some assets at an auction, the Rice brothers showed up wearing Mickey Mouse T-shirts and shorts underneath blazers. It was a classic example of how the brothers challenged an often-staid industry, said Kevin Crutchfield, former chief executive at Alpha Natural.

"It was a very millennial outfit," he said. "They worked, when needed, insanely hard, but they were also very playful."

Italy Set To Shutter 2 Midsize Lenders

BY DEBORAH BALL

ROME—Italian authorities said Sunday they were prepared to spend as much as €17 billion (\$19 billion) as part of the shutdown of two regional banks, a deal that will transfer the lenders' best assets to **Intesa Sanpaolo SpA** for a nominal sum.

Veneto Banca and **Banca Popolare di Vicenza**, are mid-size lenders in the Veneto, Italy's prosperous northeast. Both have been flailing for several years despite efforts to shore up their capital and restore their health.

On Friday evening, the European Central Bank declared that the pair were set to fail, having "repeatedly breached supervisory capital requirements."

That set the stage for the government intervention over the weekend, which will involve splitting Veneto Banca and Banca Popolare di Vicenza into good and bad assets.

The government passed a decree Sunday that will effectively sell the good part of the two banks to Intesa, Italy's second-largest and best-capitalized bank. Intesa said last week that it would be willing to buy the best assets for a token price of €1 as long as the government assumed responsibility for liquidating the banks' large portfolio of sour loans.

The €17 billion includes the cost of Rome's responsibility for the bad loans, along with items such as covering legal exposure, restructuring of the remaining bank and paying for the expense of personnel issues associated with splitting the two banks into a

\$19B

Maximum it will cost Italy to close down two lenders

In Mozambique, \$1 Billion Has Gone Missing

BY MATINA STEVIS

More than \$1 billion that Mozambique raised in international markets with the help of two major banks can't be fully accounted for by the state-owned companies that benefited from the funds, the auditing and risk-assessment company **Kroll Inc.** said in a report reviewed by The Wall Street Journal.

The report, posted to the Mozambique attorney general's website, found the state-owned entities can't account for more than half of some \$2 billion in loans and bonds arranged for Mozambique by **VTB**, Russia's second-largest bank, and Zurich-based **Credit Suisse Group AG**. Neither bank has been accused of wrongdoing.

The unaccounted-for sums include a \$500 million loan that should have been spent in cash but now can't be found, the report said. It also includes roughly \$800 million out of some \$1.5 billion spent on assets that an assessment by an independent expert found should have cost about \$700 million, the report stated.

Kroll's report, paid for by the embassy of Sweden in Mozambique, criticizes the way the state-owned companies—**MAM**, **Ematum** and **ProIndicus**—were managed and operated. The report says the companies have had almost no revenue and accuses their senior management of concealing facts and avoiding the auditors.

The chief executive of all three companies is Antonio do Rosario, a senior official in Mozambique's powerful secret service, known as SISE. He declined to comment.

A spokesman for the government of Mozambique declined to comment.

The loans' opaque nature was revealed last year when The Wall Street Journal reported they had been kept secret from the public and from subsequent creditors who continued lending to Mozambique without knowing about the past loans. The Journal previously reported the existence of the audit and of the previously undisclosed loans.

"Gaps remain in understanding how exactly the USD 2 billion was spent, despite considerable efforts to close this gap," the Kroll report said.

The differences between prices of the aforementioned



Mozambique state-owned entities can't account for half of some \$2 billion in loans and bonds meant for them, an audit found.

assets and services outlined in the invoices provided to ProIndicus and EMATUM by the Contractor, compared with the prices estimated by the independent expert total approximately USD 713 million," the report further stated.

Regarding the allegedly missing \$500 million, the Kroll report said its auditors hadn't received satisfactory explanations as to how that money had been spent. The report said the money was added into Mozambique's state budget without seeking parliamentary clearance.

"Until the inconsistencies are resolved, and satisfactory documentation is provided, at least USD 500 million of expenditure of a potentially sensitive nature remains unaudited and unexplained," the report concluded.

The scandal has plunged Mozambique into a financial crisis, with major international donors suspending all-important aid to the extremely poor southern African nation until the money is tracked and accounted for.

The International Monetary Fund has suspended a bailout to Mozambique following the revelations and is in discuss-

sions with the government for a new bailout. It has pledged to withhold any aid until questions surrounding the earlier loans are resolved. The IMF said it intends to send a staff mission to Mozambique next month in July to discuss the Kroll audit and "possible follow-up actions, including working with the authorities to address concerns related to the management of public resources."

Previous published reports about the loans prompted investigations by regulators in the U.K. and Switzerland, as well as at the Securities and Exchange Commission, on the role Credit Suisse and VTB played, as facilitators of the loans. The banks have denied wrongdoing.

The Kroll audit confirmed reports that the banks had carved \$200 million in fees out of the \$2 billion total—a slice well above what is typical for this market. The banks have said they were paid fees appropriate to the specifics of the deals.

Mozambique told creditors in October 2016 that it wouldn't be able to repay them and initiated a debt restructuring. Creditors have

been reluctant to participate, citing legal and other issues, and no progress has been made in the stalemate.

The Kroll report has been

seen as a key step toward unblocking the restructuring process and normalizing relations between Mozambique and its sources of financing.

Currencies

U.S.-dollar foreign-exchange rates in late New York trading

Country/currency	Fri in US\$	Fri per US\$ (%)	YTD chg (%)
Americas			
Argentina peso	.0618	16.1787	1.9
Brazil real	.2991	3.3432	2.7
Canada dollar	.7538	1.3267	-1.3
Chile peso	.001512	661.20	-1.3
Colombia peso	.0003310	3021.38	0.6
Ecuador US dollar	1	1	unch
Mexico peso	.0555	18.0027	-13.2
Peru new sol	.3071	3.256	-2.9
Uruguay peso	.03530	28.3300	-3.5
Venezuela b.fuerte	.100150	9.9851	-0.1
Asia-Pacific			
Australian dollar	.7567	1.3215	-4.8
China yuan	.1463	6.8359	-1.6
Hong Kong dollar	.1282	7.8000	0.6
India rupee	.01550	64.498	-5.1
Indonesia rupiah	.0000751	1331.90	-1.5
Japan yen	.008986	111.29	-4.9
Kazakhstan tenge	.003067	326.09	-2.3
Macau pataca	.1245	8.0342	1.5
Malaysia ringgit	.2322	4.2886	-4.4
New Zealand dollar	.7284	1.3729	-4.9
Pakistan rupee	.00954	104.845	0.5
Philippines peso	.0200	50.113	1.0
Singapore dollar	.7208	1.3873	-4.1
South Korea won	.0008811	1134.90	-6.0
Sri Lanka rupee	.0065270	153.21	3.2
Taiwan dollar	.03292	30.378	-6.4
Thailand baht	.02947	33.930	-5.2
Close Net Chg % Chg YTD % Chg			
WSJ Dollar Index		88.65	-0.19 -0.21 -4.61

Sources: Tullett Prebon, WSJ Market Data Group

good one and a bad one.

The €17 billion consists of €5.2 billion to Intesa and as much as €12 billion in state guarantees, including those protecting Intesa from any negative impact to its capital ratios resulting from the acquisition.

At a press conference Sunday, Prime Minister Paolo Gentiloni said that the two banks will open regularly Monday. The banks' situation "reached a point that required a rescue to avoid the risk of a disorderly failure," he said.

Italy obtained European Union permission to deal with the Veneto banks using national insolvency laws, thus avoiding inflicting losses on senior bondholders.

Intesa's offer to buy the good bank resulting from this operation was the only "significant" offer, according to an Italian government official.

The case of the Veneto banks is yet another example of Italy wriggling out of strict EU rules built after the financial crisis to prevent taxpayers from footing the bill in the event of the collapse of such institutions as banks.

When the EU authority in charge of winding down the bloc's failing banks—the Single Resolution Board—decided it wouldn't take the case, it handed all power over to Italian authorities.

The SRB said Friday night it wouldn't take action because neither of the banks would have a "significant adverse impact on financial stability."

So the two banks will be closed down under national insolvency procedures, and the painful process of EU bail-in—under which junior and senior bondholders absorb the losses—is averted. In Italy, a majority of bonds are in the hands of mom and pop investors.

By avoiding the SRB, Italian authorities could work under a softer set of rules dating from 2013 and only had to put forward a state-aid case to the commission.

—Julia-Amelia Verlaine contributed to this article.

MARKETS

Beijing Reminds Market of Heavy Hand

On heels of MSCI rally, stocks sell off on crackdown of big overseas deal makers

BY SHEN HONG

SHANGHAI—What a week for Chinese markets: First came a rally induced by a leading global index compiler's long-awaited decision to include Chinese stocks and then a selloff after a regulatory crackdown on some of the country's biggest companies.

MSCI Inc.'s move Tuesday to include for the first time Chinese shares in its global benchmarks was a recognition of the sheer weight of the world's second-largest stock market. But Beijing's abrupt regulatory sweep against some of the nation's largest overseas deal makers Thursday underscores the biggest long-lasting risk in investing in China: policy uncertainties.

The markets' response to the unexpected regulatory clampdown also serves as a reminder of how fragile Chinese investors are in the face of Beijing's seemingly strong resolve to clean up a debt-laden financial system after years of widely available credit.

The Shanghai Composite Index rose 0.5% to its highest level in a week and a half on Wednesday after MSCI announced its decision to include 222 domestically listed Chinese stocks in its emerging-markets index.

The opposite happened less than 24 hours later, when news broke that China's bank-



Rossoneri, led by Yonghong Li, owns soccer's AC Milan and is among the firms being scrutinized.

ing regulator is conducting a sweeping check on the borrowing of some of the country's top overseas deal makers in one of the most forceful attempts yet to get a grip on debt. The list covers some of the highest-flying private conglomerates in China, including **Anbang Insurance Group Co.**, whose chairman, Wu Xiaohui, has been detained by investigators of economic crimes; **HNA Group Co.; Fosun International Ltd.**; and property giant **Dalian Wanda Group**, owned by billionaire Wang Jianlin.

Little-known **Rossoneri Sports Investment Management Changxing Ltd.**, which made headlines with its acquisition this year of Italian soccer powerhouse AC Milan, also is on the list.

The five are famed for bold international bets on big brand names. The revelations triggered heavy selloffs in bonds and stocks related to some of these companies.

Shenzhen-listed shares of **Wanda Film Co.**, the entertainment unit of Wanda Group, plunged nearly 10% before the company requested suspend-

ing share trading. Bonds issued by one of Wanda's property units fell 2.5% amid chatter that several banks were dumping their holdings.

Hong Kong-listed **HNA Holding Group Co.**, a unit of HNA Group, fell 6%, while Fosun International closed down 5.8%.

The broader market also tanked. The Shanghai index erased earlier gains and closed down 0.3%, while its more-active Shenzhen counterpart lost 1.3%.

While their individual stocks rebounded after Wanda and Fosun each issued state-

ments saying their operations remain normal, investors look far from convinced in general.

"Doubts and confusion linger on among investors, and it shows again that policy risk is the biggest risk in this market," said Amy Lin, senior analyst at Capital Securities. While some of the companies in question have made relevant comments, "it'd be best for the banking regulator itself to come out to clarify," Ms. Lin said.

The China Banking Regulatory Commission has remained silent.

A similar episode occurred in mid-April when The Wall Street Journal reported that the regulatory commission had launched a crackdown on Chinese banks' risky lending and investment practices. Among them are so-called wealth-management products, which are deposit-like financial products offering much higher returns.

Both the Shanghai and Shenzhen markets fell more than 1% during that week, while the Chinese bond market entered a downward spiral that saw prices hit a 29-month low less than four weeks after that.

While the investigation into the five companies' offshore borrowing is theoretically part of the same campaign by the authorities to prevent financial risk, the timing came as a surprise, said Tim Condon, economist at ING in Singapore.

"There is an element of capriciousness in the regulatory regime when these kinds of things happen, although people investing in China are aware that the system of regu-

lation is a work in progress," Mr. Condon said.

Some investors indeed view the financial housecleaning as an overdue, positive development.

"At least they are doing it now rather than after a crisis," said Sean Darby, chief global equity strategist at Jefferies in Hong Kong. "The authorities have made it known they are going to start cracking down on leverage. This is going to be a risk for some parts of the equities market for some time."

The tricky question is how Beijing juggles the long-term system risk and the short-term effect its clampdown will have on markets. There are signs that the authorities have been taking a relatively flexible or opportunistic approach.

In the past few months, the authorities have chosen to roll out new restrictions when markets were doing well, while using state media to send soothing messages when they aren't, according to Qin Han, chief fixed-income analyst at Guotai Junan Securities.

"Confucianism preaches the importance of peace, and a harmonious society is the ultimate goal," Mr. Qin said.

To others, no matter how much economic sense the regulatory crackdown makes, it shouldn't come at the expense of free markets.

"In a genuine market economy, whether a company's leverage is too high should be determined by investors, not regulators," said Capital Securities' Ms. Lin.

—Steven Russolillo contributed to this article.

Stock Pickers to Add Chinese Shares

BY DAISY MAXEY

MSCI Inc.'s decision to add Chinese stocks to its emerging-markets index will almost certainly cause several overseas-stock pickers to start adding the shares to their mutual funds. Many already have.

Such actively managed funds don't track indexes like passive funds do, but MSCI's decision to include 222 of the Chinese stock market's A-shares—stocks denominated in yuan and listed in either Shanghai or Shenzhen—will put pressure on the people running them to wade into the arena, investors said. The inclusion in the index takes effect next year.

"Looking at some of our peers, they haven't been investing, and I'm sure they will, and they certainly won't wait until the final inclusion to do that," said Richard Thies, a portfolio manager at **Driehaus Capital Management LLC**. There is lots of room for funds to increase their exposure because foreign ownership of Chinese A-shares is extremely low, he said. He said A-shares have been a good source of returns for his fund.

MSCI indexes already include Chinese companies'

shares listed in cities like Hong Kong and New York. The 222 stocks would increase China's 28% weighting in the MSCI Emerging-Markets Index by 0.73 percentage point.

The change won't make much of a difference for the Driehaus Emerging Markets Growth Fund because it has invested in A-shares for many years, Mr. Thies said, but

Concerns remain over frequent government intervention in China's stock market.

some of its institutional clients, including pensions and foundations, which don't invest in the shares will probably revisit that decision.

Anthony Cragg, senior portfolio manager at Wells Fargo Funds, has been investing in China's A-shares for several years based on what he described as the companies' positive fundamentals. He said he believes other active fund managers will now join him.

"Now that A-shares are going to be in the index, obvi-

ously, the passive funds will have to—come a year from now—be invested, but even a lot of active managers will have to get involved," said Mr. Cragg, who manages the Wells Fargo Emerging Markets Equity Income Fund and the Wells Fargo Asia Pacific Fund.

Many large actively managed emerging-markets funds are in every other area "pretty close to the benchmark," said Mr. Cragg.

"The one area that stands out like a sore thumb is China; it's really the only major market where many major funds are a long way from the benchmark."

Concerns persist over the Chinese stock market's transparency, corporate governance and frequent government intervention.

"There still remain liquidity challenges, and there's likely to be strong demand, which will push up valuations that may scare off some investors initially," said Todd Rosenbluth, director of ETF and mutual-fund research at financial data and analysis provider CFRA.

"Even though the Chinese economy is showing signs of improvement, we believe there remain many skeptics."

Still, Mr. Thies said, with China's markets opening further, "that should mean that the markets are regulated in a more normal way," echoing the prediction of several analysts and investors who track the Chinese stock market.

Over time, that could help expand the potential universe of Chinese stocks for Edmund Harriss, portfolio manager at **Guinness Atkinson Asset Management**.

Mr. Harriss, who manages the Guinness Atkinson China & Hong Kong Fund and the Guinness Atkinson Renminbi Yuan & Bond Fund, said his funds already have a good range of exposure to China through shares traded in Hong Kong, which includes financial, retail, technology, education and health-care companies. But they hold no A-shares.

MSCI's decision, he said, means China's A-shares may become more accessible and attractive.

"It pushes the regulators and the stock exchange in China themselves to iron out some of the wrinkles that are still tricky for me to buy A-shares and settle purchase of the shares," he said. "That makes them more accessible."

158
The number of consecutive trading days passed without the Nasdaq Composite Index experiencing a pullback of 5% or more, the longest such streak since 1989

Nasdaq Defies Gravity

The tech-heavy Nasdaq Composite Index hasn't had a peak-to-trough decline of 5% since before November's election, a span of 158 days. That is the longest streak for the Nasdaq without

MONEYBEAT

such a pullback since 1989, surpassing all stretches during the heady days of the late 1990s dot-com boom, according to WSJ Market Data Group.

At a time of middling economic growth, investors have piled into shares of revenue-generating powerhouses such as

Apple Inc., Amazon.com Inc. and Google parent **Alphabet Inc.**

Gains in those stocks have driven the Nasdaq's climb for months.

Even an abrupt, five-day rout for the Nasdaq in the middle of

this month only dragged the index down 2.7%.

All U.S. stocks have been placid this year but the unusually long stretch for the Nasdaq means investors are being rewarded without facing a typical amount of risk. The Nasdaq comprises over 3,000 stocks, many of which are smaller and therefore more volatile than blue chips in the Dow, which has seen its longest stretch without a pullback since 2006. The S&P 500's streak is the longest since 1996.

—Chris Dieterich

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THE TICKER | Market events coming this week

Monday

Short-selling reports

Ratio, days of trading volume of current position, at May 31

NYSE 4.7

Nasdaq 4.5

Durable-goods orders

April, previous down 0.8%

May, expected down 0.4%

Tuesday

Consumer confidence

May, previous 117.9

June, expected 116.0

Earnings expected*

Estimate/Year Ago(\$)

Darden 1.15/1.10

FactSet 1.84/1.64

IHS Markit 0.52/0.45

Wednesday

Mort. bankers indexes

Purch., previous down 1%

Refinan., prev. up 2%

Earnings expected*

Estimate/Year Ago(\$)

General Mills 0.71/0.66

Paychex 0.53/0.49

GDP deflator

1st qtr., sec. est. up 2.2%

Initial jobless claims

Previous 241,000

Expected 240,000

EIA report: natural gas

Previous change in stocks in billions of cubic feet

up 61

Gross domestic product:

Percentage change, annual rate

1st qtr., sec. est. up 1.2%

Personal income

April, previous up 0.4%

May, expected up 0.3%

Personal spending

April, previous up 0.4%

May, expected up 0.1%

Chicago PMI

May, previous 59.4

June, expected 58.0

U.Mich. consumer index

June, prelim. 94.5

June, final 94.3

Personal spending

April, previous up 0.4%

May, expected up 0.1%

Personal income

April, previous up 0.4%

May, expected up 0.3%

Personal spending

April, previous up 0.4%

May, expected up 0.1%

Friday

Chicago PMI

May, previous 59.4

U.Mich. consumer index

June, prelim. 94.5

June, final 94.3

Personal income

April, previous up 0.4%

May, expected up 0.3%

Personal spending

April, previous up 0.4%

May, expected up 0

MARKETS

THE DAILY SHOT | By Lev Borodovsky

A Turning Point for Commercial Property

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Commercial real-estate prices are starting to roll over after reaching record highs, capping a long postcrisis rally. While there is no sign that a decline would mean imminent danger for the economy, Federal Reserve Bank of Boston President Eric Rosengren recently warned that valuations represent a risk he

"will continue to watch carefully."

So far, prices have proven resilient, reflecting in part the unexpected 2017 decline of interest rates and the rising capital flows from diverse sources such as U.S. pensions and overseas investors.

Even so, capitalization rates, reflecting the expected

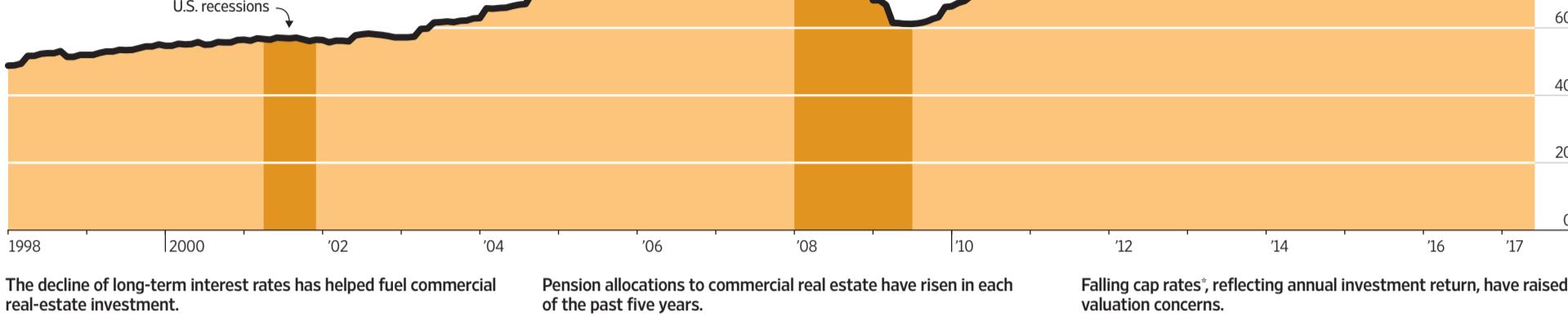
annual income generated by a property as a share of its purchase price, have fallen substantially in recent years, squeezing landlords and potentially increasing the sector's vulnerability to a market shock or economic downturn.

Some analysts expect prices to decline further, as

sales activity slows and banks pull back on lending. Those concerns, together with the headlong retreat this year of many retail firms, have helped pressure shares of real estate firms and related investment trusts. The question for investors is how fully these risks are appreciated now.

Prices have receded after a plateau

Commercial Property Price Index,
major sectors (2007=100)



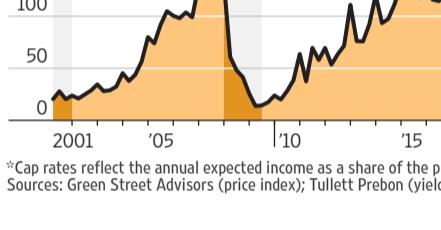
The decline of long-term interest rates has helped fuel commercial real-estate investment.

Yield on the 10-year Treasury note



Sales are softening.

U.S. commercial real-estate sales, quarterly



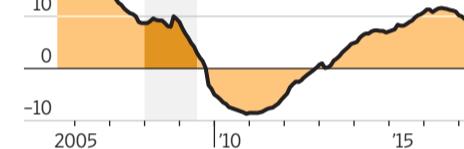
Lending standards are tightening.

Percentage of domestic banks tightening lending standards by loan type, quarterly

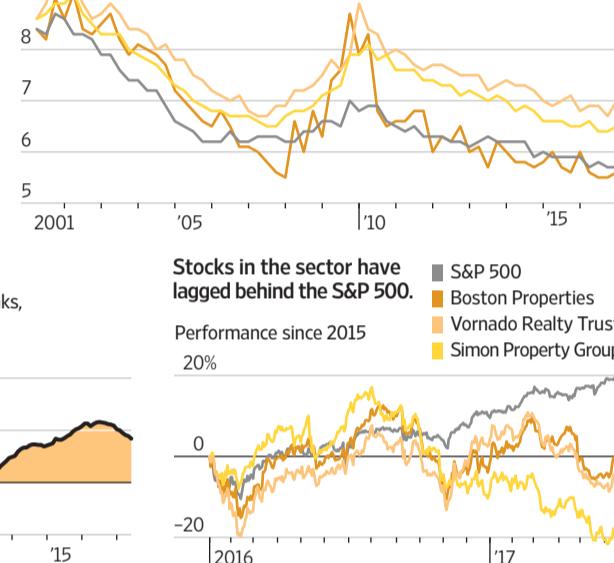


Loan growth has slowed.

Commercial real-estate loans at U.S. banks, change from a year earlier



Falling cap rates*, reflecting annual investment return, have raised valuation concerns.



THE WALL STREET JOURNAL.

*Cap rates reflect the annual expected income as a share of the purchase price.
Sources: Green Street Advisors (price index); Tullett Prebon (yield); Prequin (allocations); Real Capital Analytics (cap rates, sales); Federal Reserve (lending standards and growth); FactSet (stocks, S&P 500)

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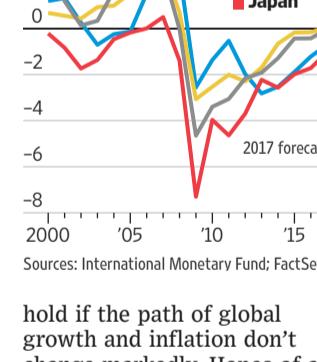
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Sometimes It Pays Not to Invest

Slim Pickings

Output gap as a share of potential gross domestic product



hold if the path of global growth and inflation don't change markedly. Hopes of a fiscal bump to growth led by the U.S. have faded, while the recent decline in oil prices may cause new worries about headline inflation.

More significantly, perhaps, the flood of global central-bank liquidity that has supported markets is past its peak. The Federal Reserve is raising rates, and the European Central Bank is inching

toward an exit from ultra-loose monetary policy.

While policy makers don't want to shock markets, global output gaps are closing. The need for monetary largess is therefore no longer as clear-cut as it was.

In this environment, faced with unappetizing initial valuations, not investing might be a valid strategy.

Building up cash doesn't reflect a particular fear that a big shock, like a new recess-

sion, is about to hit. And there are still pockets in markets where the picture is fundamentally brighter, such as in European equities or in emerging markets. Instead, it is a tactical play: Selling some assets and raising cash here is about locking in profits and creating room to maneuver. There have been big opportunities even as markets have continued their broad upward journey: Think of the U.S. high-yield-bond selloff that started in 2015, and the swoon in stocks in early 2016, as oil cratered. Or think of when bond yields rose in the wake of Donald Trump's election. Those turned out to offer attractive buying opportunities as markets rebounded—if investors had cash to exploit them.

Different types of investors vary in their ability to keep some dry powder, of course. The catalyst for deploying it isn't clear either. But, after a strong first half, raising cash to invest at higher yields or lower prices appears wise.

—Richard Barley

OVERHEARD

There is much fretting about the U.S. auto market these days.

Unit sales last year were more than 17.5 million, making it the best year ever.

If one looks under the hood, it was even more powerful.

After all, around two-thirds of vehicles sold in December were light trucks or sport-utility vehicles—usually pricier than plain old cars.

Vehicles' average sticker price was more than \$35,000.

Auto makers are always looking for something newer and more profitable to sell.

The hot categories in recent years may technically be light trucks like SUVs, but many were crossovers or compact ones known as CUVs.

With even that trend showing signs of flagging,

though, SACs—sports activity coupes—are the new "it" category, with a new offering arriving from Mercedes-Benz.

These are even smaller and more carlike than crossovers, but no less expensive.

Auto makers are surely shuddering at buyers rediscovering their love for the plain old CAR.

BlackBerry's Valuation Is Disconnected

Even in its shrunken state, BlackBerry Ltd. finds that \$815 million goes only so far.

That is how much BlackBerry was awarded in an arbitration dispute with Qualcomm two months ago. It isn't an insignificant sum, adding about 52% to the company's cash balance.

Given BlackBerry's need to grow a fledgling software business to replace a rapidly disappearing handset and service fee enterprise, an unexpected boost to the company's war chest was taken as good news.

Too good, as it turns out. BlackBerry's share price surged 44% since the announcement of the award up to its fiscal first-quarter results announcement Friday morning. That added about \$1.1 billion in market value—well in excess of the award—and set up an inevitable disappointment when the results fell short of targets. BlackBerry's share price tumbled more than 12%.

BlackBerry's focus is on software these days, so the new funds can help the company invest in key growth areas, such as mobile-device management and the automotive market. But these are also markets targeted by much larger players.

This leaves BlackBerry's valuation still looking risky. Using only projected software revenue, BlackBerry still trades at about 6.6 times forward sales—even after Friday's selloff.

That, incidentally, is the highest multiple BlackBerry has fetched since 2008, when it was the dominant force in mobile. If one thing is certain, it is that \$815 million isn't enough to buy BlackBerry's way back to glory.

—Dan Gallagher

Why Failure Would Be a Virtue in Europe's Banking System

Deal Drought

Mergers and acquisitions among banks by location of target



almost 30% in the former but by just 16% to the end of 2015 in the latter, according to the latest data.

This hasn't necessarily reduced capacity, though. The number of physical branches per 100,000 people has barely changed in the U.S., Japan and much of Europe, according to the World Bank. Spain has had a big decline, but still has far more branches than Italy and twice the number per head of the U.S.

So what is the issue? First, bank mergers and takeovers collapsed after the crisis and haven't really recovered. In Europe, Mario Draghi, president of the Eu-

ropean Central Bank, and Danièle Nouy, Europe's chief bank regulator, have called for more consolidation. But executives aren't biting. They are afraid of how regulators will treat them. Any big bank that grows in size and complexity is likely to face higher capital demands. That could hurt returns and limit dividend-paying capacity.

Another way of cutting capacity would be allowing banks to fail. In Europe, that still seems difficult, despite regulatory efforts to make it less so. This is down to political quiescence over enforcing the rules, especially in the weakest markets where failures are most

likely, such as Italy.

Spain has just forced through the resolution and sale of a failing bank, but Italy is still struggling to find a way around the rules and deal with several stuttering lenders large and small.

Oversupply is a problem across Europe, more so than the U.S. Regulators can point out this problem. It would be better to start coming up with solutions, too.

Widespread deregulation isn't the answer, but Europe should move faster to create a true single market for banking—like that in the U.S. That would help consolidation the most.

—Paul J. Davies

HEALTH-CARE TECHNOLOGY

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Monday, June 26, 2017 | R1

How Apps Can Help Manage Chronic Diseases

Hospitals and doctors have identified digital tools that can assist patients in dealing with ailments such as diabetes, heart disease and lung disease. The early results are promising.

BY LAURA LANDRO



ANASTASIA VASILAKIS

TECHNOLOGY IS OFFERING

a new fix for one of the most confounding health-care challenges: getting patients with chronic disease to take better care of themselves.

About half of all adults suffer from one or more chronic diseases, which account for seven of 10 deaths and 86% of U.S. health-care costs. But preventing and treating such ailments requires time that doctors don't have in brief office visits, and a degree of daily self-management that many patients have been unable to handle. They often become overwhelmed by the demands of their daily regimens, slip back into poor health habits, fail to take their medications correctly—and end up in the emergency room.

While there has been something of a national obsession with health apps like fitness trackers, most are aimed at exercise and lifestyle buffs and aren't designed to link patients to health-care providers. There is generally no evidence to back their use in improving health outcomes for those who have chronic disease unless the patients' own doctors are involved.

New studies, however, show that the emerging field of digital medicine—a combination of remote monitoring, behavior modification and personalized intervention—can improve outcomes in some of the most costly and tough-to-manage categories such as diabetes, heart disease and lung disease. As a result, a growing number of hospitals and health systems are adopting digital programs that have been studied in clinical trials and can be delivered on a broad scale at low cost with the use of smartphones, wireless devices and sensors.

In addition to raising patients' confidence that they can manage their health—and providing some hand-holding and nudging when they don't—experts say the innovations allow doctors to gather data about patient behavior and symptoms, and intervene when patients aren't following their regimens or have a flare-up in their disease. They also enable care teams to deliver continuing and consistent support to

change behavior, such as losing weight, taking medications as prescribed and exercising. "Digital medicine allows us to get into your life in a personal way, deliver interventions continuously and inspire you to be healthy in a way an office-based practice can't," says Joseph Kvedar, a physician and researcher who is vice president, connected health, at Partners HealthCare, which includes Brigham and Women's Hospital and Massachusetts General Hospital in Boston.

The push for digital medicine comes as reimbursement for medical care is shifting from fee-for-service arrangements to a focus on delivering quality outcomes at reasonable cost. The explosion in digital medicine has spurred researchers to develop apps for studies of diabetes, asthma and heart disease, and myriad technology startups are pitching disease-management apps to health-care providers.

That, in turn, has spurred the health-care industry to study which technologies are best. Here are some approaches backed by evidence that are gaining traction in digital medicine.

DIABETES KEEPING THE CONDITION AT BAY

Prediabetes—higher-than-normal blood sugar—increases the risk of stroke and heart

attack. According to the Centers for Disease Control and Prevention, prediabetes affects 86 million adults, or more than one in three, and as many as 30% of them will develop diabetes within five years unless they lose weight through a healthy diet and exercise.

While many health plans and insurers offer diabetes-prevention plans, the lifestyle changes to ward off diabetes can require daily hand-holding, so more are looking for ways to deliver such programs digitally. In collaboration with the American Medical Association, Salt Lake City-based Intermountain Healthcare, with 22 hospitals and 185 clinics, is pilot-testing an online program provided by San Francisco-based Omada Health for patients at risk for diabetes. The yearlong program starts with a core 16-week online course on better lifestyle habits, and assigns patients to a personal health coach and private online support forum.

Participants receive a pedometer and a cellular scale that transmits their weight readings to their Omada profile, and are visible to the coach. They log their daily activity and food either online or with a mobile app; if they have a connected device such as an Apple Watch, they can link it with the program to transmit activity automatically. Their results are displayed on a personal dashboard. After the initial sessions,

Omada provides a 36-week sustaining curriculum focusing on weight maintenance. "You can't just send someone a scale and a step tracker and pray for results," says Omada Chief Executive Sean Duffy.

Coaches usually reach out once or twice a week to check on whether participants have completed their lesson, answer questions and congratulate the patient on tracking activity or meals. Patients can also communicate as often as they like with coaches. Omada sends Intermountain reports to show how an overall population is doing, but can also send individual patient reports for follow-up.

Research has shown that Omada participants are able to maintain weight loss and lower average blood-sugar levels two years after starting. In one study of 501 Humana Medicare Advantage beneficiaries, published in the Journal of Aging and Health, participants lost 7.5% of their initial weight after 12 months, improved blood-sugar levels, and lowered cholesterol. In addition to reducing their risk of diabetes, participants also reported improvements in self-care, diet and exercise, and lower feelings of depression and isolation.

"The new reality is that patients want to seek care in their own environment and on

Please turn to the next page

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IN HEALTH CARE
DATA IS ONLY AS BIG
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JOURNAL REPORT | HEALTH-CARE TECHNOLOGY

Scientists Try New Approach on Type 1 Diabetes

Implants with cells that produce insulin could free patients from continual testing and therapy

BY BRIAN GORMLEY

IN THE FIGHT against Type 1 diabetes, drugmakers are pursuing a new line of attack: creating cells that help the body beat the condition.

In Type 1 diabetes, the immune system attacks pancreas cells that make insulin, a hormone that helps cells absorb sugar. Some 1.25 million Americans have the condition, which raises the risk of heart disease, nerve damage, kidney failure and other illnesses. Patients typically tackle the disease with diligent glucose testing and insulin therapy, used to control blood sugar or glucose.

In the past few years, scientists have made significant progress in their efforts to free patients from insulin therapy. Researchers have learned more about how to generate insulin-producing cells in a laboratory and place them into patients, while protecting the cells from the immune system, which would ordinarily reject them. Some are reprogramming the patient's own cells to retrain them to fight the disease.

"It is [in] no way an easy life trying to manage blood glucose," says Julia Greenstein, vice president, discovery research, for JDRF, a nonprofit that funds research into Type 1 diabetes.

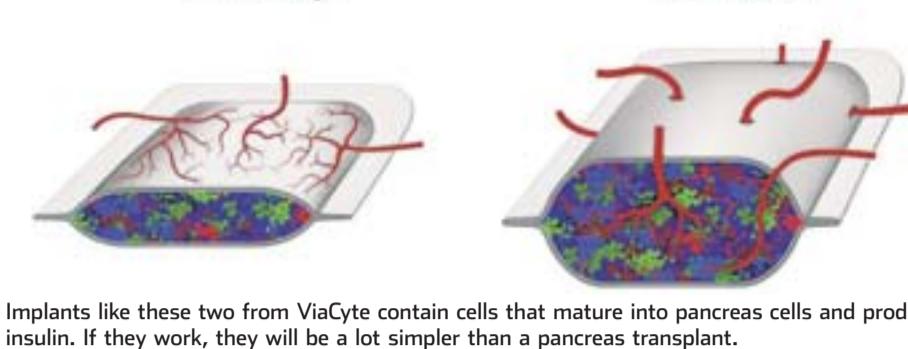
Currently, a pancreas transplant is the gold standard for freeing patients from insulin therapy because it enables the highest percentage of patients to remain independent of the treatment over the long term, says Peter Stock, a professor of surgery at the University of California, San Francisco, and co-director of the Pancreatic Islet Cell Transplant program at UCSF Medical Center.

But a pancreas transplant is a major surgery, and not every patient has a heart healthy enough to tolerate the procedure. Transplants also require immune-suppressing drugs, which increase the risk of infection and certain cancers. And the procedure requires donor pancreases, which are scarce.

Beyond transplants

A less invasive option, which has been around since the 1980s, is transplanting islets, or clusters of pancreas cells that include insulin-making beta cells. Patients receive them through a direct injection into the vein that leads to the liver. Some islet-transplant recipients can forgo insulin therapy for several years.

Yet islet transplants carry some of the same downsides as full organ transplants. A pancreas must be removed from a deceased donor to obtain the islets, even though the organ isn't actually being



Implants like these two from ViaCyte contain cells that mature into pancreas cells and produce insulin. If they work, they will be a lot simpler than a pancreas transplant.

transplanted. And the treatment requires immune-suppressing medication to prevent the patient's body from rejecting donated cells. So, like organ transplants, islet procedures are reserved for a small minority of patients.

The cures under study now would remove the need for a donor pancreas. In the first method, cells that could free patients from insulin therapy are generated in a laboratory and then transplanted into a patient.

"Everyone's waiting for the next generation of beta-cell replacement that hopefully will change the whole way in which we treat diabetes," says Gordon Weir, a Harvard Medical School professor and diabetes researcher at the Joslin Diabetes Center in Boston. "In spite of the excitement and extraordinary things that have happened in the last 10 years, there are still a lot of challenges."

Biotechnology companies **ViaCyte Inc.** and **Summa Therapeutics Inc.** hope to solve the donor-shortage

problem by coaxing stem cells to mature eventually into other cells that make insulin and other hormones.

In 2014 ViaCyte, of San Diego, began clinical trials of progenitor cells—which turn into pancreas cells—housed in a device that protected them from the immune system.

Company scientists hoped a network of blood vessels would grow on the device implanted under the skin. Then oxygen, glucose and other nutrients could diffuse through its tiny pores, allowing cells inside to thrive and function. Meanwhile, insulin and other hormones would diffuse out.

But in the study, certain immune cells interfered with the creation of this blood-vessel network. ViaCyte is hoping to improve the device to prevent this response, and resume clinical studies within 24 months.

Meanwhile, it is starting new studies of a device with larger pores that let blood vessels enter and nourish the progenitors directly. Since this approach wouldn't protect the

cells inside the device from the immune system, patients would need immune-suppressing drugs. But the treatment could make cures more accessible to patients at high risk for life-threatening diabetes complications who would also be islet-transplant candidates, according to Chief Executive Paul Laikind.

Another approach

Summa, meanwhile, formed in 2014 around research from the Harvard Stem Cell Institute that led to a means of generating billions of insulin-making beta cells in the lab.

Similar to ViaCyte, the cells would be placed in a device that is implanted in the body and protects the cells from the immune system.

Summa, of Cambridge, Mass., hasn't said when human studies will begin. "We want to create hope but not hype," says CEO Robert Millman.

Other companies are taking a different approach to working with cells. Instead of replacing those that make insulin, **Caladrius Biosciences Inc.**

and **Parvus Therapeutics Inc.** seek to salvage and restore function to cells that are damaged.

Parvus drugs reprogram immune cells that harm the body's own pancreas cells into "regulatory T cells" that suppress diabetes. This is "reprogramming a killer to [be] a peacemaker," says Parvus Chief Scientific Officer Pere Santamaria. Parvus, based in Calgary, Alberta, has licensed rights to this Navacim technology in Type 1 diabetes to **Noxartis AG**.

Caladrius is harvesting the patient's own regulatory T cells, which aren't functioning normally, says Douglas Losordo, senior vice president, clinical, medical and regulatory affairs, and chief medical officer of Caladrius. Caladrius then increases the number of these cells, repairs them and returns them to the patient in a bid to restore balance to the immune system. Caladrius, of Basking Ridge, N.J., is testing the treatment in clinical trials.

Patients are following curative research efforts closely. Dara Melnick, of Woodbury, N.Y., was diagnosed with Type 1 diabetes when she was 8 years old and is now 36. She said she tests her blood sugar 20 times a day but remains concerned about future diabetes-related health risks.

"A cure would be the sweetest thing I could ever taste," Ms. Melnick says.

Mr. Gormley is a special writer for The Wall Street Journal in Boston. Email him at brian.gormley@wsj.com.

How Apps Can Help Manage Chronic Disease

Continued from the prior page

their own schedule online, as opposed to going to the office and waiting for a provider," says Mark Greenwood, an Intermountain physician and one of the initiative's program leads. "The future of primary care is to be both physician and navigator, hooking up patients with technology to help them manage their conditions."

One Intermountain participant, Michael Astle, 64, enrolled after he learned his blood sugar was in the high range. "I knew that my health was at risk, and I wanted to lose weight," he says, but he kept putting off doing anything about it. He liked using the cellular scale to track his weight and the app to record activity and diet, and says the forum helped "form a bond if someone was struggling or feeling bad and needed encouragement."

Within 16 weeks he was down to 190 pounds from 227, and continues to lose weight toward his goal of 180. Mr. Astle says it is motivating to know that every time he steps off the scale, it sends his weight to his coach, "and I can't let it go back up."

PULMONARY DISEASE HOLDING BACK THE SYMPTOMS

Chronic obstructive pulmonary disease, or COPD, affects an estimated 30 million Americans and encompasses emphysema and chronic bronchitis. Commonly associated with smoking, it causes increasing difficulty with breathing, and exacerbations can lead to repeated trips to the ER and hospitalizations.

Temple University's Temple Lung Center in Philadelphia has developed a health application called COPD Co-Pilot. Once daily, patients use a smartphone to report symptoms on eight easy-to-read screens, and use hand-held meters to measure the air flowing in and out of their lungs. Those who don't report in by noon get a reminder from the system.

A computer algorithm helps measure how serious the symptoms are compared with the patient's baseline data; nurses review the scores and refer patients who appear to need immediate treatment to doctors. There are plans for less urgent scenarios, which nurses can recommend after review with a doctor.

A 2015 study in the journal *Telemedicine and e-Health* found that patients who used the app to report daily symptoms and received same-day treatment experienced fewer and less severe exacerbation symptoms, leading to improved symptom control, lung function and activity status.

♦ DEPRESSION APPS Traditional therapy leans on the relationship between patient and therapist, but apps are showing promise in treating depression

Patient Involvement

The percentage of surveyed health-care executives and clinicians citing these as the top general benefits of using technology for patient engagement

67%

Support patients in efforts to be healthy

60%

Provide input to providers on how patients are doing when not in clinic

51%

Create ecosystem that allows for better predictive analytics around patient health and more timely intervention

47%

Augment current capabilities of brick-and-mortar health system

29%

Give patients extra motivation since they know clinician will see data

Note: Multiple responses allowed

Source: NEJM Catalyst 2016 survey of 595 members of its Insights Council of health-care executives and clinicians

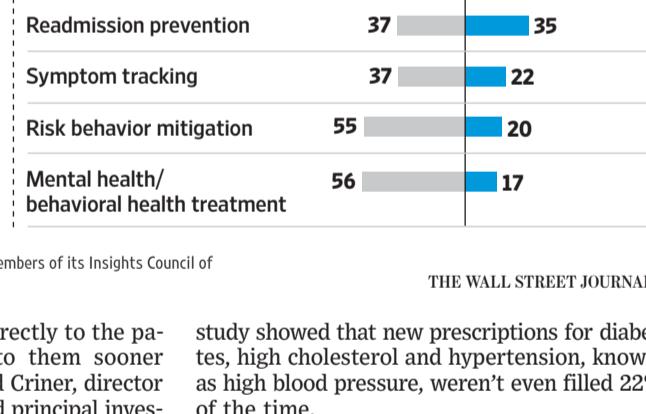
Best Tech to Achieve It

The percentage of those surveyed who said these technologies were effective in engaging patients in their own care



Where to Apply It

The share of respondents saying patient-engagement technology tools are least or best suited for these kinds of care



diabetes than usual care.

"We know there is a mismatch between the prescriptions we write and the prescriptions that get taken by patients," says Anthony Perry, vice president for population health and ambulatory services at Rush. "This is a tool that provides data back to the patients and provides a feedback loop to help build strong habits."

HEART DISEASE HELPING PATIENTS TAKE CHARGE

Heart disease causes one-third of deaths in the U.S., but many of them are due to preventable risk factors like poor diet, smoking and lack of exercise. After angioplasty, a procedure to reopen coronary arteries following a heart attack, patients can avoid a repeat event by undergoing rehabilitation. But patients may not do all the follow-up necessary, and programs are often limited in the personal attention and time patients get from rehab teams.

In a study at the Mayo Clinic in Rochester Minn., published earlier this year in the journal *Clinical Investigations*, researchers tested a health program available online or through a smartphone app that provided information about healthy lifestyles and asked patients undergoing cardiac rehab to report dietary and exercise habits. Compared with a group of patients that had usual care, those using the digital program lost more weight and improved lifestyle habits and had fewer cardio-related ER visits and rehospitalizations.

Steve Ommen, a cardiologist at Mayo and medical director of its Center for Connected Care, says Mayo is incorporating apps, wearable monitoring devices and other digital technology into programs for patients with chronic diseases.

Mayo's aim, Dr. Ommen says, is not to find an app for each disease, but to find solutions that can be broadly used in managing all complex diseases, particularly since so many patients are struggling with multiple conditions. Ideally, he says, patients could have a period of intense monitoring to get them on the right track and then "graduate to self-care and self-monitoring."

"Whenever we introduce a new technology to help them, patients are very open to trying it," he says. "This will definitely change the relationship between patients and care teams, but we see it as being more connected and really extending and enhancing our relationship."

Ms. Landro, a former Wall Street Journal assistant managing editor, is the author of "Survivor: Taking Control of Your Fight Against Cancer." She can be reached at reports@wsj.com.



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♦ "Why Doctors Should Give All Patients an Information Prescription," by Molly Mettler, an author on health care and a senior leader with Practice Change Leaders for Aging and Health.

♦ "What to Do When Elderly Loved Ones Won't Admit Their Memory Loss," by Dr. Marc Agronin, a geriatric psychiatrist at Miami Jewish Health in Miami and the author of "The Dementia Caregiver."

And on page R10 of this report, you can read excerpts of earlier online discussions. The

Experts offer views on emergency rooms, blockchain, bedtime and more.

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JOURNAL REPORT | HEALTH-CARE TECHNOLOGY



The new NICU unit at Beacon Children's Hospital in South Bend, Ind., facilitates close physical contact between premature babies and their parents.

JOHN TIROTTA

The Neonatal ICU Gets a Makeover

Hospitals are taking premature infants out of isolated incubators and into rooms with their parents

BY BARBARA SADICK

HOSPITALS ARE RETHINKING the way they care for premature babies.

The traditional neonatal intensive-care unit puts preterm babies—those born before 37 weeks—into incubators in a room with six to eight other infants. But hospitals are starting to realize that premature infants benefit from close physical contact with their parents.

One of the latest NICUs, in Beacon Children's Hospital of South Bend, Ind., was designed around this idea. There, families can stay together for weeks or months in private rooms that facilitate skin-to-skin contact—also known as kangaroo care—between parent and baby.

Kangaroo care, which is common in Sweden and Canada, has been shown to reduce mortality, infection rates and lengths of hospital stays in preterm babies, while improving infant growth and breast-feeding rates.

Instead of nurses and other hospital personnel taking charge of the babies, the hospital staff becomes coaches who teach parents how to care for their infants themselves. All care is provided in private rooms with families present. Even medical procedures are done in the same private rooms.

Beacon's unit, which opened in May, is the first in the U.S. planned so that mothers who have just delivered are able to stay with their babies, no matter how critical the baby's condition, in a room designed specifically for that purpose, says Robert D. White, a neonatologist who is the creator, along with Sue Ann Barton, principal architect at ZGF architects, of Beacon's new facility. The exception, he notes, is for moth-

ers who are so ill after delivery that they need to go to an adult ICU.

"Skin-to-skin care is a biological imperative for the sensory development of preterm babies," Dr. White says. "It reduces stress levels and helps preterm infants adapt to life outside the womb, improves breast-feeding and leads to healthy weight gain."

Beacon's facility has so-called NIC2 rooms for mothers who are still patients after delivery and their babies. When the mother is discharged, she and her baby would move to a room set up for mother as parent rather than patient, but otherwise similar to the NIC2 rooms.

Both types of rooms have linen pickup just outside of the room to prevent interruptions, private bathrooms with showers, breast pumps, lockable drawers, refrigerators for breast milk, and lighting that can be changed to suit the mood and be kept from shining in a baby's eyes. Most also have sleeping space for two on a pullout sofa bed.

William Edwards, a professor of pediatrics at the Geisel School of Medicine at Dartmouth and medical director of the Special Care Nursery at Catholic Medical Center in Manchester, N.H., says Beacon is a leader in initiatives that promote constructive emotional and physical development in preterm infants, rather than the traditional focus on avoiding complications. "In the U.S., we are at the beginning of a trend in innovative care for preterm infants that focuses on a shift to models that are already standard in other countries, with the goal of maximizing brain development for babies who have left the womb early," he says.

What follows is a closer look at the features in Beacon's NIC2 rooms.

1 "KANGAROO" CHAIR: Allows a parent to lean back and safely hold the baby skin-to-skin for extended periods.

Purpose: Under the kangaroo care method, mothers hold their nearly naked newborns in an upright position against their chest. Skin-to-skin bonding with the mother reduces babies' stress levels and helps infants adapt to life outside the womb. It also improves breast-feeding and weight gain, and lowers infection rates, and it is important to the sensory development of a preterm baby. When practiced for six hours a week for eight weeks, it has been shown to accelerate brain maturation in EEG trackings of infant brain activity.

2 SOUND CONTROL: The room and NICU unit are designed to be very quiet. Acoustic ceiling tile, heavily insulated walls, carpeted corridors and other features are designed to keep sounds under 40 decibels—about the level of a babbling brook. The alarm controls at the bedside are silent, with signals going to the nurse's communication device, and the HVAC system is designed to make as little noise as possible.

Purpose: Reducing unwanted noise and increasing appropriate sounds for a newborn baby, such as a mother's speech and lullabies, promotes the baby's development.

3 DIMMABLE LIGHT SOURCES: Rather than the standard big light in the center of a room, there are dimmable controls, and no lights are located over a baby's bed to avoid having light shine directly into an infant's eyes. One wall of each room is lighted by a bank of LED lights that can be controlled by the family to wash that wall with a color of their choice. The color on the left wall is a parent-selected color. A stronger light for medical procedures is mounted on an adjustable arm. **Purpose:** Enables parents and staff to dim the lights and control the ambience, making the room feel less institutional. None of the lights are in the direct view of the baby because preemies have very thin eyelids and cannot

turn over or otherwise turn away from an unpleasant light source.

4 WINDOW TO THE OUTSIDE: The layout of the NICU unit puts as many rooms as possible on external walls, and there is a large central atrium so that all the rooms receive abundant natural light. Here the view is into a glass-covered atrium, which has a treehouse and plants in it.

Purpose: Exposure to natural light helps maintain circadian rhythms for babies, parents and staff, and views of nature reduce stress and anxiety.

5 PULLOUT SOFA: Most NICU rooms have a sleeper sofa with space for two family members.

Purpose: To encourage family to be there as much as possible so that the baby will receive lots of human contact. The décor is designed to be homey, with color and natural finishes, and families are encouraged to add personal touches. There is also a full bathroom with a shower.

6 BREAST-MILK REFRIGERATOR: Every room has a breast pump and a separate refrigerator for breast milk. The refrigerator is built in below the counter on the left side.

Purpose: To facilitate breast-feeding.

7 ROOM SIZE: All NIC2 rooms are more than 260 square feet.

Purpose: The large size allows for care of critically ill babies who may require more equipment for life support and a large care team for specialized care. If an infant needs surgery and is too fragile to move, the NIC2's larger size allows space to perform a procedure.

8 ARTICULATING ARMS: These arms on the head wall can hold a procedure light (shown), IV pumps and other medical equipment.

Purpose: The head wall behind a hospital bed contains outlets for oxygen, air suction and electricity, and mounts for other support equipment. In ordinary ICUs, there is limited flexibility for movement of the babies. Here, articulating arms allow these devices to be repositioned easily when the baby is transferred from the incubator to a parent's arms.

Ms. Sadick is a writer in New York. She can be reached at reports@wsj.com.

In Case You Needed Even More Reason to Exercise...

A study finds that it also likely leads to doing more positive things

BY DEBORAH GAGE

EXERCISE HAS been shown to protect against diabetes, stroke and several other diseases and to improve our moods.

But does it also make us more likely to engage in other activities? Do people who exercise tend to have better social lives or achieve more of their goals?

The answer appears to be yes, according to a study that has been accepted for publication in the journal *Personality and Individual Differences*. Exercise not only makes us feel more positive, the study found, but it also increases the likelihood that we'll do more positive things.

That supports the use of exercise to help treat people with depression, anxiety and other illnesses. It also suggests exercise could help healthy people improve their everyday lives.

Doing more

The team of researchers at George Mason University recruited 179 college students



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from northern Virginia and asked them to record their exercise every day for 21 days. The students were asked each day if they had participated in any of eight activities including cycling, weight training or swimming, along with an "other" activity in case theirs wasn't listed.

They were also asked if they'd had positive social interactions each day with friends, dates, family members or other people, or if they'd achieved something they wanted to get done, such as completing a project.

The students rated the importance to them of both

types of activities on a scale of 1 to 4.

The results: On a given day, students who exercised also tended to participate in more social and achievement activities than on days when they didn't exercise, the study found, and they engaged in activities that tended to matter

to them more.

In addition, exercise on one day predicted positive social activity on the next day, but not achievement activity.

The researchers also found that positive social and achievement activities on one day didn't predict exercise on the next day.

Treating depression

The results support an approach to treating depression called behavioral activation.

"When we become depressed or whatever it is we're going through, we say to ourselves that we'll get out when we feel better," says Kevin Young, the study's lead author, who is completing his doctorate in clinical psychology at George Mason University. "Unfortunately, what we also see is that we do not feel better until we get out."

Mr. Young, who will be a clinical psychologist, adds, "We try and help someone start sprouting activities again into their lives. That will result in improvement in mood, and [positive] emotion will follow."

Mr. Young is now thinking

about ways the study could be expanded. Does exercising with a group have a different impact on other activities than exercising alone? Can exercise affect future negative as well as positive activities? How much time do we have to spend exercising before positive activities follow?

And what is the mechanism that makes exercise work this way? Is it the improved mood after we exercise that leads us to have better relationships and get more done, or is it an improved sense of self-esteem?

Although he emphasizes that the study was done on healthy people who weren't screened for depression, Mr. Young says he's now more inclined to have his patients use exercise to help them re-engage with activities they enjoy.

Depression, he says, saps people's energy and makes them fatigued.

"It's torture," he says. "Exercise is one method of intervention we have."

Ms. Gage is a writer in San Jose, Calif. She can be reached at reports@wsj.com.

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JOURNAL REPORT | HEALTH-CARE TECHNOLOGY

Much More Than a White Cane

Carmen Papalia wanted a device that didn't simply call attention to his blindness. So he teamed with engineering students to create something completely different.

BY AMY DOCKSER MARCUS

FROM THE MOMENT Carmen Papalia started using the white cane, he has tried to find ways to change it.

The white cane allows Mr. Papalia, who is legally blind, to navigate independently in the world. But he has never liked the way the white fluorescent tape on the cane draws attention to the user's disability, acting like a beacon for unsolicited offers of help. He resists the device's history as a symbol for the blind, a label Mr. Papalia refuses, referring to himself instead as a "nonvisual learner." The cane is socially isolating, he says.

After Mr. Papalia got his first cane at age 22, a friend painted a realistic looking eyeball on the rolling tip. When Mr. Papalia walked down the street, people noticed the glistening eyeball sweeping along and often started a conversation with him. When the painted eyeball wore off, Mr. Papalia, an artist who lives in Vancouver, kept experimenting. He built canes 15 to 30 feet long, representative of how he often feels conspicuous in public. He peeled the white tape off some of his canes to the graphite below. He even ditched the cane for a few experiments, using a megaphone to solicit directions, and another time walking around a city with a high-school marching band that gave him musical cues. Mr. Papalia knew he wanted a different kind of cane. But mainly, he came to realize, he sought to create a different type of interaction with the people around him.

"The cane is something I use every day," he says. "When I hold this implement, I need to constantly think through my position within the community."

'Acoustic mobility device'

In 2015, Mr. Papalia reached out to Sara Hendren, an artist and assistant professor of design at Olin College, a 350-student engineering school in Needham, Mass., a quiet Boston suburb. Ms. Hendren, who runs the Adaptation and Ability Group, a research lab at the college that mixes art and engineering, pushes the notion that engineering isn't only about finding cures for disability but also about accommodating differences.

Ms. Hendren's interest in the topic was sparked by the birth of the first of her three children, a son with Down syndrome who is now 11 years old. She appreciated how assistive



SARA HENDREN

Mr. Papalia (above) tests a cane with a microphone attached to the tip that students developed for him. Earlier he had tried a megaphone (left).

technology, a growing field in health, might broaden her son's experiences. But she also believes products should be made in collaboration with people who use them, "in service of their wishes," she says, "not in answer to someone's ideas of their predetermined needs."

In Ms. Hendren's class, "Imagining Normal," which examines different approaches to adaptive technology, student engineers worked with the dancer and choreographer Alice Sheppard, who uses a wheelchair, to create a specially designed ramp, not to ensure better access, but as a feature the dancer wanted to incorporate into her performances. They helped create a carbon-fiber, collapsible, lightweight lectern for Amanda Cachia, an art historian and curator. Ms. Cachia, who is 4 feet 3 inches tall, wanted a lectern suitable for her height that could be collapsed and easily packed in a suitcase when she traveled to give lectures.

When Mr. Papalia, a friend of Ms. Cachia's, learned about the work on the "Alterpodium," he contacted Ms. Hendren. He was eager to try a similar approach with his cane. "I saw this cane as an opportunity to collaborate," he says.

He told Ms. Hendren he wanted an "acoustic mobility device," an object that produces sounds to reflect the world as he taps. Mr. Papalia agreed with Ms. Hendren's emphasis to the students that canes shouldn't be viewed either as a purely medical object or a sign of tragedy, but one more piece of a puzzle in a different lived experience, a reflection of Mr. Papalia's rich, complicated, joyful

life. "They were meeting me where I was," Mr. Papalia says. "I was meeting them where they were. We tried to understand how we might navigate the space between us."

During a five-day visit to Olin in 2015, Mr. Papalia did a presentation of his work, including a showing of the video of his walk with the megaphone. He talked to the students about his daily life, sharing his experiences using a cane, among them incidents involving what he calls "the disruptive aspect of being disabled in a public space." The students came up with a list of 400 possible ideas for a new device. Some were fanciful, such as a cane that could make automated comments as people walked by like "nice hat" or "cool shoes." The student engineers ultimately presented Mr. Papalia with a prototype of a cane with a microphone attached to the tip and a battery-powered amplification device with knobs for tuning the sound. The sound system looks a bit like a large radio when clipped to Mr. Papalia's body.

The microphone on the tip of the cane picks up the sounds and scraping Mr. Papalia makes, depending on whether he is walking on carpet, wood or stone floors, or outside in the terrain. The device that the cane connects to allows him to distort the sound. Friends who are musicians encourage Mr. Papalia to plug the cane into their speaker systems and mixing boards, experimenting with ways to integrate the sounds of his experiences into music.

Even though Mr. Papalia says he was thrilled with the result, he was

moved when Ms. Hendren assured him that the cane, like an iPhone or any other piece of technology, could go through many versions.

"I get to call when I feel the cane is done," he says.

Fresh look

Last month, Mr. Papalia decided it was time for a redesign. Daniel Leong and Samantha Kumarasena, former Olin students who worked on the original version and graduated in 2016, come back to campus for a brainstorming session with Mr. Papalia and Ms. Hendren. In the fall, when classes start again, a new group of students will continue to work with Mr. Papalia to refine and produce the next cane.

Mr. Papalia explains that their creation "is fun to use," but that he needs something less cumbersome. The sound-modulating box is too large to hold comfortably. He wants the cane to be more like a musical instrument he can play.

Mr. Leong grabs a piece of white butcher paper and starts sketching ideas as Mr. Papalia talks. Ms. Hendren stands at a whiteboard, a prototype for the latest version starting to take shape. They consider adding some kind of universal jack so that Mr. Papalia can plug in the cane and collaborate with musicians, using his cane as a performance instrument. They wonder if they can replace the wire in the cane with a stretchable elastic cord so he can fold the device more easily. Mr. Papalia wants more microphones, perhaps spread along the length of the cane, to "amplify my presence" when he enters a room.

Ms. Kumarasena, who majored in electrical and computer engineering at Olin, recalls how during Mr. Papalia's previous visit to Olin, he took Ms. Kumarasena and other students on a walk around campus. The students lined up, put a hand on the shoulder of the person in front of them, and shut their eyes as the artist led them around campus, urging them to make their way relying on their nonvisual senses. "I had a very naive view of the challenges surrounding accessibility," she says. "I saw engineering as a way to 'fix' a disability."

Now Ms. Kumarasena approaches the project as a venue for collaboration between people who want to share the same public space. Ms. Kumarasena looks up from her notes and says to Mr. Papalia, "You seem to want a playable instrument that replicates sounds and experiences."

Mr. Papalia nods in agreement; for now, that image sustains him. Long ago, he says he realized his goal isn't just the creation of a better cane, but a better community, one in which "I don't feel marginalized or reduced." Both, he recognizes, are likely to remain works in progress.

Reflecting on the plans that emerge from the latest design session, Mr. Papalia says, "I think the cane we are working on now is pointing in the direction I want to go. But the cane I want to hold in my hand may never be finished."

Ms. Dockser Marcus is a Wall Street Journal reporter in Boston. Email amy.marcus@wsj.com.

Smartphones Open a New World for Medical Researchers

Doctors say abundant health data gathered by phones produces better, more timely studies

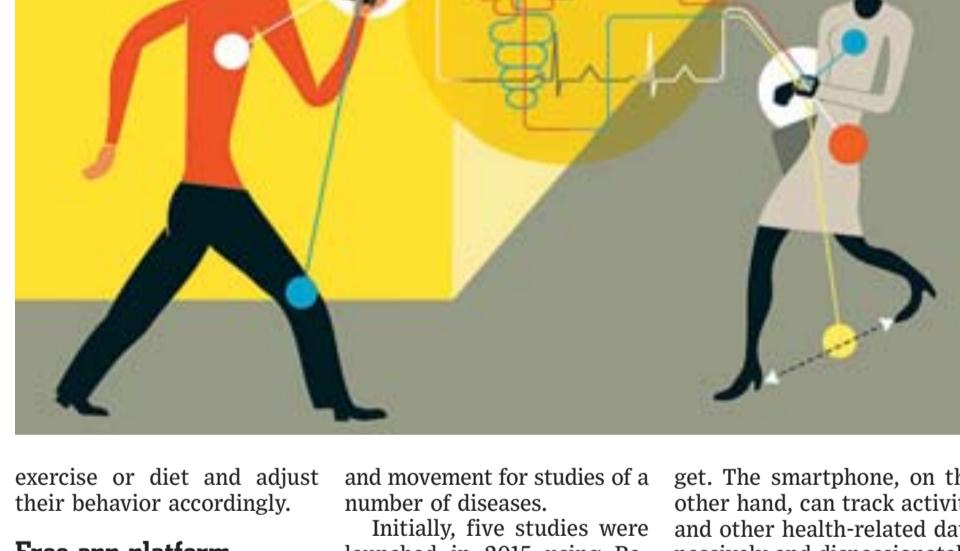
BY CHARLES WALLACE

WHEN SMARTPHONES first began collecting health data such as users' heart rates and number of steps walked, doctors were dubious about the medical value of information gathered by a phone.

Three years later, doctors have changed their minds, thanks to a series of pioneering medical studies that demonstrated the efficacy of cell-phone-based medical research. The studies have confirmed that surprisingly large numbers of people can be recruited into long-term research studies on mobile phones; that their consent to participate can be obtained much more easily than in conventional studies; and that the medical data obtained can be made safely anonymous, collected and analyzed by advanced algorithms in ways never before imagined.

Indeed, so much data can be collected automatically and accurately via mobile phones—without participants or lab workers having to log it—that some scientists believe it will be easier to conduct and monitor many trials involving drugs or exercise in larger populations than have been examined up to now in conventional studies.

What's more, doctors believe it will be possible to give participants feedback not only about their own health but also about the population at large much faster than is possible with conventional medical studies, which often appear in scientific journals years after they're conducted. Participants could quickly see, for example, the beneficial effects of



to researchers by **Sage Bio-networks**, a Seattle health-tech firm that developed the sharing and security protocols for the studies.

Following publication of the research studies this year, a number of researchers said they received inquiries from pharmaceutical firms interested in how they could use smartphones for clinical trials for drugs. "There is huge interest in the studies from pharma, who want us to help them deploy this kind of technology for clinical-trial populations," says Eric Schadt, director of the Icahn Institute for Genomics and Multiscale Biology at Mount Sinai Hospital in New York, who worked on the asthma study.

In fact, British drugmaker **GSK** has become the first pharmaceutical company to carry out a medical study using ResearchKit, tracking 300 rheumatoid-arthritis patients' fatigue, mood and joint pain over three months with data from iPhones. It hasn't yet released the results.

New research techniques

Ray Dorsey, a Parkinson's disease researcher at the Center for Human Experimental Therapeutics at the University of Rochester, says the Parkinson's study conducted by iPhone was a breakthrough not only because the researchers obtained consent from more than 9,500 patients over the phone, but also because the study's iPhone app, mPower, used four innovative tests to gauge the extent of the disease: It required the Parkinson's patients to tap the phone's screen as fast as they could; walk 20 steps, turn

around, wait 30 seconds and take 20 steps again; take a memory test; and speak into the phone. Among other analytical tools, the app used an algorithm developed at Oxford University that can detect Parkinson's from a digital voice file with 98% accuracy.

While all the phone-based studies were initially limited to the U.S., a number have reached overseas, such as the cardiovascular study, which is being rolled out in the U.K., Hong Kong and the Netherlands.

One aspect of phone-based studies that researchers are trying to improve on: Many people drop out. The studies still end up with many more participants than traditional studies, but researchers would like to find a way to retain more of the people who initially sign on.

Euan Ashley, a researcher at Stanford University who worked on a cardiovascular study called MyHeart Counts, says about 5,000 people did the six-minute walk the app called for, the standard for measuring heart health. But more than 40,000 people who signed up for the app dropped out of the study before they got to the walk.

"The bar for entry in these studies is very low," Dr. Ashley says. "So there is less adherence than in a clinical setting."

Researchers say they are looking at ways to make the apps more engaging over time, such as giving users not only their own data, but also comparisons to other users in the same demographic group.

Mr. Wallace is a writer in New York. He can be reached at reports@wsj.com.

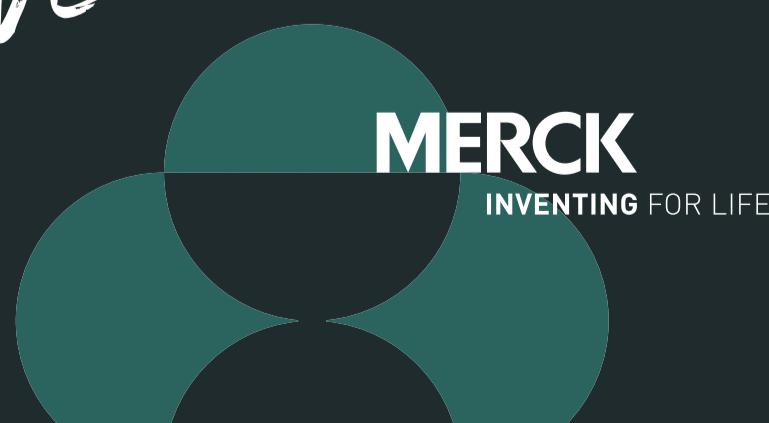


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JOURNAL REPORT | HEALTH-CARE TECHNOLOGY

Crispr Offers a Leap Forward for Diagnosing Disease

Scientists are hoping it can detect deadly ailments faster, cheaper and more accurately than current tests

BY AMY DOCKSER MARCUS

WHEN IT COMES to treating deadly diseases, scientists are always looking for a method of diagnosis that is fast, cheap and accurate. Now, they may have found it in an unlikely place: Crispr.

Crispr, which stands for Clustered Regularly Interspaced Short Palindromic Repeats, is part of the immune system of bacteria. It works by capturing an invader's DNA and integrating it into the genome of the bacteria to help fend off future attacks. For bacteria, Crispr serves as a kind of immunization card.

While scientists have studied the Crispr system for years, they only more recently started unlocking its broader potential as a technology. The breakthrough came after a group of scientists led by Jennifer Doudna of the University of California, Berkeley, and Emmanuelle Charpentier, then of the University of Vienna, published a paper in 2012 demonstrating how to reprogram one particular Crispr system, Crispr-Cas9, to enable the editing of genes. Shortly after, in 2013, several groups reported using Crispr to edit genes in mammalian cells. Crispr diagnostics, an area of interest to some researchers early on, largely got pushed aside in the frenzy that followed.

Zika test

Then, following an outbreak of the Zika virus in Brazil in 2015, a team of researchers led by James Collins of the Massachusetts Institute of Technology and Harvard University started developing a new Zika test. They wanted something that could be deployed to remote locations and offer rapid detection. When discussions turned to how to also enable distinguishing between the African and American strains, one of the researchers proposed Crispr. Last year, the Collins lab published a paper on its Crispr Zika diagnostic.

Since then, interest in advancing Crispr's usefulness in diagnostics has grown. The goal is to develop tests

that can be used in the field, and eventually at home, without requiring analysis by specialized technicians or access to labs, as current blood tests do. "What Crispr allows is the democratization of measurement," says Dan Wattendorf, director of Innovative Technology Solutions at the Bill & Melinda Gates Foundation, which has provided funds for Crispr-based diagnostic development.

Crispr-Cas9, the best known of the Crispr systems, can be programmed to insert, edit, or delete a gene in an organism's genome and has caused enormous excitement among scientists. In the lab, Crispr has helped correct mutations in human cells that cause diseases like sickle cell anemia or cystic fibrosis. Crispr systems operate using different proteins or enzymes, known as Crispr-associated proteins, or Cas.

The possibility of someday curing disease or making changes in the genome of embryos has spurred huge

New discoveries that could lead to even more diagnostics keep coming.

investment—but also a contentious patent battle for control of the technology, and an ethical debate about how, and when, Crispr's gene-editing capacity should be used.

Meanwhile, as new Crispr proteins have been discovered and their properties analyzed, scientists working in a number of research labs now realize that Crispr's unique aspects offer a new approach in diagnostics.

Guillaume Lambert, who runs a lab at Cornell University, says his group wants to use Crispr to detect antibiotic-resistance genes, so that patients don't lose time, and continue infecting others, while taking a drug to which their particular strain of bacteria won't respond. "This is a potentially dangerous treatment delay," says Dr. Lambert, a former member



Researchers at the Broad Institute of MIT and Harvard used Crispr technology to help develop a highly sensitive test that can quickly detect small amounts of Zika virus in someone's blood.

of the Collins lab who helped develop the Zika test while there.

Keith Pardee, an assistant professor at the University of Toronto and a collaborator on the Zika Crispr diagnostic, says he is principal investigator on a project being funded by the Canadian Institutes of Health Research and the International Development Research Centre to launch what is believed to be the first clinical trial of a Crispr diagnostic. The trial is expected to start in 2018.

Expanding boundaries

The trial, which will include the Collins lab, five labs in Latin America, and others, will test the diagnostic on patient samples in Ecuador, Brazil and Colombia. The scientists involved are discussing detection not only of Zika but also related viruses such as dengue, Chikungunya virus and yellow fever, Dr. Pardee says.

Discovery of Crispr proteins besides Cas9 has also helped spur research in Crispr diagnostics. In 2016, Dr. Doudna's lab published a paper demonstrating how Cas13a may be useful to detect sequences of RNA in a virus. (RNA carries genetic information from DNA and catalyzes protein synthesis in the cell.)

Unlike the better known Cas9, which makes a specific cut in a DNA

sequence then stops at its target, a key feature of the Cas13a enzyme is that it keeps on cutting. The continued chewing of RNA along with the original target—the Berkeley researchers call the enzyme a kind of molecular Pac-Man—allows for the possibility of detecting a virus even when smaller amounts of RNA molecules are present.

Dr. Collins says he was working on improving his group's Zika diagnostic when a colleague, Feng Zhang of the Broad Institute of MIT and Harvard, reached out after reading his paper. Dr. Zhang, a pioneer of Crispr-Cas9 gene editing, was also working on developing a Crispr diagnostic. But he wanted to use Crispr-Cas13a, not Cas9, and suggested to Dr. Collins that they combine their efforts.

Enter Sherlock

Earlier this year, their labs announced the creation of a new diagnostic platform with the ability to identify different viruses based on extremely low amounts of RNA in blood and urine samples. It works in a regular test tube or on special paper activated using body heat. The scientists looked for a catchy name for the platform, and chose Sherlock, for Specific High-sensitivity Enzymatic Reporter unlocking.

Sherlock, Dr. Zhang says, allows detection of a virus down to a single molecule of RNA, an important factor in a disease like Zika, which can make someone very sick even when only a small amount of virus is present. The new test, adds Dr. Collins, "is 1,000 times more sensitive than what we did with Zika."

New discoveries that could lead to even more Crispr diagnostics keep coming. Last month, Dr. Doudna and her Berkeley group published a paper that describes 10 new Crispr enzymes, all variations of the Cas13a protein. The discovery, the scientists report, opens up the possibility of a diagnostic that can detect and distinguish between two different viruses in a single sample.

Gene editing is likely to remain at the center of Crispr's appeal, because so many are drawn by the idea of changing the genetic destiny of humans. But Dr. Doudna says the work on diagnostics is a chance to "circle back" to the beginning of the discovery of the technology and create low-tech, inexpensive tools to diagnose disease. "It's tantalizing to go after that," she says.

Ms. Dockser Marcus is a reporter for The Wall Street Journal in Boston. Email amy.marcus@wsj.com.

The Ways AI Is Transforming Drug Development

Pharmaceutical companies hope computers can accelerate the discovery process and yield more effective medications

BY DANIELA HERNANDEZ

ON A RECENT Friday in Boston, Randell Sanders gave a nurse two samples of his blood, plus a sample of urine and saliva. Clinicians would test some of the samples to see how he is responding to treatment for pancreatic cancer.

But samples also were sent to a lab where computers using artificial intelligence are changing the way pharmaceutical companies develop drugs.

The idea is that machines, which are adept at pattern recognition, can sift through vast amounts of new and existing genetic, metabolic and clinical information to unravel the complex biological networks that underpin diseases. That, in turn, can help identify medications likely to work in specific patient populations, while simultaneously steering companies away from drugs that are likely to fail.

In the past, drug companies have used artificial intelligence to examine chemistry—whether a drug might bind to a particular protein, for instance. But now the trend is to use AI to probe biological systems to get clues about how a drug might affect a patient's cells or tissues.

Biological insights driven by machine learning also could help pharmaceutical companies better identify and recruit patients for clinical trials of therapies most likely to work for them, perhaps boosting the chances of those medications' getting approved by regulatory agencies such as the Food and Drug Administration.

Data from the samples produced by Mr. Sanders, 64, a U.S. Navy veteran, will become part of the database in a \$17 million, seven-year study known as Project Survival, bankrolled by Berg, a Framingham, Mass., biotech firm that is one of several compa-



Randell Sanders, a cancer patient, is contributing lab samples to a study of AI and drugs.

nies in the U.S. and Europe using AI to make drug research and development less expensive and more efficient. Mr. Sanders says he agreed to take part in the study in hopes that it might "help the next person." Intelligent machines will scour his samples and genes, along with those of hundreds of other patients, for molecular fingerprints, or biomarkers, that could later be used to help measure a specific drug's impact and to identify patients in which such a drug is likely to be most useful.

The big difference between AI-driven drug trials and traditional ones, says Niven Narain, chief executive of Berg, is "we're not making any hypotheses up front. We're not allowing [human] hypotheses to generate data. We're using the patient-derived data to generate hypotheses."

Broad AI effort

Project Survival is part of a larger research program to develop therapies with the help of intelligent machines. Other efforts to leverage AI technology in pharmaceutical research include using it to find new drugs or new uses for already approved medications, as well as speeding up clinical trials by improving patient recruitment and site selection, according to a May 2017 report by analyst Datamonitor Healthcare.

Some companies, such as Numerate Inc. in San Bruno, Calif., and BenevolentAI Ltd. in London, are developing their own molecules and licensing them to drug-industry clients. Others, such as International Business Machines Corp., Atomwise Inc. in San Francisco and Insilico Medicine Inc. in Baltimore, are forming research partnerships with universities and nonprofits or setting up AI services aimed at drug companies.

For example, Merck & Co.

is using Atomwise's deep-learning technology to identify compounds that could be developed into medications for neurological conditions, according to David Rosen, an associate principal scientist at Merck Research Labs in Palo Alto, Calif. Recently, there's been growing interest in leveraging this type of AI for health-care applications, in part due to the vast improvements deep learning has enabled in applications like machine translation and computer vision, which also rely on pattern recognition.

In January, GlaxoSmithKline PLC and Lawrence Livermore National Laboratory in Livermore, Calif., announced a partnership to use AI for pharmaceutical R&D. The consortium is in the process of securing work space in San Francisco and signing on other collaborators, according to John Baldoni, GSK's senior vice president of platform technology and science. The aim is to use AI to cut development time down to a single year, from more than 10 in some cases, he says.

In Europe, scientists are getting ready to launch a similar initiative, which will include Johnson & Johnson's Janssen Pharmaceuticals division, plus several other drug

companies and academic researchers, according to several people familiar with the matter. Janssen declined to comment on the partnership.

The uptick in interest in AI is a convergence of a few forces, says Sastry Chilukuri, a partner in the pharmaceuticals and medical-products practice at the global consulting firm McKinsey & Co. These forces include the recent availability of "enormous volumes of data," advances in computing power and AI algorithms, and the pharmaceutical industry's declining struggle with productivity in R&D, he says.

The rise of precision, or personalized, medicine, is also putting pressure on drug developers, steering them away from a one-size-fits-all model.

"We know that the same disease is not the same in every patient," says Andrew Stern, director of novel therapeutics at the University of Pittsburgh's Drug Discovery Institute.

With care becoming more individualized, markets for some drugs are likely to be relatively small compared to what we've seen in the past with blockbusters," he says. But development costs are "probably not going to be that different" if the R&D process stays the same, he adds.

Hence the hope that AI will

reduce the cost of developing new drugs. There is scant data so far to support the premise that AI will lower costs, partly because commercializing new medications takes so long and the recent move toward AI-aided biology is relatively new.

"R&D pipelines run for about a decade," says McKinsey's Mr. Chilukuri. Thus, benefits "will play out in the next 10 to 15 years," he says.

The boost in value to the pharmaceutical industry in the medium term could be the equivalent of a 5% to 10% increase in sales, Mr. Chilukuri says, though "longer-term benefits will exceed that."

Early benefits

Some drug developers say they're already seeing early benefits.

Janssen uses AI in "the vast majority of projects," says Hugo Ceulemans, scientific director of discovery data sciences. AI systems trained on various data sources, including preclinical data sets, have helped make "significant performance improvements" by enabling "better selections of which compounds to...make and test" in the lab and by "flagging" whether compounds might have "toxic" effects or "unexpected favorable" ones, he says.

DANIELA HERNANDEZ/THE WALL STREET JOURNAL

At Berg, Dr. Narain says AI has helped scientists "decide which cancers we were going to go after" by helping them understand how a drug in clinical testing might work at the cellular level. Berg's system first identifies genetic and other markers among sick and well patients by drawing on detailed medical histories as well as data from scientific publications and chemical databases. It then ranks the genes, proteins or metabolites it finds according to their relevance to a particular disease, and determines which specific genes or proteins are associated with certain patient outcomes.

Such screening is "at least 50% cheaper" than traditional methods, says Dr. Narain.

Multiple hurdles must still be overcome for AI to fulfill its potential in pharmaceutical R&D. For instance, data sets, even within the same institutions, can be fragmented or stored in incompatible ways, making it difficult for machines to make sense of them unless significant efforts are made to harmonize the data, according to Olexandr Isayev, an assistant professor in machine learning at the University of North Carolina, Chapel Hill.

Data privacy is also a concern, scientists say, especially given recent cyberattacks on health systems around the world.

Then, there's the drug-approval process, which requires data from animal and human experiments, making it unlikely computers will completely replace scientists soon.

The FDA encourages companies "to improve efficiency of identifying potent and safe molecules," says Peter Stein, deputy director of the office of new drugs at the FDA's Center for Drug Evaluation and Research.

But, Mr. Stein adds, FDA standards for clinical trials and the drug-approval process "are not different based upon the particular discovery strategy."

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JOURNAL REPORT | HEALTH-CARE TECHNOLOGY

When Doctors Get Negative Reviews Online

Reputation-management firms help physicians undo the damage done by critical feedback

BY SHIRLEY S. WANG

WHEN BASIL BESH, an orthopedic hand surgeon based in Fremont, Calif., decided in 2009 to start his own surgery center, he knew he had to have a strong presence on the web to be competitive.

He set up a Google alert to tell him whenever his name was mentioned and signed up for a service run by Empathiq, a health-care-focused online reputation-management service, that monitors his online reviews on rating sites such as those run by Healthgrades Operating Co. and Yelp Inc. He routinely reads his reviews and calls patients who express dissatisfaction to find out what if anything he can change. This has led him to make improvements to his practice, says Dr. Besh, and to a 4.5-star rating (out of 5) on Yelp.

It is standard practice for large and small businesses to closely monitor their online reputations, and now more services are helping doctors, clinics and hospitals do the same. In addition to monitoring reviews and ensuring accuracy about the details of the practice, some of these firms will solicit patient reviews and generate other positive content to push down negative press in web-search results. Some also help their clients contact patients to address their concerns and ask them to change their reviews.

Reputation is everything

Bad online ratings can wreak havoc on doctors' businesses, in extreme cases driving physicians to leave a particular state to practice elsewhere, according to doctors and reputation-management companies. Ratings sites will take down reviews that use profanity or can be proven fake, but they typically won't edit or remove a review simply because a doctor (or any business) disputes what is in it.

And unlike restaurants or plumbers, doctors can't change their company name if their reputations are damaged.

But doctors and reputation-man-

agement firms say paying close attention to reviews and other feedback doesn't just benefit doctors; consumers also benefit if doctors make changes that result in a better patient experience.

More than 70% of consumers search for health information online, according to Pew Research Center, and 77% of consumers say they use online reviews as the first step in finding a new physician, according to a 2015 survey of 1,438 patients by Software Advice, a software research and advisory firm.

Andrea Pearson, chief marketing officer at Healthgrades, one of the largest rating sites for doctors, with one million visitors a day, says reputation-management firms can play a beneficial role by increasing the volume of feedback from patients—but only if the reviews are truthful and come from real patients. (Healthgrades has several checkpoints in place to help it verify the authenticity of reviewers, she says.) Still, she says most physicians will find these firms' offerings are limited, and will have more success when they work directly with the online sources themselves.

Others are more critical of any practice that attempts to skew consumers' impression about a business.

"Reputation-management firms are paid to make their clients' online image as flattering as possible," says Luther Lowe, who heads public policy at Yelp. Doctors, like other business owners, are able to respond to reviews, including negative ones, he says, adding that Yelp sees more failed attempts to mislead consumers with fraudulent positive reviews than it sees failed attempts to malign competitors with fake negative reviews. Yelp, he says, has several technologies in place to detect and pull down fake reviews.

Reputation-management firms say patient-confidentiality rules mean physicians have to be more careful than other businesses in how they respond to negative reviews and complaints online. For example, if a patient says a doctor missed a particular diagnosis, physicians can't



SYLVAIN GENTILE

Basil Besh has been on guard since starting his own surgery center in 2009.

publicly dispute the patient's claim because it would violate confidentiality. Instead, doctors are encouraged to respond generically to the review online and ask the patient to contact the practice for a more specific response.

Banner Health, a large integrated health service employing or affiliated with 9,000 doctors, monitors its online reviews through Reputation.com of Redwood City, Calif. Soon, Banner will start using natural-language recognition technology to analyze online comments on Facebook and other social-media sites and reroute negative feedback into its call center, a service provided by **Salesforce.com**. The software will divide comments into positive, neutral and negative buckets, and the negative comments will be monitored continuously during business hours. Complaints that require action will be issued a trouble ticket. For instance, if a patient is in the emergency room and complains about a long wait, Banner may send a staff member to apologize and give them a coffee, says Alexandra Morehouse, chief marketing officer of Banner.

The health system also solicits phone- and email-based patient-satisfaction scores directly and will have doctors call patients to discuss negative reviews. "One woman hung up three times because she didn't believe the doctor would call" about a review, says Ms. Morehouse. The doctor eventually connected with her and was able to clear up a miscom-

munication, she says.

iHealthSpot, another reputation-management service used by healthcare professionals, builds separate websites called microsites that are embedded in its clients' pages. These microsites pull in reviews from ratings sites and the web but display only those that are three, four or five stars—effectively hiding the most negative reviews. The microsites also provide an overall rating based on that subset of reviews.

'A gray area'

"From our perspective, there are often reviews on sites that are unfair, [yet] you can't get them removed," says Mary Hall, iHealthSpot's chief executive. "We're not getting rid of the bad ones, just highlighting the best ones. It is a bit of a gray area."

Carolyn Murray, who owns a medical weight-loss clinic called **Physicians Weight Loss Centers** in Columbia, Md., says she turned to iHealthSpot a few years ago when a prospective patient wanted to cancel her appointment after seeing a negative review about the clinic on Yelp.

The review was left by an unhappy patient who had missed several appointments without canceling and wanted her visit fee back even though the cancellation policy stated she would forfeit it, says Ms. Murray, who isn't a physician herself but employs one in the business.

Another negative Yelp review described a patient experience that clearly didn't happen at her clinic,

she says. Ms. Murray says she appealed to Yelp, which declined to take down the reviews, saying she could respond to them if she wanted. Yelp declined to comment.

Ms. Murray says that employing a reputation-management firm has been helpful because she now knows when patients leave reviews, good or bad, and can respond to them quickly. But she is frustrated that people can say whatever they want about her clinic even if it isn't truthful. She says that several patients have threatened to leave bad reviews if they don't get their money back.

The clinic has an average 2-star rating out of 5 on Yelp, based on eight reviews, and a 3.7-star rating out of 5 on Google, based on 15 reviews. The microsite on her clinic's website, however, lists a 5-star average patient rating, with most of the reviews coming from Google.

Ms. Murray says she believes the microsite reviews "are helpful, not misleading, because a lot of the negative reviews are incorrect."

Most doctor reviews are positive, according to industry research. About 75% of the time, negative reviews of doctors and clinics are about things like wait times, grumpy receptionists or parking—things can easily be addressed, those in the industry say. The other complaints tend to center on the physician's bedside manner, confusion about treatment or follow-up care, or lack of follow-up. Only occasionally do reviews state that a doctor treated them incorrectly, they say.

Dr. Besh, the California hand surgeon, learned from reading a review that patients were waiting a long time to see him. He reduced wait times in part by emailing forms in advance through a patient portal.

At the same time, "there's a price to be paid for that—what patients want versus what patients need," he says. For instance, a patient once wrote a negative review because Dr. Besh refused to order an MRI. "We work by guidelines, and the MRI wasn't warranted," he says. But "I can see how a doctor could say we're going to order MRIs on everyone" so they won't get bad reviews.

"Online reputation review is really a double-edged sword," says Dr. Besh.

Ms. Wang is a writer in London.
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JOURNAL REPORT | HEALTH-CARE TECHNOLOGY

Can Auto Fatalities Go to Zero?

Self-driving cars could help go a long way toward that goal

BY ADRIENNE ROBERTS

AUTONOMOUS CARS are generating considerable buzz for many reasons, but one of the most dramatic centers on public health: Many say self-driving vehicles could drastically reduce—or even eliminate—the tens of thousands of traffic fatalities that occur annually in the U.S.

Human error plays a role in 94% of all traffic accidents, according to the National Highway Traffic Safety Administration, which is why auto makers and regulators believe self-driving vehicles have the potential to be so transformative. Once driverless cars are on the roads in large numbers, they say, there will be no need for traffic lights because the vehicles will be able to communicate with each other to time when they go through the intersection. The cars will intuitively know what's a safe speed to travel based on traffic and road conditions. And human errors such as failing to stop at a stop sign or mistakenly driving through a red light will become nonissues.

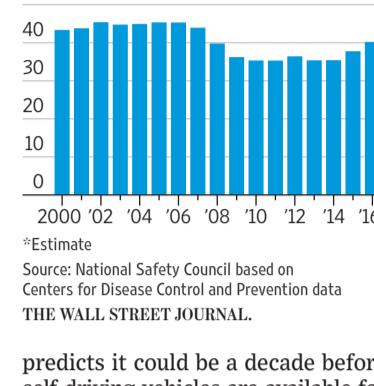
"Self-driving vehicles are constantly monitoring the roads, and they're never drunk or distracted," says Brandon Schoettle, a researcher at the University of Michigan Transportation Research Institute who studies autonomous driving.

Of course, it remains to be seen whether the safety benefits will pan out as expected and when they will begin. Researchers say it depends on how quickly driverless technology evolves, how long it takes the public to embrace self-driving cars and what happens in the interim—when autonomous cars and those driven by humans are sharing the roads.

"There are a huge number of unknowns," says Mr. Schoettle, who

Toll on the Roads

After declining for the better part of a decade, motor-vehicle fatalities have turned back up in recent years



*Estimate

Source: National Safety Council based on Centers for Disease Control and Prevention data

THE WALL STREET JOURNAL

predicts it could be a decade before self-driving vehicles are available for sale and an additional 20 to 30 years before most drivers own them.

"There might be some positives and negatives" during the transition, Mr. Schoettle says, but "the real huge benefit is very far down the road when autonomous vehicles become the norm."

Deathproof Volvos?

Last year, the federal government announced guidelines for the development of autonomous vehicles, and the Transportation Department says it is currently reviewing and updating the policy to incorporate feedback from numerous stakeholders.

The department under the Obama administration also set a goal to eliminate all traffic fatalities within 30 years, aided by the deployment of self-driving cars. Cities including Chicago and Boston have made similar pledges, vowing to eliminate traffic fatalities and severe injuries within certain time frames.

Swedish auto maker Volvo Car

Corp. has taken it a step further, going so far as to say its new vehicles will be deathproof by 2020, with autonomous-driving technology propelling the way.

"Nobody should be killed [while driving]," Lex Kerssemakers, head of Volvo's North American operations, said in an interview in April. "We have all the technology available" to eliminate traffic deaths.

Such promises are welcome news at a time when motor-vehicle fatalities are on the rise. The National Safety Council says there were 40,200 traffic fatalities in the U.S. last year, up 6% from 2015 and up 14% from 2014, the sharpest two-year escalation in more than a half-century. The nonprofit group says that while it is too early to pinpoint specific causes for the increase, speeding, drunken driving and texting while driving probably played a role.

As auto makers introduce crash-avoidance technologies such as automatic braking and blind-spot detection into new cars, traffic fatalities and injuries in theory should be decreasing. A 2015 study by the Boston Consulting Group suggested that advanced driver-assistance systems could prevent 28% of all crashes and 9,900 fatalities in the U.S. if new-car buyers invested in such systems.

The problem is, while cars today are safer than they've ever been, people are driving distracted more than ever and feel comfortable texting and eating in their vehicles, says Dave Sullivan, an automotive analyst at AutoPacific Inc. "I think as long as humans are involved, we will always have accidents," he says.

Almost all auto makers are investing in self-driving vehicles, some on their own and some through partnerships with companies like Waymo



Speeding, drunken driving and texting may all contribute to rising fatalities.

LLC, the self-driving car unit of Google parent Alphabet Inc., and Uber Technologies Inc.

Tesla Inc. already is introducing features in its electric cars that allow them to drive themselves at times, but don't render them fully autonomous. Others, like Ford Motor Co. and Waymo, want to take drivers fully out of the equation by removing the steering wheel.

Nothing is perfect

Tesla's Autopilot, the semiautonomous driving system that allows Tesla's cars to steer, brake, cruise and change lanes on their own under certain conditions, came under scrutiny last year after a driver using the technology was killed in a collision with a tractor-trailer on a Florida highway. The NHTSA found no defects in the system's automatic emergency braking and forward-collision warning features, and suggested the driver could have anticipated the crash and had time to react.

"There will never be zero fatalities," Tesla Chief Executive Elon Musk said on a conference call in

September. "The world is a very big place and there's a huge number of people and a huge number of circumstances. It's really just about minimizing the probability of death, not the illusion of perfect safety."

As the Tesla crash demonstrated, it may be difficult to determine who or what is responsible for a crash when a vehicle takes over key driver functions. And that leads into another big unknown surrounding driverless cars: How long will it take for the public to warm to them?

In addition to the trust factor there is the issue of cost, especially at a time when Americans are holding on to their cars longer than ever before. The average age of cars and light trucks hit 11.6 years old in 2016, according to IHS Markit, and is expected to continue to increase as the quality of vehicles improves over time. So even after self-driving technology is fully developed, mass adoption of autonomous vehicles still could be a long way off.

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What's Your HRV? It's Time to Find Out

Heart-rate-variability monitors are spreading as a way to relieve stress and optimize workouts

BY CHARLES WALLACE

EVERY MORNING, as soon as he wakes up, Inaki de la Parra, an endurance athlete from Mexico, uses a heart-rate monitor he straps to his chest and an app on his smartphone to measure the tiny variations in the intervals between his heartbeats.

Like a growing number of athletes, Mr. de la Parra uses these measures of his heart-rate variability, or HRV, to help tailor his workout regimen—with high variability indicating his body is prepared for strenuous exercise and low HRV signaling that

duce stress and anxiety. This technique has also been used to treat everything from stage fright to irritable bowel syndrome.

While your heartbeat might seem steady at any given time—whether your heart is beating fast because of strenuous activity or slower because you're at rest—there are actually tiny variations in the time between beats. That variability is due to the interplay of the two arms of the autonomic nervous system, the part of the nervous system that controls bodily functions, including the heartbeat, without a person's conscious direction.

Those two arms are the parasympathetic and the sympathetic nervous systems, says Lawrence Creswell, a cardiac surgeon in Jackson, Miss., who studies sports cardiology. "The sympathetic arm has to do with

a day off—because low HRV is a sign that the body is still stressed, and pushing it too hard in that state might result in physical damage. "I think it's a good measure of the health of the athlete," Mr. Couzens says. "A drop in HRV often precedes injuries."

Dealing with stress

Doctors and psychologists, meanwhile, have been studying HRV as an indicator of physical and mental health, and how altering it can benefit patients. Richard Gevirtz, a professor of health psychology at Alliant International University in San Diego, says training people to raise their HRV is being used successfully to treat stress-related disorders like anxiety, gastrointestinal problems such as irritable bowel syndrome, and work issues like fear of giving a speech.

Dr. Gevirtz has developed a program that uses slow, methodical breathing to increase HRV. He says studies show that each individual has a different breathing rate, usually between five and seven breaths a minute, at which they obtain maximum HRV, which has a calming effect. The research has shown that breathing at that rate can raise a person's average HRV by 25% over time, he says.

An analysis of several peer-reviewed studies of heart-rate training using rhythmic breathing was published in March in the journal Psychological Medicine. It concluded that "HRV biofeedback training is associated with a large reduction in self-reported stress and anxiety."

The big moment

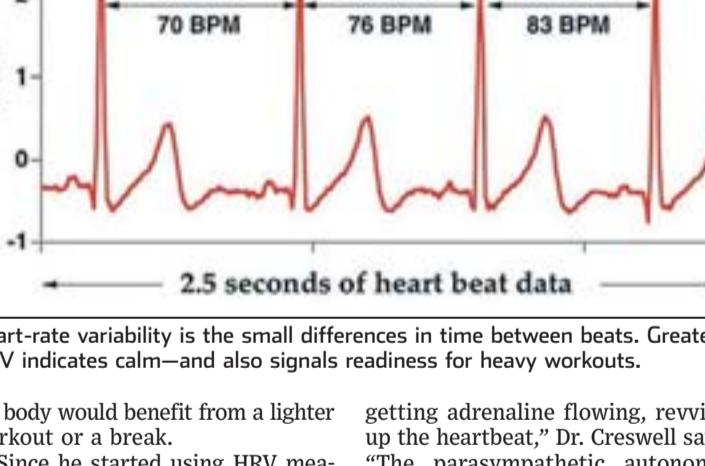
Harry van der Lei, co-founder of the Hourglass Performance Institute in Atlanta, says training to control HRV with breathing can improve performance in golf, tennis and shooting—sports where performance anxiety can cause even seasoned pros to miss shots. "By increasing your HRV, you are increasing your stress-management capacity," he says.

Mr. van der Lei's company teaches golfers how to improve their HRV under conditions of pressure and stress such as tournaments. But he adds that while HRV training can enhance skills an athlete already has, it isn't a substitute for those skills.

Measuring HRV is simple. Several smartphone apps provide detailed HRV measures and tracking using data from wearable heart-rate monitors. Another alternative is an earlobe clip called Inner Balance, which plugs into a smartphone and displays HRV data on-screen.

There are also several apps people can use to train themselves to regulate their breathing to raise their HRV and lower stress and anxiety. Practitioners recommend 20 minutes a day of breathing practice to obtain the full benefit.

Mr. Wallace is a writer in New York. He can be reached at reports@wsj.com.



Heart-rate variability is the small differences in time between beats. Greater HRV indicates calm—and also signals readiness for heavy workouts.

his body would benefit from a lighter workout or a break.

Since he started using HRV measurements to help guide his training a year and a half ago, Mr. de la Parra shaved five hours off his previous time in the Ultraman triathlon, winning the 2016 event by completing the 6.2-mile swim, 261-mile bike ride and 62-mile run in 22 hours, 34 minutes.

"HRV is a great tool that's really helped my training," he says.

Adrenaline vs. brakes

Endurance athletes, however, aren't the only ones finding benefits from HRV data. Thanks in part to the availability of accurate heart-rate data on wearable devices, it's being used in training by soccer, basketball and football players, among others, from the elite to the weekend warrior. Psychologists are using it to train golfers and tennis players to control their heartbeats so they're calmer under pressure. And some see managing heart-rate variability as a way for nonathletes to deal with stress.

By learning how to control their respiration with slow, rhythmical breaths, people can temporarily increase their heart-rate variability, which some medical experts say can help lower blood pressure and re-

A Possible Path to Better Sleep—and a Better Memory

A study finds promising results from 'pink noise'

BY BONNIE MILLER RUBIN

CAN'T REMEMBER where you left your cellphone? Totally forgot about that dentist appointment? If you're past middle age and really want to hang on to your memory, swap the Sudoku and crossword puzzles for a good night's sleep.

Many studies have made the connection between sleep and memory consolidation—the brain's ability to cement short-term memories into longer-term ones, so they can be recalled the next day. But as we age, deep, refreshing slumber can be as elusive as those misplaced car keys.

Thus, an experimental technology that enhances sleep, according to the Northwestern University scientists who developed it, could present a breakthrough for older people suffering memory loss. In a series of tests, researchers at Northwestern found that when "pink noise"—an engineered sound that scientists say is more soothing than the better-known white noise—was delivered in short bursts during sleep, older people showed better cognitive function after waking than they did after a night without pink noise.

Pink noise, which is a composite of sounds, differs from white noise because each of its individual sounds carries the same frequency, unlike notes in music, say, whose frequencies double with each higher octave. In short, the frequencies are more balanced than white noise.

"This is a simple, safe, non-pharmacological approach" to improving one's memory, says Phyllis Zee, a professor of neurology at the Feinberg School of Medicine at Northwestern and senior author of the study, published recently in the journal *Frontiers in Human Neuroscience*. What the study showed, she and her co-authors say, is that acoustics can be used to enhance the quality of older people's sleep, and can improve their memory in the bargain.

Slow wave

Earlier research by Jan Born and colleagues at the University of Lubeck in Germany found a link between acoustic stimulation and deep sleep (also known as slow-wave sleep) in young adults. His group found that subjecting the sleepers to pink noise enhanced slow-wave brain activity.

But until now, such studies in the elderly population—the group with the most difficulty getting sleep, and thus at highest risk for memory impairment—have been lacking, Dr. Zee says.

In the Northwestern study, 13 healthy men and women between 60 and 84 were monitored as they slept on two nights about one week apart. Each person was subjected to pink

noise on just one of those nights, though they were not aware of this, as a control. The sample size was "relatively small," due to the unusual demands placed on the subjects' time, but this didn't bias the results, Dr. Zee says, because each person experienced both the actual stimulation and a night of no noise, thus reducing the variables involved.

While the subjects slept, their brain waves were monitored using electroencephalography, which recorded their neural activity and sent the information to a computer. The pink-noise bursts were played through headphones at specific intervals, synchronized according to each subject's brain waves.

To measure the acoustic stimulation's effect on memory, the participants were tested on 88 word pairs before they went to sleep, and again in the morning. On average, word recall following the nights of pink noise was about three times as great as it was after the noiseless nights.

Automatic adjustment

"The advantage of our algorithm is that it's individualized and automatic, adjusting to each person's sound-wave sleep, which can differ from night to night," says Roneil Malkani, an assistant professor of neurology at Northwestern and a co-investigator. "The timing is important to get the most beneficial effect."

Robert Stickgold, associate professor of psychiatry at Harvard Medical School, who wasn't involved in the Northwestern research, calls the results "very impressive." But questions remain about whether such an intervention would keep us mentally nimble, says Mr. Stickgold, who is also director of the Center for Sleep and Cognition at Beth Israel Deaconess Medical Center in Boston.

"Sleep enhances other kind of memories as well—like emotional memories," he says. "My concern is by concentrating only on this one kind of memory, we could be potentially impairing other types of memory where research has not been done and where there is no data."

The Northwestern researchers are doing more testing in young and older adults to see how acoustic stimulation might perform over a longer period, including one study in patients with mild cognitive impairment, sponsored by the National Institutes of Health, Alzheimer's Association and Illinois Department of Public Health. A patent is pending for the pink-noise algorithm, and the researchers plan on developing devices for home use in the near future.

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getting adrenaline flowing, revving up the heartbeat," Dr. Creswell says.

"The parasympathetic autonomic system is the brakes and pulls down the heart rate."

The balance between those two systems is in constant flux. After a hard workout, the parasympathetic system dominates as the body demands rest. This is associated with a decline in heart-rate variability. As the body gets the rest it needs, the sympathetic nervous system takes the upper hand, preparing the body for renewed activity. When that happens, heart-rate variability increases.

Dr. Creswell says that in sports training, the idea is to have your heaviest workouts when your heart is most recovered—when your HRV is at its highest.

That number won't be the same for everyone. The range of HRV numbers differs from person to person.

Alan Couzens, a Boulder, Colo., coach who trains competitive athletes, says it takes about a month of monitoring your HRV to establish a baseline before you can use it to determine your recovery status.

Mr. Couzens uses HRV data that athletes send him to help set their training schedules. On days when an athlete's HRV number is down, he orders up a light training day or, rarely,

there are also several apps people can use to train themselves to regulate their breathing to raise their HRV and lower stress and anxiety.

Practitioners recommend 20 minutes a day of breathing practice to obtain the full benefit.

Mr. Wallace is a writer in New York. He can be reached at reports@wsj.com.

JOURNAL REPORT | HEALTH-CARE TECHNOLOGY

To Treat Depression, Start With a Digital Therapist

Studies suggest that online tools can be as effective as in-person therapy for some patients

BY HEIDI MITCHELL

THE WORLD HEALTH Organization estimates that more than 300 million people suffer from clinical depression world-wide. But cost, time, stigma, distance to travel, language barriers and other factors prevent many from seeking help.

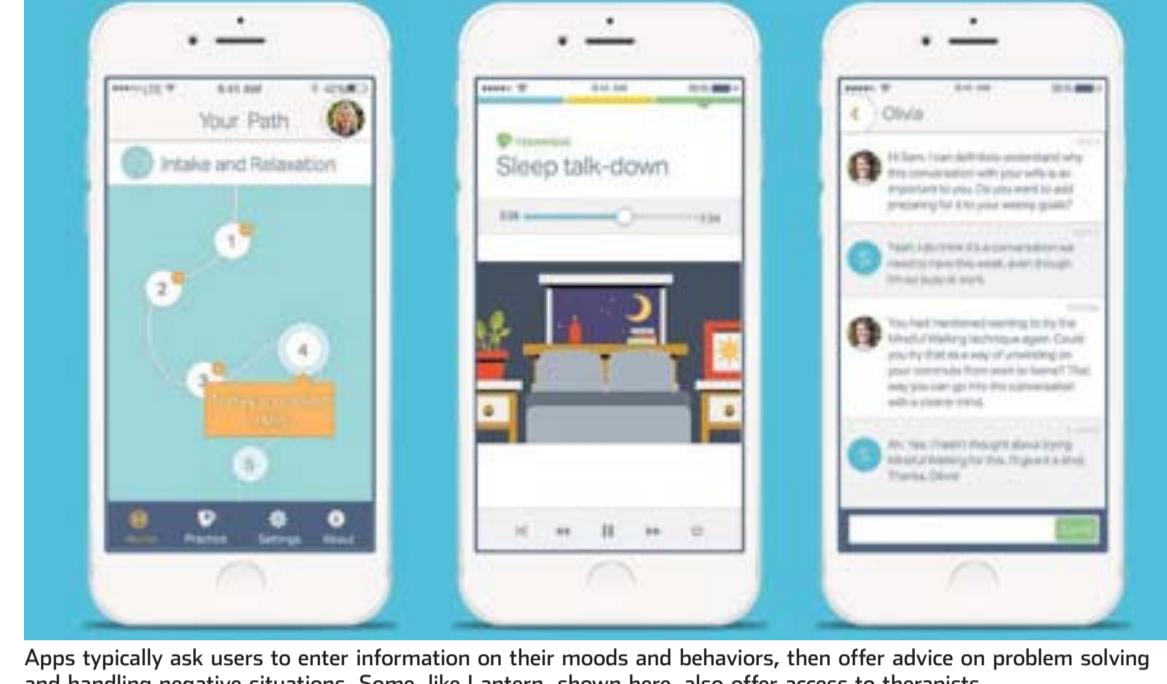
Now, a growing group of health-care providers are betting that technology—from web-based courses to mobile apps that send prompts via text—can help bridge that gap.

It might seem surprising, since therapy, more than many other kinds of medicine, is so focused on the relationship between patient and therapist. But research, including a meta-analysis of studies involving internet-based cognitive behavioral therapy, or CBT, suggests that digital therapies augmented by coaches who are available by text or phone can be as effective as evidence-based traditional therapy in treating some people with depression.

One study, funded by the National Institutes of Health and involving 99 patients with moderate depression, found that 90 of them completed a full eight-week course that included access to a suite of treatment apps and text support from coaches with at least a bachelor's degree in psychology. On average, those who completed the course experienced a significant decrease in symptoms of depression, with three-fourths meeting the criteria for full remission.

Elsewhere, a study by the U.K. National Health Service, based on 1.2 million referrals for depression and anxiety, showed that computerized CBT administered to people with depression yielded a recovery rate of 58.4%, compared with 53.9% for those undergoing several types of in-person therapy. Ricardo F. Muñoz, a professor and founder of the Institute for International Internet Interventions for Health at Palo Alto University, who wasn't involved in the research, says that while patients with more severe depression may be more likely to seek in-person therapy, "the fact that much mild or clinical depression can be successfully treated with computerized CBT is of note."

Clinical psychologists put the first



Apps typically ask users to enter information on their moods and behaviors, then offer advice on problem solving and handling negative situations. Some, like Lantern, shown here, also offer access to therapists.

digital interventions for depression online about 15 years ago, according to Stephen Schueller, an assistant professor of preventive medicine at Northwestern University and a member of Northwestern's Center for Behavioral Intervention Technologies. But what they found was that it was difficult to motivate patients with depression to engage regularly with what were essentially online PowerPoint presentations.

Over the past five years, online therapies have evolved to include mobile apps such as Joyable, Lantern and Ginger.io, which are more personalized and responsive. They typically ask users to enter information about their moods and behaviors, then offer problem-solving suggestions, prompts to help patients retrain responses to negative situations, and daily health tips.

Dr. Schueller believes digital interventions need to continue evolving with technology to remain effective. "The future is trying to better understand how to make these apps and sites engaging," he says. "That will include clinical psychologists working with experts in augmented reality, virtual reality and gaming to develop mobile solutions that are truly novel."

One such tool might look like Koko, an online messaging chatbot that uses the internet community to address emotional distress. With Koko, a user puts in a negative thought, like "I'm stupid," and sends it out to other people who may be working through similar situations, Dr. Schueller says. "The crowd creates responses, which go through the system and come back to you as a new message: 'Maybe you didn't fail because you're stupid, but maybe because you didn't sleep enough or you didn't study enough.'"

The idea is that the crowd "can provide many different ideas that, when combined, might produce better or more creative solutions" than a therapist can, says Dr. Schueller, adding that Koko also uses machine learning to identify those in need of more direct intervention or support.

Lynn Bufka, associate executive director of practice research and policy at the American Psychological Association, says research has demonstrated that individuals can benefit from a range of technology-enabled services. As such, she would like to see a more "stepped" approach to mental-health care for individual patients.

Stepped care might start with a brief in-person assessment of a patient who shows signs of depression, so that therapists can identify any behavioral or health concerns, says Dr. Bufka, who believes that a human should always be involved at the beginning of a treatment process. "Then, depending on severity, we would provide each patient with a self-help book or access to web-based education. If that didn't work, perhaps we'd move to a computer-assisted intervention, and then move toward in-person treatment," either group or individual sessions, Dr. Bufka says. The stepped-care system exists in the U.K., she says. "I think we'll ultimately see a combination of different online interventions" for depression, she says.

Dr. Muñoz of Palo Alto University says he also believes that therapeutic and preventive services for depression could fall on a continuum. The challenge for the public is knowing which digital tools to trust, he says, pointing to PsyberGuide, a website headed by Dr. Schueller that uses a standardized rating system to help consumers select products and apps for various mental-health conditions, as a good model.

The App Is In

An English study found these recovery rates for selected therapies for patients diagnosed with depression

Computerized cognitive behavioral therapy	58.4%
Interpersonal psychotherapy	53.9
Brief psychodynamic psychotherapy	47.0
Counseling	45.2
Behavioral activation	44.8
Cognitive behavioral therapy	44.1

Source: Psychological Therapies: Annual Report on the Use of IAPT Services, England, 2014-15, based on 421,744 people who were clinically depressed at the start of treatment and completed treatment

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Eventually, Dr. Muñoz envisions something he calls massive open online interventions, where therapeutic and preventive services could be delivered virtually to anyone in the world, in any language, at any time—ideally at no charge to users. The only barrier to entry would be internet access. Once the technology is built and more people use it, he says, the marginal cost of providing that intervention to one more person would gradually approach zero.

He points to a study he conducted in which 15,170 smokers from around the world participated in a free online smoking-cessation program offered in English and Spanish. After 12 months, 3,479 users, or 23%, reported they had quit smoking; to help that many people quit using more common care, he says, health providers would have had to give nicotine patches to 17,395 smokers, at a cost of \$3.65 million.

His program, which had been built with earlier research grants, cost a total of \$200,000 to maintain and advertise the website worldwide for 30 months.

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JOURNAL REPORT | HEALTH-CARE TECHNOLOGY

The Case for Giving Health-Care Consumers a Nudge

A law professor argues that people will make better choices if they're asked the right way

BY LISA WARD

PEOPLE OFTEN MAKE poor health-care decisions. Would they make better decisions if the choices were presented in a different way?

That's the idea behind so-called choice architecture, or presenting options in a way that subtly encourages people toward a desired decision. Based on psychology and behavioral economics, it aims to encourage people to make better choices without openly limiting their options.

Often referred to as a "nudge," choice architecture is widely used in personal finance. To encourage people to invest in 401(k)s, for example, many employers automatically deduct contributions from paychecks unless a worker specifies otherwise. Now, health-care providers and payers increasingly are incorporating principles of choice architecture in their dealings with patients and doctors, with the aim of cutting costs while preserving patient autonomy.

For example, some states encourage child vaccinations by making it difficult for parents to opt out. They may require a doctor's signature or a trip to a government office to sign an unvaccinated child up for school. Elsewhere, insurers and hospitals may encourage doctors to prescribe a generic drug over an expensive one by displaying the generic more prominently on a form.

While research suggests that choice architecture can be a powerful tool, it also raises concerns that it could be used by insurers and hospitals to advance their own interests rather than the patient's.

That question is among the issues examined in a recent book, "Nudging Health: Health Law and Behavioral Economics," edited by Christopher T. Robertson, an associate dean and law-school professor at the University of Arizona; I. Glenn Cohen, professor at Harvard Law School and faculty director of

the law school's Petrie-Flom Center; and Holly Fernandez Lynch, executive director of the Petrie-Flom Center.

The Wall Street Journal spoke with Prof. Robertson about using choice architecture in health care. Edited excerpts follow:

Make it easy

WSJ: How can choice architecture be used to help people make better health-care decisions?

PROF. ROBERTSON: Only about 30% of Americans have advance-care directives where they make decisions about future treatment in case they are ever incapacitated. One way to get more people to do advance directives is by making it a condition for buying health insurance or a way to earn a discount on their policies. Research shows that individuals [with such directives] often chose care that's less intensive, invasive, and therefore less expensive, than is otherwise presumed. So this is an example of where policy makers have an interest in helping people make decisions that better reflect their own preferences.

WSJ: Do nudges work when people have an array of options from which to choose?

PROF. ROBERTSON: Think of a corporate cafeteria. If the company wants employees to eat more fruits or vegetables, it should put them at eye level. It also can place sugary desserts off to the side where people have to seek them out. One important aspect of choice architecture, based on key insights from behavioral science, is to make the good choice the easy choice.

There also is an assumption that it is better to have more choices, but studies from behavioral science show people are often befuddled by too many choices. They can suffer from overload and become stressed and confused, so the added choices don't improve outcomes or satisfaction.

So I think curating choices can



Christopher T. Robertson says some nudges may 'create a small inconvenience,' but they maintain the individual's discretion.

add a lot of value. For example, buying health insurance is impossibly complex because there are thousands of options, but by creating levels of coverage—bronze, silver, gold—the Affordable Care Act simplified the process. Patients may end up having only a handful of plans from which to choose, but they can make apples-to-apples comparisons and buy a plan better reflecting their actual preferences.

WSJ: Why is choice architecture better than traditional incentives?

PROF. ROBERTSON: To get doctors to prescribe more generic drugs, they could be offered a carrot, like a bonus based on the number of generic drugs prescribed, or a stick, forbidding them to write more than a certain number of brand-name prescriptions. But these incentives are demeaning. They overtly undermine physicians' discretion, and it's hard to calibrate the quality of the decision, especially because it creates a conflict of interest. But nudges, in which physicians are required to scroll down farther or sign an extra form to prescribe a name-brand drug, create a small inconvenience that might shift physician behavior toward a path of least re-

sistance, but it maintains their discretion.

Is it fair?

WSJ: One critique of choice architecture in health care is that it may work in the best interests of the government, hospital system or insurer, rather than the patient. Do you see that as a problem?

PROF. ROBERTSON: With health care, all decisions have larger implications. If a physician is writing too many brand-name prescriptions, it isn't just the patient's interest. Everyone in the same insurance pool and the taxpayers subsidizing the insurance pool [would benefit] if the doctor prescribed fewer brand-name drugs. So it is perfectly fair to keep all perspectives in mind.

It's also important to understand that there is often no way to avoid choice architecture—people are pushed in a direction to make a decision regardless. The question is: Are you doing it accidentally or purposely? Why is it OK to do this accidentally, without a plan, and do patients harm, but it isn't OK to better facilitate decisions?

WSJ: Can you provide an example?

PROF. ROBERTSON: In the U.S., peo-

ple have to go out and find health-insurance coverage, and the path of least resistance is to not get it. In other countries people are covered automatically. That's the irony of the Affordable Care Act. Although it has a mandate to get coverage, it really has preserved the option to not be covered since it requires people to opt in to avoid the penalty. A slightly stronger version would default people into coverage, charging a premium rather than a penalty, while allowing people to opt out. There have been proposals as part of health-care reform to do this because it would repeal the mandate and preserve the choice to be uninsured, while at the same time potentially causing more people to be insured through automatic enrollment.

WSJ: Can choice architecture go awry?

PROF. ROBERTSON: Nudges can be designed poorly. Several states require people applying for a driver's license to decide if they want to be organ donors. It turns out the DMV isn't a very good place to make such decisions. People are in a hurry and the last thing they want is to spend more time contemplating their own deaths. When forced into a corner, people are more likely to just say no, which undermines the policy goal. So the nudges backfired.

One of the larger themes of the book is that these are just ideas or proposals that need to be first tested in the lab and then tested in the field. The science of nudging itself is still in its infancy, and we are learning a lot more about what works and where.

WSJ: Are there other pitfalls?

PROF. ROBERTSON: Nudges may have a small effect when there are structural or systematic problems that need to be addressed.

Merely putting healthy food in the right places or disclosing nutrition information on food labels is unlikely to solve [the obesity problem] because the U.S. has larger, fundamental problems: The government subsidizes unhealthy food, and many people lack access to fresh fruits and vegetables.

Ms. Ward is a writer in Mendham, N.J. Email reports@wsj.com.



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