outside India think the national subscription plan goes against the spirit of open access. Such schemes do little to remove global barriers to accessing knowledge, says Juan Pablo Alperin, who studies scholarly communication at Simon Fraser University in Vancouver, Canada. They "encourage everyone to fend for themselves", he says.

Rahul Siddharthan, a computational biologist at the Institute of Mathematical Sciences in Chennai, India, and a member of the advisory group, agrees that subscriptions aren't ideal. He says that India should be part of reforming the publishing system — but if national deals can negotiate access for its inhabitants at a fair price, that would be a good thing.

To make paywalled research accessible globally, Muthu says, researchers in India should be encouraged to post their author-accepted, peer-reviewed manuscript in an open-access repository as soon as it has been accepted in a journal. This is called a post-print.

But again, publishers could pose a barrier. Before publication, many publishers require authors to sign copyright agreements that impose an embargo period — ranging from months to years — before authors can make post-prints available.

A growing number of institutions have introduced 'rights-retention' policies that ensure researchers keep the right to share their work in repositories without breaching copyright, says Suber.

But existing repositories in India aren't very popular, so researchers might not use them unless policies are enforced, says Siddharthan.

The advisory group is also divided on how to handle open-access journals that charge APCs. The fees can range from a few hundred to a few thousand US dollars, which is out of reach of many researchers. Siddharthan says that if the government were to pay, it would give such researchers the opportunity to publish in respected open-access journals.

However, Muthu and Arul Scaria, an intellectual-property researcher at the National Law University in New Delhi and an advisory group member, argue that public funding should not be spent on publishing fees, in addition to subscription costs. A central fund would incentivize researchers to submit articles to journals that charge these fees, funnelling more money to publishing companies in the United Kingdom, the United States and Europe, says Muthu.

Given the ongoing debate, it is not clear what position the draft policy will take on APCs. VijayRaghavan said in a public consultation on 12 June that quality journals need to charge these fees to survive, but the costs are disproportionately high for places such as India. "We are actually negotiating on a nationwide level and I am sure that very soon the time will come when both access and the ability to publish at reasonable cost are available," he said.

LIFE ON VENUS? SCIENTISTS HUNT FOR THE TRUTH

Interest in the hellish planet explodes after the detection of phosphine, a potential marker of life.

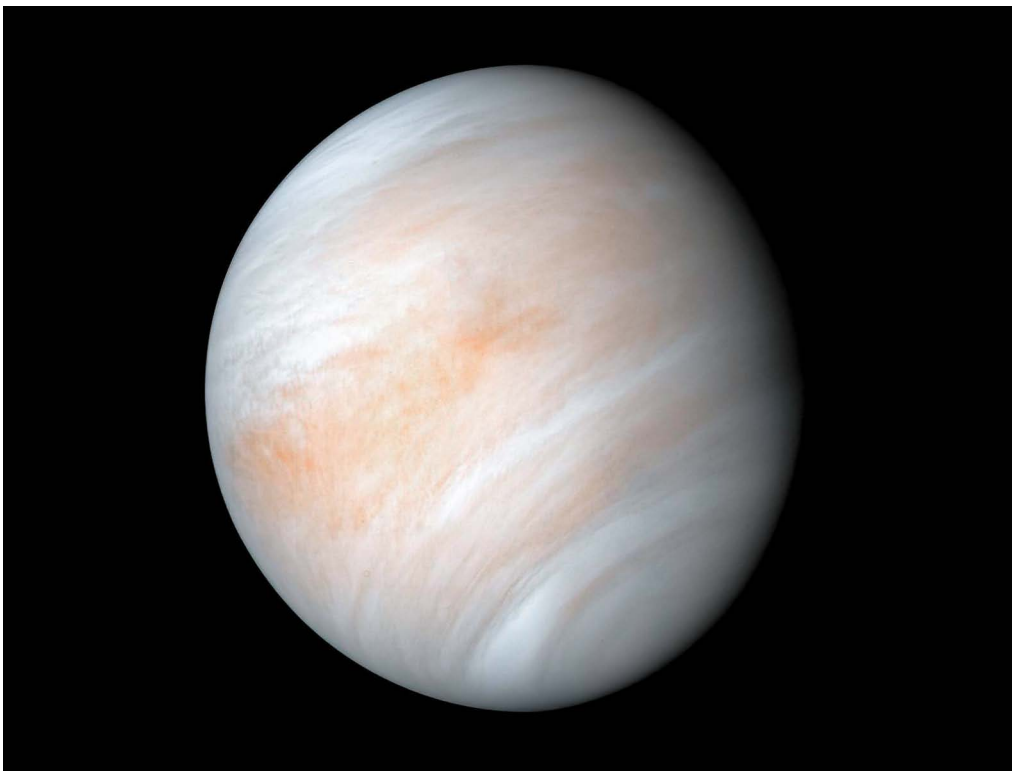
By Jonathan O'Callaghan

The surprise discovery of gas that could be a sign of life on Venus has reignited scientific interest in Earth's closest neighbour. Researchers and space agencies worldwide are now racing to turn their instruments — both on Earth and in space — towards the planet to confirm the presence of the gas, called phosphine, and to investigate whether it could really be coming from a biological source.

"Now that we've found phosphine, we need to understand whether it's true that it's an indicator of life," says Leonardo Testi, an astronomer at the European Southern Observatory in Garching, Germany.

On 14 September, scientists revealed that they had found phosphine in Venus's atmosphere, about 55 kilometres above the surface[1], using the Atacama Large Millimeter/submillimeter Array in Chile and the James Clerk Maxwell Telescope in Hawaii. The radio data showed that light was being absorbed at millimetre wavelengths that corresponded to a phosphine concentration of 20 parts per billion in the atmosphere.

Astrobiologists have flagged phosphine — a toxic compound of hydrogen and phosphorus — as a possible signature for life on other planets[2], and it is made by some organisms on Earth. "Anaerobic life produces it quite happily," says Clara Sousa-Silva, a molecular astrophysicist at the Massachusetts Institute of Technology in Cambridge, and co-author of the phosphine-detection study. But the gas should be broken down in Venus's harsh, highly acidic atmosphere. That led the discovery team to conclude that there must be some mechanism replenishing the gas, hinting at either biological production or an unknown chemical process that scientists cannot yet explain. Researchers have tentatively suggested[3] that in the region of the atmosphere where phosphine was found — away from the crushing pressures and scorching



NASA/JPL-CALTECH

Venus's atmosphere is highly acidic and contains very little water.

temperatures of the planet's surface — some airborne microbes could survive.

Before seriously considering that possibility, scientists are eager to make sure that phosphine really is present on Venus. Not everyone is yet convinced by the team's observation. That's partly because the researchers identified only one absorption line for phosphine in their data, says Matthew Pasek, a cosmobiogeochemist at the University of South Florida in Tampa. "Someone else needs to confirm it."

"The atmosphere and the clouds are the platform for life."

Astronomers are now hoping to follow up on the detection using other telescopes on Earth. "We are proposing to use two instruments," says planetary scientist Jason Dittmann at the Massachusetts Institute of Technology, who plans to conduct observations with Sousa-Silva. One of the instruments is at the NASA Infrared Telescope Facility in Hawaii; the other is on NASA's Stratospheric Observatory for Infrared Astronomy, a plane that carries a telescope.

Observations in the infrared and other parts of the spectrum will enable scientists to look for other absorption lines associated with phosphine, providing a way to verify its presence. They could also offer more data on where the phosphine is located, and how its levels vary over days and weeks. Dittmann's team had hoped to observe Venus in July 2020, but the coronavirus pandemic has pushed its telescope time back. "We're hopeful we'll start getting data in the near future," he says.

Flying visit

Away from Earth, other plans are afoot. Three missions are scheduled to fly close to Venus in the coming months: Europe and Japan's BepiColombo spacecraft, on its way to Mercury, and the European Space Agency's Solar Orbiter and NASA's Parker Solar Probe, both on their way to the Sun.

Observations by these spacecraft are advantageous because they would not be constrained by Earth's atmosphere. But the crafts' instruments are designed to look at other things, such as the surface of Mercury or the Sun, so it's not clear whether they have the right sensitivity to detect phosphine in the Venusian atmosphere.

BepiColombo has a slim chance of detecting the gas in a fly-by this October, and a better chance next August, with its infrared instrument. The Parker Solar Probe, too, might be able to make a detection, with an instrument designed to study solar particles. "It is a low probability, but I would not completely rule it out," says Nour Raouafi, an astrophysicist at the Johns Hopkins University Applied Physics Laboratory in Laurel, Maryland, who is the project scientist on the mission.

There is also a spacecraft currently orbiting Venus: Japan's Akatsuki mission, which entered orbit in 2015 and is studying Venus's weather and searching for volcanism. Although it lacks the instrumentation required to spot phosphine directly, it could help in other ways. "The atmosphere and the clouds are the platform for life," says project scientist Takehiko Satoh, a planetary scientist at the Japan Aerospace Exploration Agency in Sagamihara. "We can provide information about that."

Future missions

More promising are likely to be missions still in development, which could be altered to support the detection of phosphine. The discovery strengthens the case for such missions, says Jörn Helbert at the German Aerospace Center, who is a member of the BepiColombo team.

The Indian Space Research Organisation (ISRO) has a Venus orbiter called Shukrayaan-1, planned to launch in 2025. ISRO did not respond to *Nature*'s request for comment about its plans for Venus. But Sanjay Limaye, a planetary scientist at the University of Wisconsin–Madison, says that ISRO has enough time to reconsider its instruments. "They would be mistaken if they don't see that opportunity," he says.

In the meantime, if astronomers can confirm the detection of phosphine, they will want to rule out other plausible production methods before considering that it is being made by living organisms. That will include creating models to investigate non-biological routes of production, and conducting laboratory experiments to look for chemical pathways that were not considered in the initial study. "Modelling is a reasonable response right now," says Pasek. "Most chemistry that we think of for Earth is dominated by water. On Venus, that's not the case. So there's a lot of experiments that no one has done."

1. Greaves, J. S. *et al. Nature Astron.* https://doi.org/10.1038/s41550-020-1174-4 (2020).
2. Sousa-Silva, C. *et al. Astrobiology* https://doi.org/10.1089/ast.2018.1954 (2020).
3. Seager, S. *et al. Astrobiology* https://doi.org/10.1089/ast.2020.2244 (2020).

TRUMP'S SUPREME COURT PICK COULD AFFECT SCIENCE

Amy Coney Barrett is likely to influence environmental regulation and agency transparency.

By Nidhi Subbaraman

Amy Coney Barrett, a conservative legal scholar, appeals-court judge and law professor, is US President Donald Trump's pick for a seat on the country's Supreme Court. If approved by the Senate, Barrett would tilt the already conservative-majority bench further to the right. That in turn could limit the federal government's power in environmental regulation, temper the influence of federal science agencies in highly technical court cases and change the transparency required of such agencies, say legal scholars interviewed by *Nature*.

Composed of nine justices, the Supreme Court has the final say in disputes over how US law is interpreted and administered. Currently, five of its justices are conservative, and three are more liberal; Barrett would replace liberal justice Ruth Bader Ginsburg, who died on 18 September of complications from pancreatic cancer.

Although Ginsburg was best known for using the law to expand women's rights, she leaves behind a legacy of rulings that protect the environment. For instance, her vote in a landmark 2007 dispute deemed that greenhouse gases such as carbon dioxide are pollutants and can therefore be curbed under the Clean Air Act. That 5–4 vote gave the US Environmental Protection Agency (EPA) the responsibility to regulate against climate change.

Barrett's track record on the environment and on science is unclear because it is rare for the appeals court she oversaw to get such cases, says Robin Craig, an environmental-law scholar at the University of Utah College of Law in Salt Lake City. "She's a bit of a cipher, particularly in the science-related areas of law."

But legal scholars expect that if Barrett is sworn in, the resulting powerful conservative majority is likely to rule in favour of challenges against environmental regulation. And they think science agencies such as the EPA could see their ability to impose rules on industry weaken.

"I think it pretty much leaves the world with