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THE WALL STREET JOURNAL

DOW JONES | News Corp ***** MONDAY, MARCH 27, 2017 - VOL. CCLXIX NO. 70 WSJ.com ***** \$3.00
Lastweek: DJIA 20596.72 ▲ 317.90 1.5% NASDAQ 5828.74 ▼ 1.2% STOXX 600 376.51 ▼ 0.5% 10-YR. TREASURY ▲ 29/32, yield 2.396% OIL \$47.97 ▼ \$1.34 EURO \$1.0800 YEN 111.33

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◆ **Hollywood is set to more quickly make major movies available to home viewers after they hit theaters. A1**

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◆ **The U.S. is lagging behind other countries in the battle to supply cutting-edge production machinery for factory automation. A1**

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◆ **The White House signaled it may reach out to Democrats following the collapse of the House GOP's health bill after a revolt by conservatives. A1**

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◆ **Thousands took part in anticorruption demonstrations across Russia, the most significant challenge to Putin in years. A7**

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Thousands of Protesters Take to the Streets in Russia



USE OF FORCE: Russian riot policemen detain a demonstrator during an opposition rally in central Moscow Sunday to protest official corruption. The marches were called by leading opposition figure Alexei Navalny, who was detained along with hundreds of others. A7

Stock Retreat Has Its Fans

After long rally, a correction could be good for the market, some investors say

By Aaron Kuriloff, Corrie Driebusch and Akane Otani

Investors don't typically root for stocks to fall, but some now think a period of declines might be healthy.

Many investors and analysts fear a postelection rally that has driven the S&P 500 up roughly 10% has cleaved

share prices from the underlying fundamentals that tend to drive gains over time, such as interest rates and corporate earnings.

What's due now, some investors say, is a correction: a 10% pullback from the indexes' March 1 highs. They contend

such a retreat would tamp down speculation, deflate pockets of froth in popular investments and provide buying opportunities for those still on the sidelines.

Such declines serve an important function in a healthy market cycle, these investors say. By contrast, long periods without corrections can lead to unruly trading and end in larger, more disruptive declines.

"It's like dental work," said

Michael Farr, president of the money management firm Farr, Miller & Washington. "You dread it. You don't want to get it. But you're glad when it's over and you feel better."

The Dow Jones Industrial Average fell 59.86 points Friday to 20596.72 and lost 317.90 points last week, its worst since September. The

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◆ OPEC warns members on output..... B1

Studios Seek to Offer Films Sooner Online

By BEN FRITZ

Hollywood studios are preparing to upend decades of tradition by releasing movies at home less than 45 days after they debut on the big screen, according to people with knowledge of their plans, a goal they have pursued unsuccessfully for years.

The studios and theater owners have long been at loggerheads over the issue, which Hollywood executives consider vital to their long-term survival and cinemas consider a threat to theirs. But now, faced with changing consumer habits fueled by proliferating on-demand entertainment options,

the two sides are finally discussing a compromise, people with knowledge of the talks said.

The only question that remains for so-called premium video-on-demand is when and on what terms it starts, not whether it does, the people said. By year-end, it is likely films will start to become available on VOD as soon as a few weeks after their theatrical debut for between \$30 and \$50.

Such a move would transform the economic model of the movie business, while blur-

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DRIVING U.S. FACTORIES: FOREIGN ROBOTICS

Manufacturing rebound means buying modern machinery from overseas

By DANIEL MICHAELS

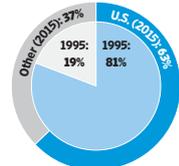
Vickers Engineering Inc. embodies the potential of American manufacturing. The New Troy, Mich., machining company supplies precision parts to clients including Toyota Motor Corp. and Volkswagen AG, and exports to Mexico and Canada. Its staff has risen fivefold and average pay has doubled over the past decade, says Chief Executive Matt Tyler.

What's helping to power Vickers's made-in-America success? Advanced Japanese and German factory equipment. When Vickers first bought industrial robots in 2006, it chose between only European and Japanese models, says Mr. Tyler, and has been adding Japanese robots ever since. "We were not aware of any American-made option."

Factory Imports

The U.S. produces a declining proportion of its industrial production equipment.

U.S. industrial machinery market share



Source: VDMA THE WALL STREET JOURNAL

America is losing the battle to supply the kind of cutting-edge production machinery that is powering the new automated factory floor, from digital machine tools to complex packaging systems and robotic arms.

Commerce Department data show the U.S. last year ran a trade deficit of \$4.1 billion in advanced "flexible manufacturing" goods with Japan, the European Union and Switzerland, which lead the industry. That is double the 2003 deficit. It was down from \$7 billion in 2001, but much of the decline came from foreign equipment suppliers expanding in the U.S., not from an American comeback.

U.S. firms are also losing market share at home, according to Germany's VDMA industry group. Please see **ROBOTS** page A10

These Are Banner Days For English Soccer Managers

Impatient fans are hiring planes to fly messages during matches; Wenger Out

By JOSHUA ROBINSON

LONDON—During a recent Premier League soccer match, the crowd was momentarily distracted by a buzz from above.

Arsène Wenger, the embattled French manager of Arsenal, one of England's top teams, looked up from the sideline to see a small aircraft pulling a banner that offered a hot take on his job performance. It said: "No Contract #Wenger-



Arsene Wenger opinionated—when it comes to managers, with the average tenure lasting just a couple of seasons. This is bad news for Please see **BANNER** page A10

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FROM LEFT: ASSOCIATED PRESS; OZ GELINE AND JUSTIN

ROBOTS

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 trial-machinery trade group. In 1995, they satisfied 81% of domestic demand for farm equipment. In 2015, the most recent data, that had slipped to 63%.

The trade gap presents a conundrum for President Donald Trump, who wants the U.S. to manufacture more and import less. He has criticized makers of cars, air conditioners and farm equipment for moving production abroad. Companies have responded by touting investments in U.S. factories. Yet a resurgent U.S. manufacturing sector would fuel more equipment purchases from foreign firms, because companies have little other choice.

If Vickers could find what it needed domestically, "we would absolutely go with the American option," says Mr. Tyler, "all things being equal."

Manufacturers fret over the lack of U.S. automation suppliers because the digitized, miniaturized and customized products of tomorrow are increasingly intertwined with innovations in the machines used to make them.

A report to President Barack Obama on advanced manufacturing, prepared by his council of science advisers in 2012, concluded that the "hard to replace" U.S. lagged other rich nations on manufacturing innovation.

Rosie the Riveter

The Defense Department, which wants sophisticated factories to help field a modern arsenal, last year proposed steps to "help Rosie the Riveter become the Digital Native she is destined to become."

China, meanwhile, is seeking to move beyond its reliance on cheap labor to compete globally. Its "Made in China 2025" strategy aims to dominate advanced manufacturing, in part through aggressive foreign acquisitions such as appliance-maker Midea Group's purchase last year of Germany's Kuka AG, a world leader in industrial robotics.

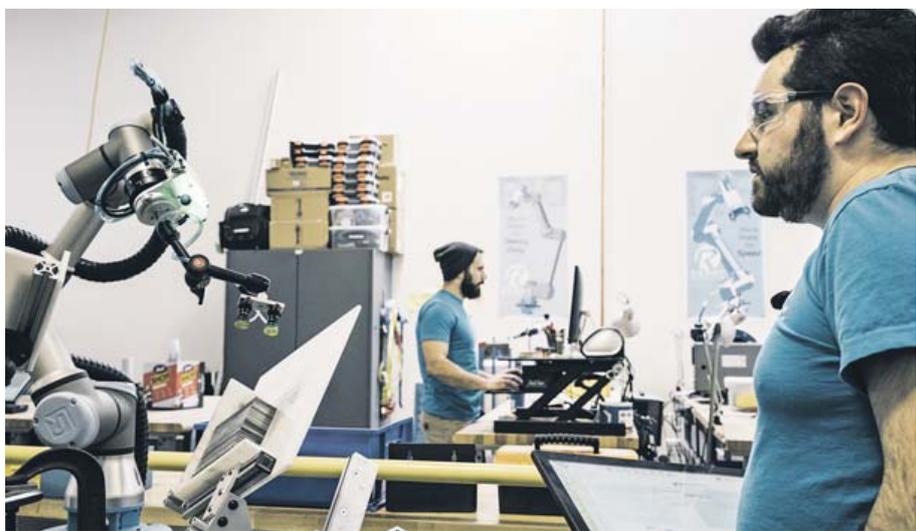
The current White House considers to comment on whether Mr. Trump declined the factory-technology gap a problem.

Noble Plastics Inc. in Grand Coteau, La., a family-owned producer of molded-plastic parts ranging from oil-ribe components to glue-bottle tips, started in 2000 with one used molding machine made in Ohio by a U.S. company, Newbury Industries. Typical of the industry, Newbury was bought in 1996 by a German company, which a Japanese rival acquired in 2008.

Today, inside what President Missy Rogers describes as "a very unimposing building in a very small town," Noble operates a digital network linking automated injection-molding machines from Germany's Arburg GmbH and robotic arms from Japan's Fanuc Corp., the world's largest industrial-robot producer.

The network uses American elements such as motors and sensors and U.S. systems for product-design and process-management, she says, "but Fanuc is the heart of our system."

Ms. Rogers and her husband frequently attend manufacturing trade fairs to "stay ahead of



A Baltimore startup called Ready Robotics is fighting back against foreign domination with smartphone-style interfaces to make automation easier for small firms.

the pack" by seeing which suppliers are most innovative. "You see the same names and companies every year" and they are consistently Japanese or European, she says. "I want to buy from the people who are always trying to make their systems better."

The U.S. dominated advanced manufacturing through the 1970s, when the cutting edge was largely machine tools. Detroit was at the forefront. The world's first industrial robot, the two-ton Unimate built in Connecticut, was installed in 1961 at a General Motors Co. plant in Trenton, N.J., according to the International Federation of Robotics, a trade group. GM and Ford Motor Co. tested robots through the 1970s. GM and Fanuc in 1982 created a joint venture.

In the 1980s, as U.S. manufacturing slumped, almost seven of 10 American machine-tool companies closed due to falling demand, the strong dollar and strategic miscues, according to a 1993 Rand Corp. study.

The decline continued this century as U.S. manufacturers

Tesla's California factory is packed with red Kuka robotic arms from Germany.

outsourced more and baby boomers retired. Shrunken manufacturers demanded fewer production experts, accelerating the factory-technology decline. "In the U.S. there's been a brain-drain in manufacturing technology," says Alex West, manufacturing-technology analyst at London consultants IHS Markit.

In Japan and Europe, industries such as electronics and pharmaceuticals pushed their automation suppliers for increasingly specialized equipment. Governments funded research and development.

Car makers including Toyota and BMW AG, which faced high labor costs and sought product

improvements, prodded their domestic machinery suppliers for automated systems to boost efficiency and quality.

A struggling GM in 1992 sold its half of the Fanuc venture to Fanuc, which kept growing. Today Fanuc supplies multiple industries and nearly all of GM's industrial robots. "We look for the best manufacturing equipment suppliers to provide the quality and scale we need," says GM spokesman Klaus-Peter Martin.

The U.S. today runs a global surplus in "flexible manufacturing" goods, but its exports are mainly components and less-sophisticated machinery, and to developing nations. It imports more advanced equipment.

Among importers is Tesla Inc., often cited as a model for high-value, U.S.-based manufacturing. The electric-car maker's Fremont, Calif., factory is packed with red Kuka robotic arms from Germany. Tesla in November bought German factory-automation specialists Grohmann GmbH to help build its Nevada battery factory. Tesla's announcement said it sought "the best engineering talent in automated manufacturing systems."

Tesla declined to comment for this article. "If you want to build new production facilities in the U.S.," says Torsten Gede, a manager at German investment group Deutsche Beteiligung AG, which sold the Grohmann to Tesla, "a large part of the machinery and technology has to be imported because local alternatives are rarely available."

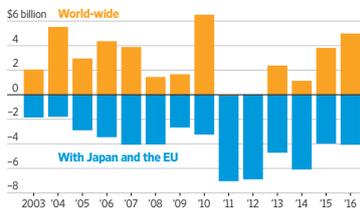
By 2006, when Vickers Engineering in Michigan decided to automate, it had only European and Japanese options. Intimidated by the idea of adding industrial robots, "we wanted to buy as safe and reputable machines as possible," says Mr. Tyler. His team pondered questions such as "would they hold up in the used market if they turned out to be a dog?"

Vickers chose Fanuc robots and digitally controlled machine tools from DMG Mori Co., formed from the merger of German and Japanese companies. "If you're going to invest mil-

Robot Gap

The U.S. runs a global trade surplus in advanced-technology 'flexible manufacturing' equipment but a large deficit with countries that lead the field.

U.S. balance of trade in 'flexible manufacturing' equipment



Source: Commerce Department

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lions of dollars in a piece of equipment," says Mr. Tyler, "you want to be sure they'll still be in business in 10 years." DMG Mori's 2012 opening of a California plant pleased Mr. Tyler because it simplified conversions about innovations. He is also excited that nearby Lake Michigan College recently opened a \$12 million building devoted to teaching advanced manufacturing. "We need to catch up with Germany and Japan in romanticizing engineering," he says.

That was part of the idea behind the 2014 Revitalize American Manufacturing and Innovation Act, passed following the Obama administration's 2012 report. The government has since committed more than \$1 billion to establish a "network for manufacturing innovation" that includes government research labs, universities and companies. Other participants have committed over \$2 billion.

The network, dubbed Manufacturing USA, in January announced its 14th institute, the Advanced Robotics Manufacturing Innovation Hub hosted by Carnegie Mellon University in Pittsburgh. Led by the Pentagon, it will focus on making automation easier to use, especially for small companies.

A White House spokeswoman says: "The Manufacturing USA institutes are an interesting experiment in public-

private partnerships with U.S. manufacturing competitiveness and promoting a robust and sustainable national manufacturing R&D infrastructure. The administration will be reviewing the effectiveness of this approach during the coming months."

When Drew Greenblatt bought Marlin Steel Wire Products LLC, a small Baltimore maker of wire baskets for bagel shops, he knew nothing about robotics. That was 1998, and workers made products manually using 1950s equipment, and the result "was like a Charles Dickens novel, with guys missing eyes and fingers from accidents."

Surging wages

Pushed near insolvency by Chinese competition in 2001, he started investing in automation. Since then, Marlin has spent \$5.5 million on modern equipment. Its revenue, staff and wages have surged and it now exports to China and Mexico.

A few of Marlin's machines are from U.S. suppliers, but its most advanced equipment comes from suppliers including Japan's Yaskawa Electric Corp. and Germany's Trumpf GmbH. Mr. Greenblatt isn't thrilled with that option, not only because he'd prefer to buy Ameri-

can, but also because most industrial-automation equipment is designed for big companies with technology departments.

About two years ago Mr. Greenblatt linked up with a group of Johns Hopkins University graduates to launch a startup, Ready Robotics, that makes smartphone-style interfaces for industrial robots, aiming to make automation easier for small firms. "A lot of innovation is happening Stateside," Mr. Greenblatt says.

Trumpf Chief Financial Officer Lars Grinert, who previously ran the company's U.S. operations, says he sees an opening for "the American mentality in software development." Trumpf's world-wide center for laser research and production is in Princeton, N.J. By augmenting robots with sensors for vision, motion and touch—a field where the U.S. is strong—American innovators are enabling automation systems to be reactive and not just follow rote tasks. Jeff Burnstein, president of the Association for Advancing Automation, an Ann Arbor, Mich., trade group, says that among small tech companies "you're seeing a lot of drive toward innovation in automation in the U.S."

Some U.S. companies are building up their industrial-automation expertise by buying it—from abroad. General Electric Co. last year bought 3-D metal printing companies in Sweden and Germany for roughly \$1.5 billion and is expanding their operations. Europeans, says Christine Furstoss, a vice president in GE's research arm, "did a great job on equipment."

Teradyne Inc., a supplier of automated semiconductor-testing equipment based near Boston, a few years ago sought a high-growth acquisition focused on cobots—collaborative robots—and found "surprisingly few U.S. companies," says its CEO Mark Jagella. "You find more in Europe and Asia." In 2015 Teradyne bought Denmark's Universal Robots A/S, the largest cobot producer. —Ted Mann, Natascha Divac and Mike Colias contributed to this article.

BANNER

Continued from Page One
 Mr. Wenger, whose 21-year stint is currently the focus of a debate so fierce that two rival fan groups decided to ring up a fellow named Simon Moores.

Mr. Moores, the owner of a banner-flying company called Airads, is one of the quiet beneficiaries of England's perpetual state of sporting disconsolation. His planes achieved a rare double this month by towing both Wenger banners, pro and con, earning around \$2,500.

In March 2014, Airads was also hired to fly by Manchester United's home stadium with a banner that read: "Wrong One—Moyes Out." A month later, United's then-coach David Moyes was canned.

Last season, Mr. Moores was prepared to fly another banner calling for the ouster of Mr. Moyes's replacement at United, Louis van Gaal. In the end, the banner was grounded by a technical problem: Mr.



Simon Moores, owner of a banner-flying company, is a winner.

van Gaal was fired before takeoff.

All this marks a departure from the usual orders Mr. Moores fields for local advertising, birthday wishes and marriage proposals. He likes to say that he's popped the question to more women than anyone else in the U.K. The 60-year-old, who has run Airads since 2005, said he and his crews have now flown over a dozen soccer stadiums and that new commissions have been rolling in since the Arsenal

display. "Football and aviation seem to be coming together now," he said.

Yet the growing market for mile-high diatribes isn't always a blue-sky affair. "Dealing with fan groups is one of the most difficult things," Mr. Moores said. "It's more difficult than actually flying the airplane."

First there is the problem of basic decency. Angry fans often request messages that are, as he puts it, "deeply scatological and offensive." Mr.

Moores has to cajole them into something more family-friendly.

Once that is settled, he often has to counsel his clients on how best to get their points across. He recommends, for instance, that they use a hashtag for maximum exposure.

After the anti-Wenger banner flew, hundreds of people used the hashtag to post photos of the plane on Twitter. Some asked where they could send donations, while others joked about shooting it down with a bazooka. "This club is becoming a joke," said one post.

Another perennial problem: English weather. On the Saturday of the Arsenal match, Mr. Moores looked at the stormy skies and warned his clients it might not be possible to fly. The Wenger In and Wenger Out camps asked him to try.

Mr. Moores and his Wenger Out payload took off from southern England into fierce headwinds toward West Brom's stadium in Birmingham. At the same time, a second crew working for Mr. Moores pointed its Cessna at

Birmingham with the opposite message in tow.

"The chances of doing this were somewhat less than 50/50," Mr. Moores said.

The weather broke just long enough for the juddering propeller aircraft to be visible from the stands. Both planes made it to the game in the first 15 minutes.

The anti-Wenger banner conspirators had been the first to call. They were led by longtime Arsenal fan Chris Butler, whose crowdfunding page for anti-Wenger displays has raised nearly \$4,000 this month.

"We're just tired of our Groundhog Day seasons," said Mr. Butler, whose followers have marched in protest outside of Arsenal matches, unfurled anti-Wenger signs in the stands and hammered the coach with coordinated attacks on social media. "We lose against the big teams. We have an appalling record in Europe. The guys are just fed up," he added. "We've had 10 years of misery."

After laying out "the standard Scrabble kit" of up to 32 characters in red or black, in-

cluding spaces, Mr. Moores factored in fuel, distance, and landing fees. The quote for a job like this: \$935.

As word of the Wenger Out air raid began to leak out on social media, a group of Arsenal supporters, 6,000 miles away in Hong Kong, calling themselves Gooners20—Arsenal is known, informally, as the Gunners—decided to hatch a counterplot to support Mr. Wenger, who has unfailingly kept Arsenal among the top four teams in the Premier League during his career.

Since England has only a handful of banner-flying companies, it wasn't much of a coincidence that they ended up dialing Mr. Moores.

On the day of the dueling planes, Arsenal lost, dropping to sixth in the standings. Mr. Wenger, 67, whose contract is up this summer, was in no mood to talk light aircraft. "We lose game after game at the moment and that is for me much more important than my future," he said.

Wenger In, Wenger Out, it didn't really matter to Mr. Moores. "I kind of support Manchester United," he said.