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Devastating risks of transitioning to 'green' energy: Mining for electric-powering minerals has left 23 million people exposed to toxic waste, 500,000km of rivers polluted and 16 million acres of farmland ruined

- Toxic byproducts of metals mining also pollute 10.7 million acres of flood plains
- Researchers estimate the pollution also impacts 5.72 million livestock worldwide
- Scientists hope their new global database and mapping tool helps stem the tide
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By [MATTHEW PHELAN FOR DAILYMAIL.COM](#)

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Tens of millions of people — more than live in the entire state of **Florida** — are now exposed to toxic water runoff from metal mining, a new study has found.

The report lays bare the devastating impacts that can follow a reckless transition to 'green' energy, compounding the ecological damage wrought by over 150 years of drilling and mining for **fossil fuels**.

The researchers found that 23 million people worldwide, as well as 5.72 million in livestock, over 16 million acres of irrigated farmland and over 297,800 miles worth of rivers have been contaminated by mining's toxic byproducts seeping into the water.

This metal mining includes many so-called 'rare earth elements' essential to the manufacture of high-tech electronics, solar cells, wind turbines and all the batteries needed to store sustainable 'green' energy (and power electric cars and iPhones).

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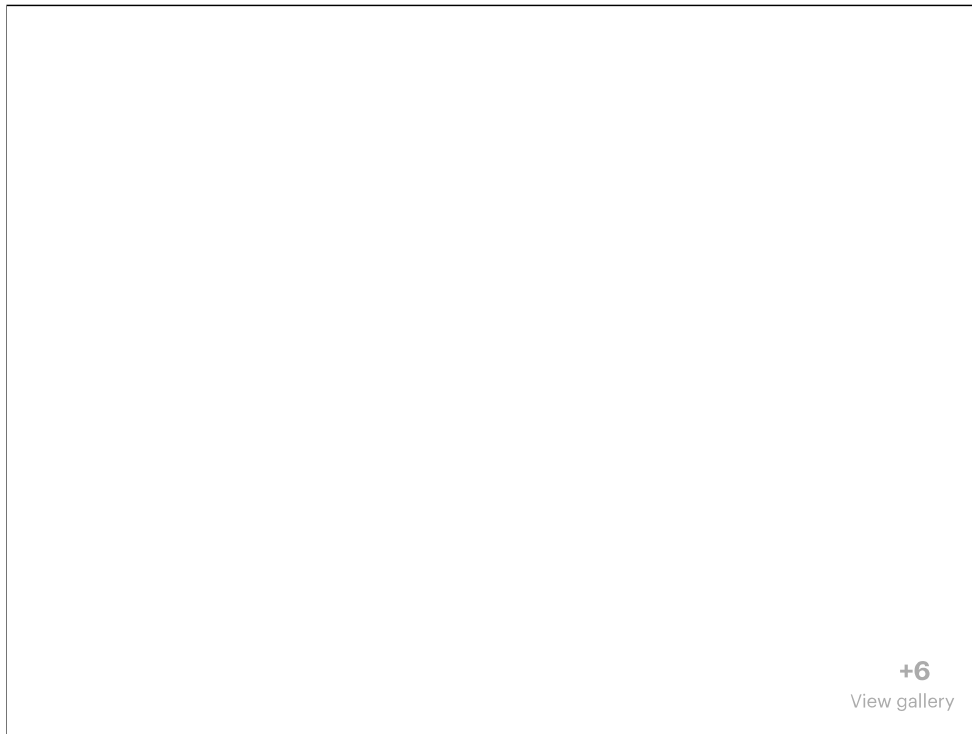
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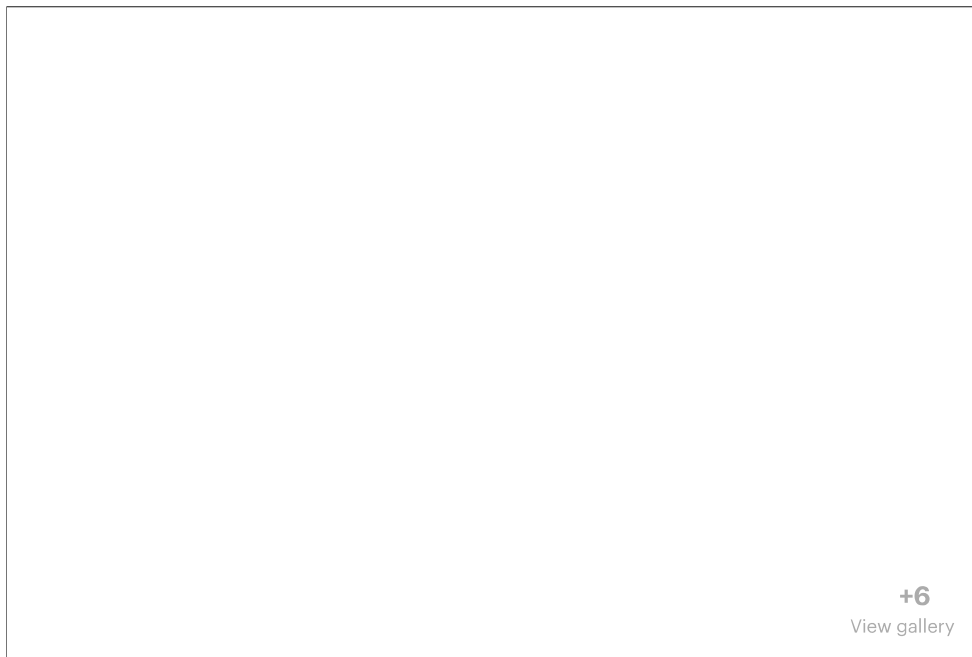
While the new study focuses on environmental impacts, global metals mining has recently faced shocking lawsuits against major tech firms, including Apple, **Google**, **Microsoft** and **Tesla**, over **child slavery in the Congo**, where 70 percent of the industry's cobalt is sourced.



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Researchers found that over **297,800 miles** worth of rivers have been contaminated by toxic mining byproducts. Above, a **March 27, 2021 aerial view** of an area contaminated with toxic waste generated by mining companies that have polluted the Tagarete river in Bolivia



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The scientists found that **23 million people** have been exposed to toxic mining waste worldwide. Above, **Dan Bender** of the La Plata County Sheriff's Office takes a sample from the Animas river in Colorado polluted by about 3 million gallons of waste from the Gold King Mine

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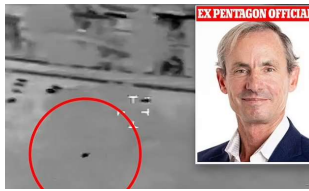
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'Rapid growth in global metal mining is crucial if the world is to make the transition to green energy,' noted **Chris Thomas**, a zoologist at the University of Lincoln whose specialty is in spatial ecology and threats to the global water supply.

Thomas led the analysis and modelling work for the new study, which was published today in **Science**.

Thomas and his colleagues have developed a new database, supported by on-the-ground testing, which now maps the hundreds of square miles' worth of rivers and floodplains contaminated by these industrial processes across the globe.

The devastation wrought by this contamination, they found, was widespread, affecting approximately 297,800 miles (479,200 km) of river systems total and over 63,000 square-miles (164,000 sq-km) of floodplains worldwide.

But, North America stood out as the most affected, at 123,280 miles of tainted river systems, and approximately 10.7 million acres of polluted floodplains.

But the damage was not much better in South America with 50,766 miles of rivers and over 9.5 million acres of floodplain impacted; nor in Asia with about 37,842 river-miles and about 8.3 million acres of floodplain polluted by metal mining waste.

In terms of potency of local damage, however, the the scientists saved their harshest criticisms for 'the environmental legacy of historical mining,' which they said was 'most problematic in western Europe,' where long-abandoned old mines have left lasting environmental damage.

'Much of the estimated global contamination we have mapped is a legacy from the industrial era,' Thomas said in a press statement. 'Rightly, modern mining is being encouraged to prioritize environmental sustainability.'

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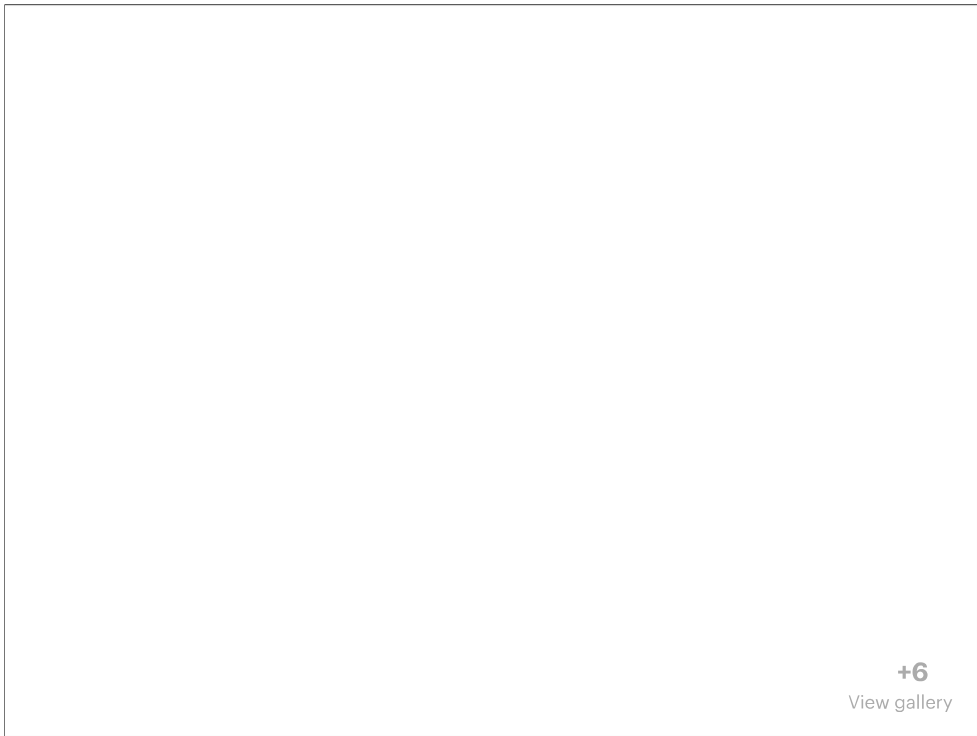
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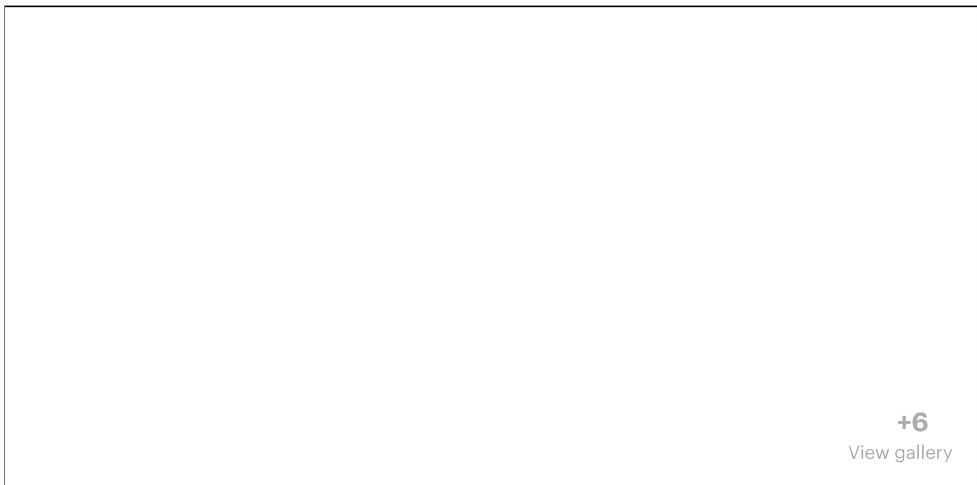
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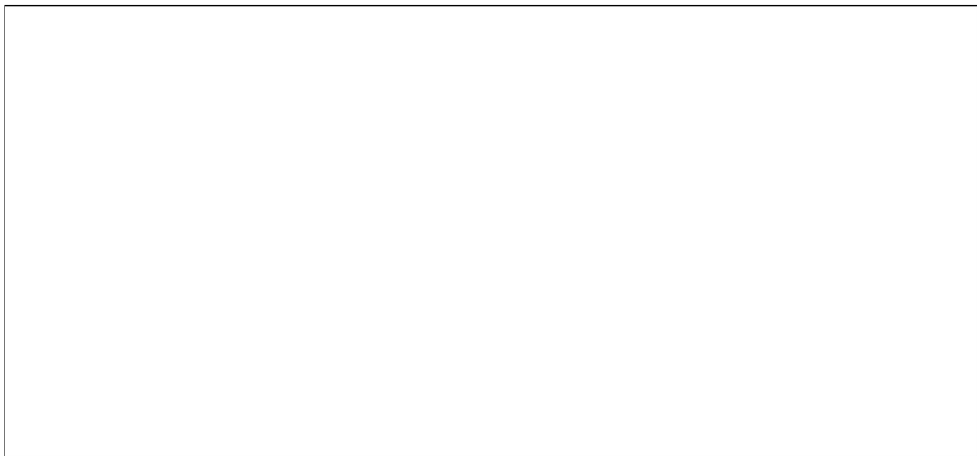
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Potentially harmful mining contaminants can seep into the local water supply, whether transported downstream to along river beds and floodplains, or deep into underground aquifers. Chronic copper metal poisoning kills a sheep in North Ronaldsay, Texel, Suffolk



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The researchers identified 159,735 abandoned mines, marked in blue above, whose environmental impact due to laxer historic regulations contributed 'much of the estimated global contamination,' according to report co-author and spatial ecology expert Chris Thomas



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The study also modelled the waste from 22,609 active mines, marked in red above, as well as 11,587 mining waste storage facilities and 257 known cases of failed and leaking storage sites (not pictured above): 'the most comprehensive compilation of metal mine locations to date'

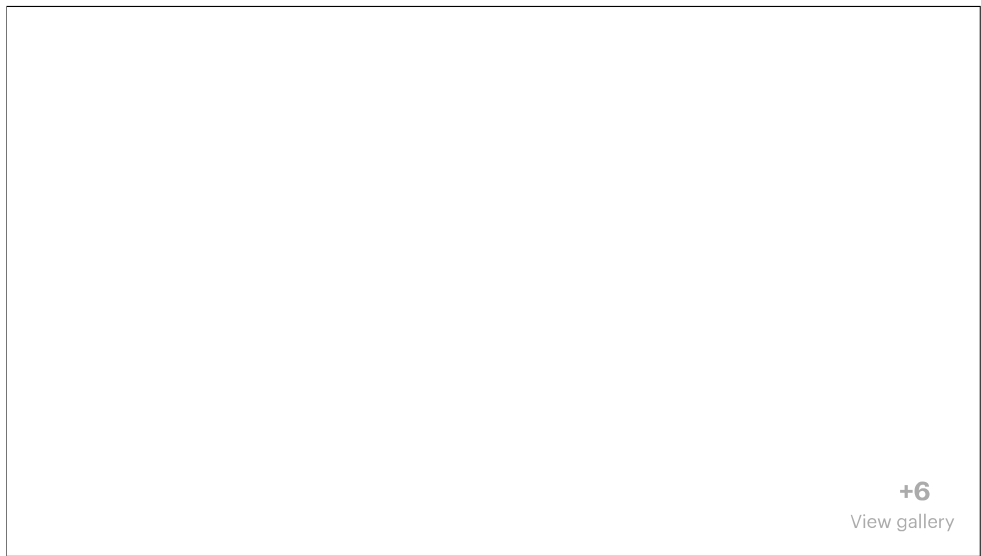
The researchers developed a model to predict the spread of contaminants from all known active and inactive metal mines — plus facilities used to seal off hazardous mining waste — with a focus on pollution from lead, zinc, copper, and arsenic.

These potentially harmful contaminants and industrial byproducts can seep into the local water supply, whether transported downstream where the metals are deposited along river beds and floodplains, or otherwise sinks deep into underground aquifers.

Mark Macklin, director of the university's Lincoln Centre for Water and Planetary Health, who led the international team behind the new research, said he anticipates the new study's maps and modelling tools will help prevent future reckless mining.

'We expect that this will make it easier to mitigate the environmental effects of historical and present mining,' Macklin said.

'Our new method for predicting the dispersal of mine waste in river systems provides governments, environmental regulators, the mining industry and local communities with a tool that, for the first time, will enable them to assess the offsite and downstream impacts of mining on ecosystem and human health.'



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Inactive mines and their pollution outnumbers the mining waste generated by new mines

All told, the researchers identified 159,735 abandoned mines and 22,609 active mines — as well as 11,587 mining waste storage facilities and 257 known cases of failed and leaking storage sites.

The team described the new database in their report as 'the most comprehensive compilation of metal mine locations to date.'

Concerns over just how bad the ecological impact of metal mining for sustainable technology might be is complicated by the diverse variety of resources involved, which can lead to 'apples to oranges' comparisons.

According to **the MIT Environmental Solutions Initiative**, green energy technologies like wind turbines and electric cars often do require many more mined minerals than the present fossil fuels infrastructure.

One electric car, for example, requires six times more metallic and mineral materials than a combustion engine car, MIT's university team reports.

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And a wind power plant requires nine times more of these mined compounds than a traditional gas-fired plant.

But these heavy investments in initial overhead are dwarfed by the repeated volume of fossil fuels currently mined today to meet present and growing energy demands.

As of 2021, over 7.5 billion tons of coal were extracted from the ground, wreaking havoc on local people and environments from **Sydney Australia's Royal National Park**, to **coal-rich Inner Mongolia in China** and more.

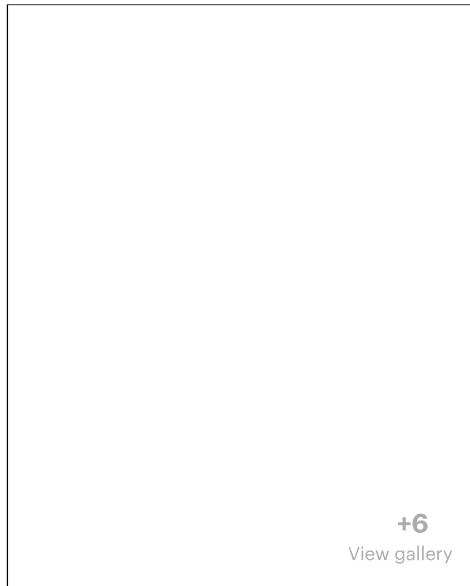
This is a whopping 25 times the current estimates of the metal mining needed for a clean energy revolution by 2040, according to projections from the Paris-based **International Energy Agency** (founded during the 1970s oil crisis by the **OECD**).

The transition, according to the IEA, will require new mining under 30 million tons.

Scott Odell, a visiting scientist at MIT's Environmental Solutions Initiative who specializes in clean energy and mining, cautions however that these environmental impacts often need to be assessed on a more detailed, case by case basis.

The mining of any two different metals requires different techniques with different impacts — as can two separate deposits of the same metal if located in significantly different conditions.

'I think if someone were to tell you one or the other is better in terms of direct impacts pound for pound,' Odell said, 'you should ask a lot of questions about how they got to that answer.'



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Above a farmer copes with chemical waste on a corn crop in Ahmedabad, India in 2018. Industrial processing of mined metals was another pollution factor included in the study

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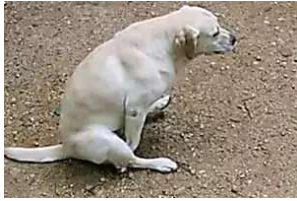
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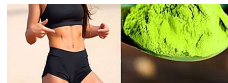


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▶ **Nadiya Hussain** details the financial struggles she and her husband faced at the beginning of their marriage as she graces the cover of Women & Home

▶ **David Ginola's** daughter Carla is married! Bride stuns in a fitted lace gown as she kisses husband Adrien Rosenpick in St Tropez

▶ **Claudia Schiffer, 53**, looks like a Malibu Barbie with fresh tan and blonde hair as she walks Versace runway for 1st time in 5 YEARS: 'A warm hug'

▶ **Model Gemma Ward** shows off her trim pins in flimsy shorts and an oversized jacket at a fashion show for Gucci in Milan

Jenna Bush Hager awkwardly HESITATES after Hoda Kotb asks if her husband Henry is her 'best friend' - but

▶ says they text 'at least 10 TIMES' a day

▶ Daisy Edgar-Jones puts on a VERY leggy display in a plunging black dress as she reunites with Paul Mescal at the Gucci show in Milan

▶ Gisele Bundchen reveals she was 'just surviving' before shock Tom Brady divorce - and is 'now living'... as star details how pair 'grew apart'

EXCLUSIVE Recluse Kim Basinger - who has not been on a red carpet in four years - will make RARE appearance... before 70th birthday

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▶ How Russell Brand tried to silence his critics - using feminist Meghan's favourite lawyer: For years the comedian has been intimidating accusers

Tory Lanez forced to give up his celebrity

▶ diet for bland prison food during 10 year sentence for shooting Megan Thee Stallion

▶ Riverdale star Casey Cott welcomes his first child with wife Nichola Basara as the star reveals the name of his baby boy

▶ Lily-Rose Depp puts on a stylish display as she goes braless underneath orange minidress while house hunting in Los Angeles

▶ Zoey Deschanel models a chic leather motorcycle jacket and mini skirt at ultra-exclusive San Vicente Bungalows in West Hollywood

▶ Julia Roberts, 55, proves everyone loves a Pretty Woman as Ryan Gosling and Salma Hayek's billionaire husband jump into a photo op with her

▶ Olivia Wilde wears a T-shirt that supports the actors and writers strike as she heads into a gym in Los Angeles

▶ Officially over! Meghan pulls the plug on Archetypes podcast after withdrawing her application to trademark the title

▶ Heather Locklear, 61, steps out in Calabasas after sobriety setback that sparked concern from friends and family

▶ Christine McGuinness and close pal Chelcee Grimes unfollow each other on social media as the TV star posts snaps with her new 'bestie'

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▶ Robert DeNiro's star-studded Malibu hotspot Nobu is sued by a SECOND hostess claiming she was sexually assaulted by the same bar manager

▶ Braless Demi Moore, 60, stuns in a plunging blazer and gold fringe trousers as she takes her tiny dog Pilaf to the Versace show during MFW

▶ Emily Ratajkowski flashes her abs in a cropped tee with leather trousers and coordinating coat in NYC

▶ Christy Turlington's daughter Grace Burns, 19, proves she's inherited her mother's supermodel genes as she makes her Milan Fashion Week debut

▶ Dwyane Wade says telling Gabrielle Union he had fathered a child with another woman in 2013 was 'way harder' than competing in NBA playoffs

▶ MAUREEN CALLAHAN: How delicious to see Team Jonas' ugly 'bad mom' blitzkrieg on Sophie Turner misfire... She will win this divorce saga

Russell Brand was known to be 'nasty' if people rejected his sexual advances - with models 'warned about

▶ [going home with him', comedian claims](#)

▶ [Strictly's first songs and dances are REVEALED: Angela Rippon will strut her stuff to hit by famous Diva while frontrunner Layton Williams gears up for a Samba](#)

▶ [Travis Scott's attorneys claim star's phone 'is LOST AT SEA at the bottom of the Gulf of Mexico' - and cannot be used as evidence in Astroworld lawsuit](#)

▶ [Matthew McConaughey's alleged stalker 'shows up at star's book event' - with fan 'escorted away by police' after actor got restraining order](#)

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▶ [Love Island stars 'kicked out of star-studded event for homophobic comments and abusing homeless man'](#)

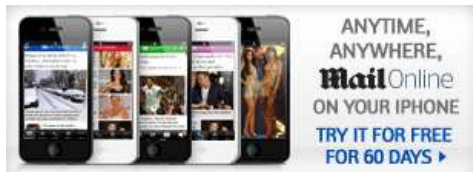
▶ **Nick Knowles, 61, gushes over his fiancée Katie Dadzie, 33, as he details their romance after sharing VERY racy snap together for his birthday**

▶ **Kelly Clarkson sings Since U Been Gone during Today concert in New York City... after revealing daughter River, 9, will be on her new album**

▶ **Strictly's Katya Jones flaunts her dancer physique in a skintight black dress as she joins EastEnders' Danielle Harold at Radiant Resilience exhibition**

▶ **Leonardo DiCaprio, 48, arrives at same time as 'ex' Gigi Hadid, 28, in Milan where his 'new love' Vittoria Ceretti, 25, has been making a splash**

▶ **Coronation Street is set for a major schedule shake-up as viewers miss their dose of Weatherfield drama**



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TECH NEWS & REVIEWS

Wordle has a hidden 'hard mode' - but players claim it might actually make the game EASIER

While an estimated 300,000 people play Wordle daily, many are unaware of a secret 'hard mode', which can be found within the game's settings.

353 comments 1 video

Apple could start selling iPhones and iPads as part of a SUBSCRIPTION service from 2023, report claims

A new report from Bloomberg claims that Apple is working on selling iPhones and iPads as part of a hardware subscription service.

93 comments

YouTube adds thousands of FREE TV shows and movies to its service including The Sandlot, Legally blonde and There Will Be Blood as company moves to compete with streaming giants

This is the latest move from the Google-owned social video giant, as it tries to compete in an increasingly crowded, and competitive market.

68 comments

Project Skyway: World's largest network of 'drone superhighways' could be built in ENGLAND - connecting the Midlands with the Southeast over 165 miles

If approved, Project Skyway will connect the airspace above cities including Reading, Oxford, Milton Keynes, Cambridge, Coventry, and Rugby.

58 comments 2 videos

About time! Instagram FINALLY brings back the chronological feed - six years after it was ditched in favour of a curated feed

Instagram is launching two new ways for users to catch up with their feed - Following and Favourites - which will show posts in chronological order.

6 comments 1 video

Smart BRA with built-in ultrasound technology can detect early signs of breast cancer

The smart bra features small ultrasound sensors in the lining, and was developed by Nextwear Technology, a wearables firm based in Abuja, Nigeria.

8 comments 2 videos

Smartwatches are less effective at tracking the health of people with dark skin, study finds

The research by University of Alberta is the first to pool figures from multiple studies to specifically examine how skin tone may affect the accuracy of heart data in wearables

40 comments

World's THINNEST mechanical watch is unveiled: Bulgari's Octo Finissimo Ultra is thinner than a 10p coin - and has an eye-watering £332,700 price tag

Rome-based Bulgari spent three years developing the watch, which is crafted from sandblasted titanium as measures just 0.07 inches (1.8mm) thick.

308 comments 1 video

Smart ring that constantly measures your temperature could provide an early warning of Covid-19 infection - even if your symptoms are subtle

Experts from the University of California and MIT Lincoln Lab studied data on 50 people who

owned sensor rings and had had Covid-19 before the study.

196 comments

Suzuki could launch a FLYING CAR by 2025 after joining forces with Japanese startup SkyDrive

Suzuki has announced that it's joining forces with Tokyo-based flying car firm SkyDrive to develop an electric, vertical takeoff and landing aircraft.

79 comments 4 videos

You could soon feel PAIN in the metaverse: Creepy armband uses electrical stimulation to mimic uncomfortable sensations such as a bird pecking at your skin

H2L, a Sony-backed company based in Tokyo, has developed an armband that uses electrical stimulation to deliver physical pain.

35 comments 2 videos

Engineers develop a bizarre 'magnetic tentacle robot' that can move around the narrow tubes of the lungs to take tissue samples

Like something from a horror film, the new robot's 'magnetic tentacle' would slowly creep into the mouth of a patient under general anesthesia, University of Leeds scientists show.

6 comments 1 video



ADVERTORIAL FEATURES

► Bachelorette vet Hannah Brown models a red bikini with fiancé Adam Woolard in Mexico... after revealing proposal led to panic attack

► Leonardo DiCaprio's girlfriend Vittoria Ceretti, 25, wows in a sexy thigh-split dress at the Gucci show in Milan - after the actor was seen arriving in Italy

► Celebrity SAS: Who Dares Wins stars Amber Turner, Danielle Lloyd and Melinda Messenger cut glam figures as they join the rest of the cast at series press launch

► Doja Cat paints the town monochrome in revealing mesh outfit to celebrate release of new album Scarlet with Spotify event and afterparty in LA

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