

Off the BENCH

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The Eppendorf – LifeScienceStyle Magazine

SHORT DISTANCE CONCEPT

In the 15-minute city,
everything important can be
reached quickly – and without a car

FEMINIST VIEW

Stop stereotypes:
brain researcher Anelis
Kaiser Trujillo calls for
more diversity
in scientific studies

Dossier Always Stay
Positive

presented by
eppendorf



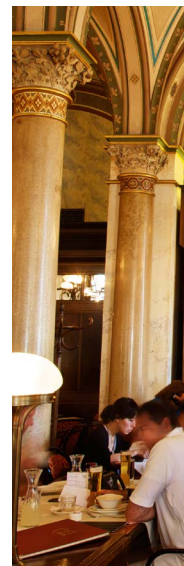
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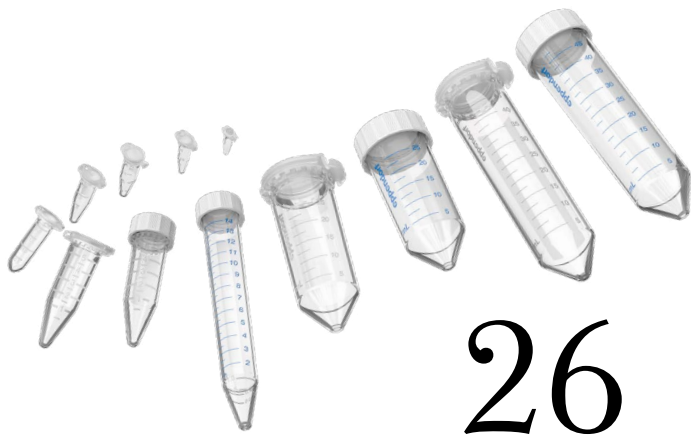
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Dear Reader,

Do you often find yourself not expecting a particularly good outcome from a meeting or negotiation? Or that, at the end of the day, you are unhappy that apparently nothing pleasant has happened to you all day? Depending on circumstances and stress level, it is possible that we perceive things to be more negative than they actually are. The rainbow on a cloudy day, or a friendly chat with the person at the next table in a café are moments that we experience every day. Whether we pay enough attention to them or carelessly dismiss them as meaningless – this is the topic of positive psychology.

The science defining a successful life presumes that people with a positive outlook are more content. At the same time, it is not about viewing everything through rose-colored glasses but rather directing one's focus towards those things that elicit feelings of happiness. For the same reason, it is important to remember one's strengths rather than gloss over one's supposed weaknesses. A fascinating topic that we don't want to give away just yet – after all, we will talk about it extensively in our dossier.

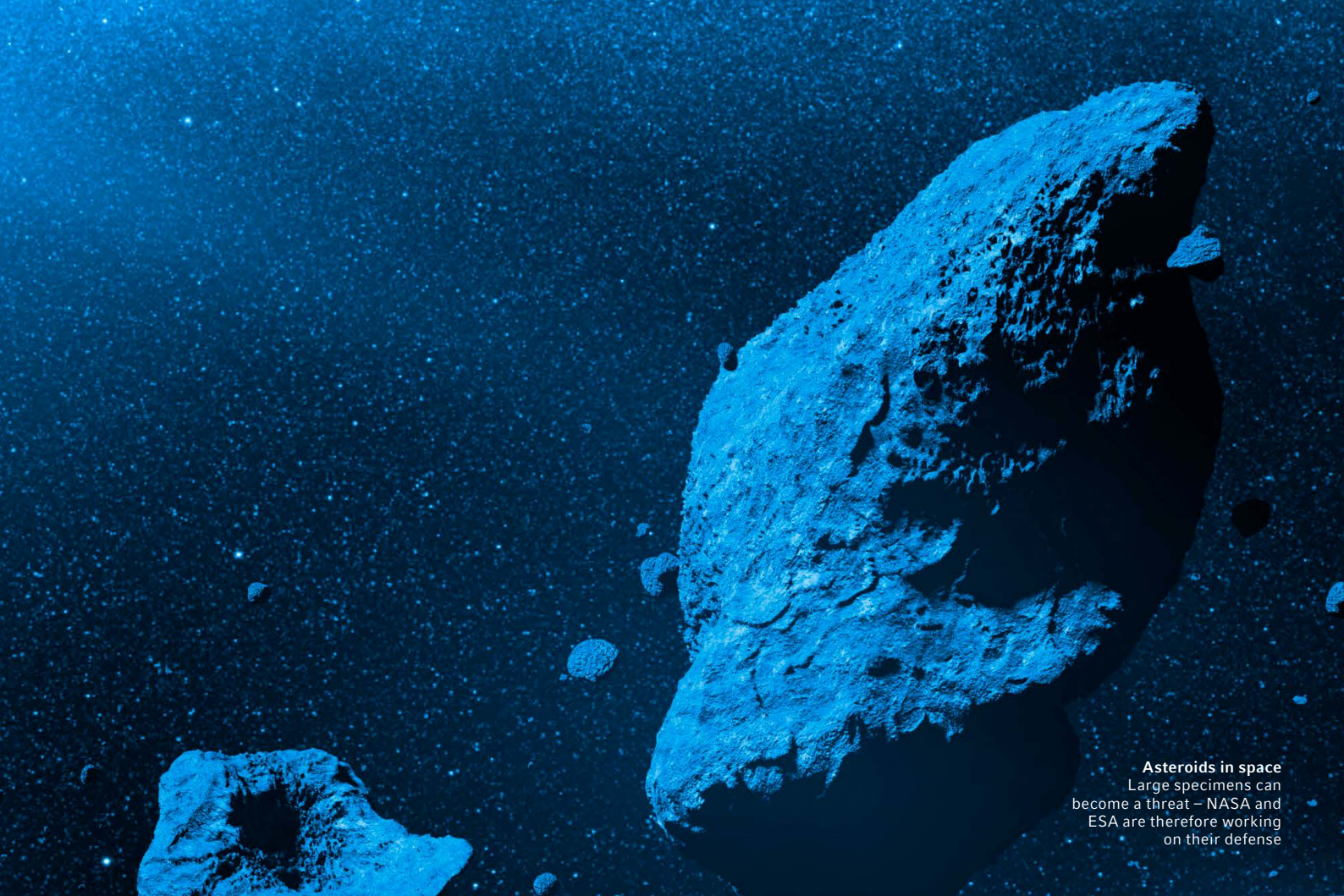
And we will directly apply the idea of having a positive outlook: our series of images on endangered coral reefs reports on projects concerned with saving them; the article on the 15-minute city presents the advantages of short commutes; and sleep researcher Björn Rasch reveals how and when we should rest so that new knowledge will be stored in our memories more effectively. In contrast, it is admittedly difficult to find a silver lining when it comes to reporting on invasive animals that threaten foreign ecosystems. Starting on page 20, you will find practical tips on how we can direct our gaze towards the pleasant aspects of life and become even more content than we – hopefully – already are. Stay positive!

We wish you an inspiring read,

The editorial team of "Off the Bench"

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Snippets of Knowledge



Asteroids in space
Large specimens can become a threat – NASA and ESA are therefore working on their defense

The Danger from Outer Space

What happens when an asteroid 500 kilometers in diameter plows into the Pacific Ocean? Fans of astronomy can take in this scenario in an impressive animation broadcast on the Discovery Channel. According to the animation, the gigantic asteroid would first destroy ten kilometers of the surrounding Earth's surface, unleashing a shockwave. After further horrifying consequences, the Earth would be uninhabitable within a day.

There would be no defences against an occurrence like this – but perhaps there would be for smaller astronomical bodies, umpteen thousands of which are racing through space. "There are alarms multiple times a week," says Richard Moissl, who coordinates asteroid defences at the European Space Agency (ESA). Every

report is followed up on; with every one so far, the "all clear" was issued. This is also true for the asteroid "2023 DW", approximately 50 meters in diameter, which, according to calculations, is supposed to fly past Earth at a distance of up to 4.3 million kilometers on February 14, 2046.

In 2022, NASA showed how we can defend ourselves from dangerous asteroids, when they steered the probe "Dart" into an asteroid and changed its trajectory. An especially effective defense is being worked on together by NASA and the ESA: a space-based telescope is to detect threatening fragments in space and send out corresponding warnings, so that humanity will not be threatened by the same fate as dinosaurs roughly 66 million years ago.



Bad Air

When bad air quality is the topic of discussion, we normally think of emissions from traffic, industry or agriculture. The fact that this could apply to our four walls seems outlandish. Yet indoor air led to more than three million deaths in 2020 alone, according to estimates by the World Health Organization (WHO) – as many as are killed by bad air outdoors. Whether it is gas or a wood-burning stove, mold, or chemical pollutants that off-gas from furniture: pollution like this, which occurs more often in lower-income households with worse living conditions, mounts up and turns indoor spaces into unhealthy places.



No Interest in STEM

Even when female students are interested in STEM fields, the choice of a university program presents the next obstacle. Misconceptions such as gender stereotypes keep young women from studying STEM topics. Benita Combet from the University of Zurich has studied why this is the case. “Particularly with regard to factors like a logical thinking style and technical ability, heavily gender-specific stereotypes still exist, which obviously decisively influence female high school students’ decisions,” says the sociologist. According to her, female students also often have false perceptions of STEM subjects’ content and need to be better informed.

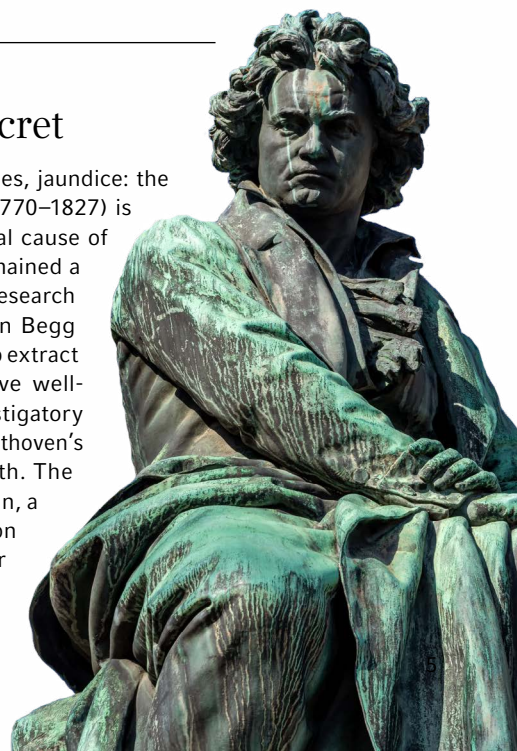


One Night

without sleep biologically ages the brain – by up to two years. Sleep and the age of the brain therefore mutually affect each other, discovered a team led by David Elmenhorst from the Jülich Research Institute. However, somebody who sleeps regularly or only once for just a few hours, should not expect any serious consequences.

The Curls Hold the Secret

Progressive hearing loss, stomachaches, jaundice: the suffering of Ludwig van Beethoven (1770–1827) is well-documented. However, the actual cause of death of the composer genius has remained a mystery, until now: an international research team, under the leadership of Tristan Begg from Cambridge University, was able to extract Beethoven’s complete DNA from five well-preserved curls. Archeogenetic investigatory tools helped with the exploration of Beethoven’s illnesses and the reasons for his death. The results: a mix of genetic predisposition, a Hepatitis B infection, and consumption of alcohol led to his death in the year 1827.



Exquisitely Beautiful and Endangered

Coral reefs are among the most species-rich ecosystems in the world. The “rainforests of the oceans” are indispensable for the health of the planet – while at the same time, they are seriously threatened by climate change.

A journey to four reefs.



The Coral Triangle: An Ocean Paradise

Bright red corals, clownfish, giant clams and, at times, a blue whale. The Coral Triangle, located between the Philippines, Borneo and Papua New Guinea, is home to more than 3,000 fish species and 600 coral species. As well, six of the seven species of sea turtles that exist worldwide lay their eggs right here. There is no other place on Earth that shelters as many different species of animals and plants. Besides three quarters of all known species of stony coral, this area features

extended meadows of sea grass, and mangrove forests grow along the coastlines. Since the currents within the lagoons of the Coral Triangle are weak, a large proportion of the plastic waste that ends up in the oceans on a daily basis is not carried out to sea but instead remains in place, threatening biodiversity. Institutions such as the Coral Triangle Initiative want to expand the protection of the ecosystem by establishing marine reserves.

An aerial photograph of the Great Barrier Reef, showing a vast expanse of coral. The water is a deep blue, and the coral is mostly a vibrant turquoise color. However, there are significant areas where the coral has turned a brownish-white, indicating bleaching. The reef is composed of numerous small, interconnected patches of coral, creating a complex, organic pattern. The overall scene is one of natural beauty, but also of environmental concern.

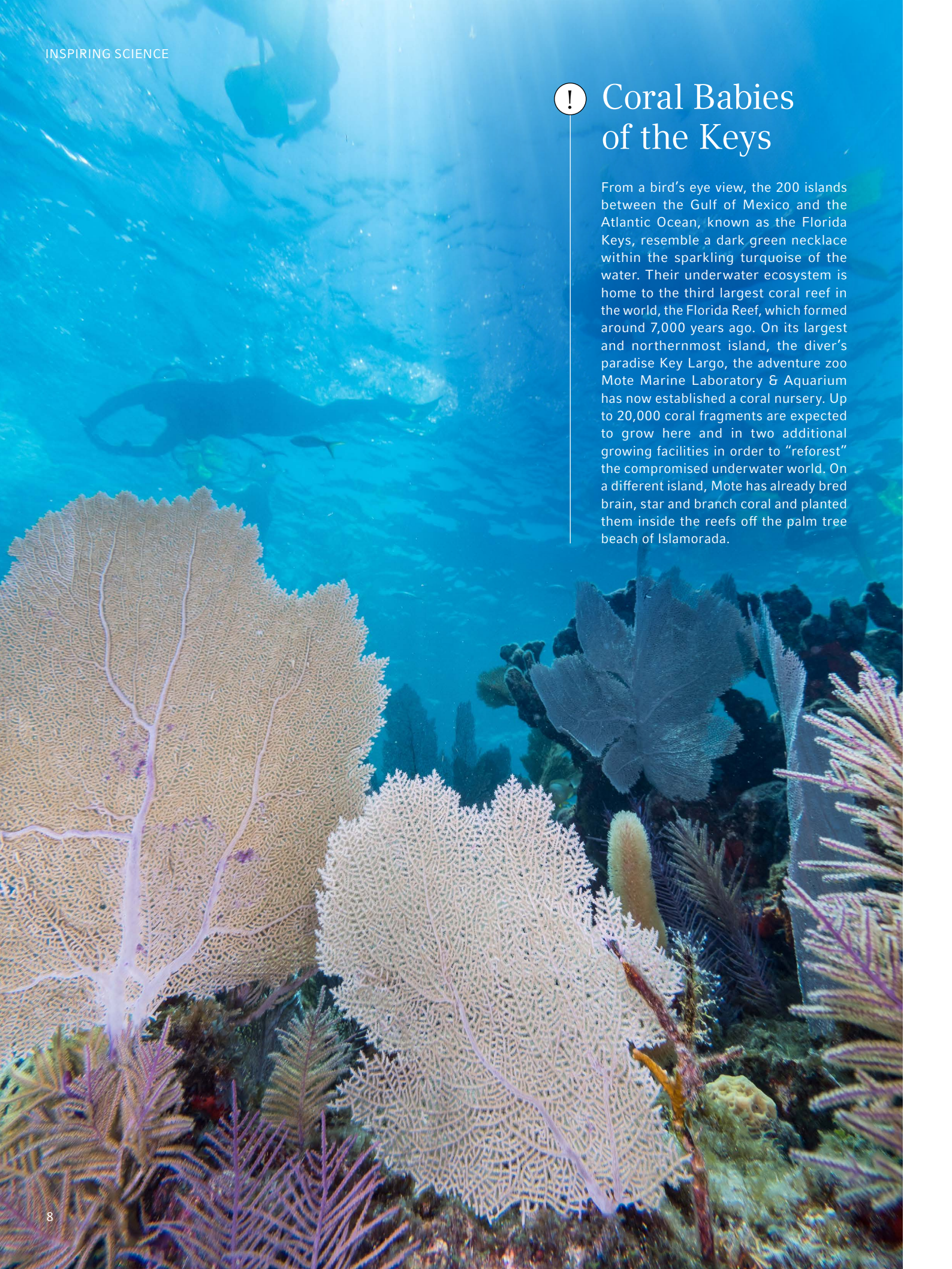
! There is Hope for the Bright Beauty

From space, it is visible to the naked eye: the Great Barrier Reef off the northeast coast of Australia is the most extensive coral reef in the world. It covers an area the size of Germany, and it provides a home to the smallest of all shark species, the wobbegong, as well as the largest – the whale shark. Climate change, however, is taking a toll on the shimmering beauty. Since 2016, it has been plagued four times already by mass bleaching events: due to consistently rising ocean temperatures, corals drive out the algae with which they normally lead a symbiotic existence, and which are responsible for their intensive coloring – leaving behind the chalky-white coral. Saving them is top priority: in 2018, marine biologists of the Reef Restoration Foundation “planted” particularly robust coral in bare areas – this past May, they spawned for the first time. A success that gives rise to hope.



Coral Babies of the Keys

From a bird's eye view, the 200 islands between the Gulf of Mexico and the Atlantic Ocean, known as the Florida Keys, resemble a dark green necklace within the sparkling turquoise of the water. Their underwater ecosystem is home to the third largest coral reef in the world, the Florida Reef, which formed around 7,000 years ago. On its largest and northernmost island, the diver's paradise Key Largo, the adventure zoo Mote Marine Laboratory & Aquarium has now established a coral nursery. Up to 20,000 coral fragments are expected to grow here and in two additional growing facilities in order to "reforest" the compromised underwater world. On a different island, Mote has already bred brain, star and branch coral and planted them inside the reefs off the palm tree beach of Islamorada.



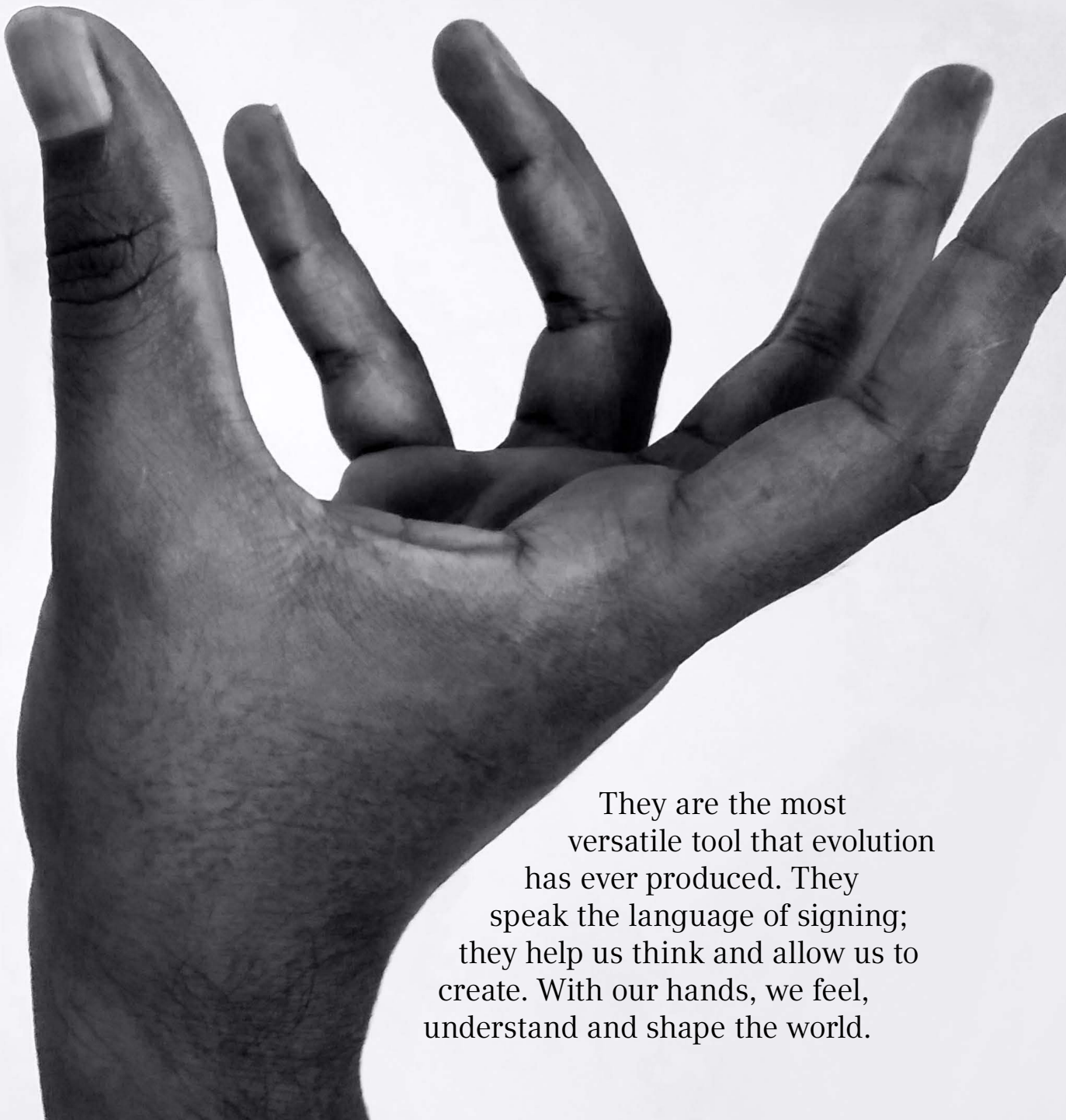


! Undiscovered Jewels of the Deep

By pure chance, this past spring, divers discovered a hitherto unknown coral reef on the crater rim of a sunken volcano, at a depth of 600 meters, off the shores of the Galápagos Islands in the Eastern Pacific. It is a sensation, with its seabats, spiny lobsters, sharks, rays and breathtaking stony coral. Not least because typically, deep-sea coral reefs contain only about

ten to 20 percent live coral, but also because the abundant resident coral is healthy. They show hardly any evidence of bleaching – the process that leads to coral death as a result of global warming. Scientists hope that this very old and untouched, coral reef may be able to help reconstruct marine ecosystems to better understand climate change.

The Hand – A True Marvel



They are the most versatile tool that evolution has ever produced. They speak the language of signing; they help us think and allow us to create. With our hands, we feel, understand and shape the world.

It was kind of a crazy idea”, says cellist Burkard Maria Weber. Together with extreme alpine climber Alexander Huber and a number of helpers, he carried a small piano, as well as a cello, across a narrow ridge to the Heidenpfeiler in a forest in southwestern Germany in June of 2019. The professional musician and Mr. Huber, also known as the “Huberbua”, then climbed the 60-meter-high steep face of this sandstone rock – and proceeded to play “Clair de Lune” by Claude Debussy on this plateau measuring a mere ten square meters.

“Concerto Vertical” was the name of this art-in-action, which made it to television. Climbing star Alexander Huber turned out to be an amazingly good pianist, and cellist Burkard Maria Weber was convincing as a surprisingly confident climber. “We wanted to show what hands are capable of”, explains Weber. They allow for both an extremely powerful performance as well as utmost sensitivity. The 54-year-old who, with his lion’s mane and headband, more closely resembles a rock star than a classical soloist, has no problem amalgamating his seemingly contradictory passions. “Climbing even has a positive influence on my performance”, says Weber, “afterwards my joints and fingers are usually completely nimble.”

Delicate and versatile

Our hands are a marvel. 27 bones, connected by joints and tendons, 33 muscles and three major nerve branches, as well as connective tissue, blood vessels and skin endowed with ultrasensitive tactile sensors form the most delicate and versatile gripping and palpitation tool that evolution has ever produced. The palm of the hand is protected by a strong group of tendons that enables a powerful grip. The average grip strength of a man is equivalent to a mass of 50 kilograms. Women, on average, possess only about half as much strength. Athletes are capable of achieving values that may easily surpass 100 kilograms.

At the same time, most people’s fingers are of a slender and graceful build. This is mainly due to the fact that they do not contain any muscle. They are in fact remote-controlled, akin to a marionette on strings. It is through flexible and durable tendons that they are connected to the muscles inside the palm of the hand, the forearm and even the shoulder. These tools allow people to achieve amazing accomplishments. Beginning with lighting a fire, picking up the most delicate seeds of grain from the ground or weaving a net. All the way to the ability to construct delicate clockwork mechanisms, performing surgery on the tiny hearts of newborns or reading Braille.

His musical climbing act was a special test of endurance for Burkard Maria Weber, as well as a reminder of how sensitive and fragile our hands really are. Two years ago, he hadn’t noticed the closing of an automatic car window, which resulted in the tip of his left middle finger being crushed. When he pulled back reflexively, the articular capsule and the tendons were also injured – unfortunately affecting the very finger that is crucial to the orientation

on the neck of the cello, and therefore accurate performance. “In the beginning, the pain was hellish, returning periodically after months”, recalls the musician. “Naturally, I was immediately worried that I would never again be able to perform music without pain. For us professional musicians, this is immediately existential.”

Yoga for the sensitive body part

Weber sought help from Dr. Jochen Blum, chief physician at Worms Hospital in Germany. Dr. Blum is an emergency and hand surgeon; he also plays multiple instruments, and as a young man he completed his apprenticeship as a violin maker in Siena. For more than 30 years, he has been offering consultations specifically for musicians. “Particularly with musicians, I only operate if there is absolutely no other way”, he says. Often, as in the case of Burkard Maria Weber, an individually adapted mobility training and targeted relaxation exercises will help – a kind of hand yoga. On rare occasions, Dr. Blum will implant artificial finger joints in musicians or replace a thumb with a toe.

According to Dr. Blum, damage or loss of a thumb is particularly tragic as the thumb is the key feature of the human hand. In particular, the flexible thumb saddle joint plays a pivotal role for this universal tool. It is with its help that we are capable of performing a precise pincer grip as well as power grips. Finally, we are also able to securely hold and artfully move pens and screws thanks to our thumb’s rotating CMJ joint.

Diagnosis via palpation and touch

Hands can be employed as an independent sense. They feel the temperature of water; they guide a key securely into the lock in the dark; their fingertips discover imperfections that are invisible to the naked eye. With a little experience, our fingertips will distinguish real silk from artificial silk and leather from imitation leather. A touch is full of fine nuances; it can sense and pass along, tenderness, warmth and closeness.

A close network of receptors and nerve tracts transmits sensations to our spinal cord and brain. For the hand surgeon, their own hands are the deciding tool. To Jochen Blum, palpation and touch are among his most important diagnostic methods: “They often provide me with more information than x-rays or other technical methods.”

During a follow-up visit in his special office hours for musicians, Jochen Blum closely observes Burkard Maria Weber’s cello playing: bowing; the speed of the left hand; the perfection of the vibrato. He then carefully palpates the musician’s hand. It is slender and sinewy. The blood vessels protrude strongly and wind like vines across the back of the hand. The fingertips display the typical callus-formation of a string musician. Dr. Blum examines the flexibility of the joints; he looks for swelling, sclerosis and unusual structures of those ring tendons which lend stability to the fingers. The doctor is satisfied: “Very good, no more serious abnormalities.” Weber is visibly relieved. ■

An Inherent Indulgence

Even from a scientific perspective, chocolate has a lot to offer – after all, this treat is chock-full of surprising facts. We have compiled five.


! Flavoring Agent Identified

Chocolate that tastes of potato chips, cucumber or boiled meat – a rather far-fetched and unappetizing thought. However, this is exactly what the roughly 600 aromas contained within a cocoa bean taste like: they are not at all chocolatey but highly individual. This finding is not new: as early as 2011, Peter Schieberle, then employed at the German Research Institute for Food Chemistry in Munich, together with his team, isolated the basic building blocks of the classic chocolate aroma. The result: only 25 of the several hundred aromas are needed to produce the typical cocoa flavor. It is the combination of these aromas that paves the way to the unique chocolate experience. Schieberle's discoveries thus laid the foundation for the targeted alteration and refinement of chocolate varieties.

! Healthier Than Expected

There is a persistent rumor that those who want to support their health and stay slim should stay away from chocolate. Researchers at the University of Aberdeen, in the group of Chun Shing Kwok, have observed that test subjects who ate up to 100 grams of dark chocolate per day suffered less from heart disease than those who did not indulge. Today, many more beneficial qualities are known. The cocoa bean is considered one of the largest natural sources of magnesium among all foods; it contains antioxidants which protect the body from free radicals; and its consumption raises the “good” cholesterol in the blood. The same rule applies here: the darker the chocolate, the better its quality.





! Happiness in a Cocoa Bean

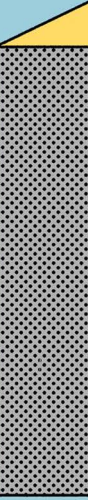
Eating chocolate improves one's mood. This is not entirely due to its flavor: nutritional physician Johannes Georg Wechsler, Head of the Center for Food Medicine and Prevention (ZEP), credits chocolate with a mood-enhancing effect. Chocolate contains the amino acid tryptophan which, in turn, ensures that the happiness hormone serotonin is produced inside the body. It is, however, unclear whether the doses of these ingredients are indeed high enough to influence our mood in a positive way. According to Wechsler, chocolate not only elevates our mood in the short-term, but it can also have anti-depressive effects. That being said, in the case of serious mental illness, it is of course not considered appropriate therapy.

! Effective Stimulant

Chocolate provides comfort in times of heartache; it motivates during stressful phases at work or in school, and according to a study out of the UK, its effect is even akin to that of doping. A team of researchers led by Rishikesh Kankesh Patel at Kingston University wanted to know how the consumption of chocolate would affect athletic performance. To this end, cyclists mounted their bikes and rode for a period of two minutes at moderate speed. Those who had consumed 40 grams of dark chocolate daily in the two weeks prior to this experiment covered farther distances than the control group. Patel's explanation: due to its content of flavanols – secondary plant chemicals contained within the cocoa bean – dark chocolate will expand the blood vessels and thus reduce oxygen consumption during athletic activities in a measurable manner. Improved performance without doping – another item on the list of benefits of chocolate.

! Cocoa Without the Plant

As tempting as chocolate may be, we have an uneasy feeling as sugar and fat-laden chocolate enters our shopping cart – and its climate footprint also leaves much to be desired. For a bar of chocolate to make it to the checkout, rain forest must give way to the cultivation of cocoa beans. Furthermore, long transport routes to their destinations contribute to climate stress. There may be light at the end of the tunnel: Regine Eibl and Tilo Hühn of Zurich University of Applied Sciences have succeeded in growing cocoa from the seeds of a fruit in the laboratory and use this to make chocolate. Their method is called "cellular agriculture", where natural processes are imitated in a bioreactor. "You can make as much chocolate as you like", says Tilo Hühn. Entirely without sunlight, soil, pesticides and fertilizer. At this time, however, climate-conscious consumers are asked to be patient: today, a 100-gram bar of chocolate made in the lab would cost close to 200 euros.



A City for People

Short distances, fewer cars – this is the basic idea of the 15-minute city. Everything important should be accessible fast – on foot or by bike. City planner Marcel Cardinali from Bielefeld, Germany, knows what this concept should look like in practice

Climate: Parks, Not Parking Lots

Most cities are characterized by car traffic. The consequences: an immense need for space and high emissions. The 15-minute city, on the other hand, is constructed in such a way that as many destinations as possible may be reached within 15 minutes, either on foot or by bike. This includes shopping and sports activities, work or a visit to the doctor. Destinations outside this radius are conveniently connected via public transit. As a result, as residents are less dependent on cars, a large proportion of mobility-linked emissions are eliminated. An additional bonus: ground thus far sealed will be repurposed in a climate-friendly manner. Parking lots could be parks, and traffic lanes could become pedestrian precincts lush with vegetation.

Society: Rediscovering Conversation

A city designed for cars separates people from one another. Motorized individual traffic reduces opportunities for exchange between societal groups. The chance encounters that are so typical for a park or the bus will not happen if one sits alone in the car. The 15-minute city offers opportunities for once again allowing conversation between different people and social backgrounds – simply through their physical presence of being in the same place at the same time. Even people's identification with their own place of residence, as well as their sense of community, could be enhanced in this way.

Health: More Exercise Throughout the Day

The World Health Organization estimates that by 2030, 500 million people worldwide will suffer from illness as a result of inactivity. More sports activities would help, for sure. But covering our daily distances not in the car, but on foot or on bike, has a great effect. The 15-minute city provides its inhabitants with incentive to move more. Shops

supplying daily needs are within walking distance; green spaces and car-free zones invite one to stroll with friends and family. One positive side effect: spending valuable time together enhances psychological wellbeing. It is certainly a lot better than being stuck in traffic – an unfortunate reality for many in today's big cities.

Economy: More Flexible Work

Over the past years, the world of work has undergone substantial changes that are summarized by the buzzword "New Work". The amount of co-working space has risen, and, due to the COVID pandemic, working from home has become commonplace. A proportion of workers can now carry out their work entirely digitally; commuting by car is a thing of the past for them. This is how the 15-minute city works perfectly with the idea of more flexible work. People who work in their neighborhoods spend more time there, even during the day, than they would if they were to commute to the office, thus generating the required customer base for shops, cafés and pharmacies.



THE CITY SCIENTIST



Marcel Cardinali is a city planner and researcher; he teaches at the OWL University of Applied Sciences and Arts (Germany), and he is a member of the board of directors at the Institute for Design Strategies (IDS). Marcel Cardinali also works on the Horizon 2020 research project URBiNAT, leading a team of researchers who study the “impact of nature-based solutions on health and wellbeing”.



“Developing Individual Solutions on a Neighborhood Level”

Why are so many cities geared strongly towards cars?

Marcel Cardinali: The cities of Europe have grown historically over centuries. The core contains the city center, with dense structures originating in medieval times that had been built for walking-distance travel. Industrialization introduced factories, which were built surrounding the city center. The proximity of these industrial plants to living quarters led to such extreme health problems that in 1933, based on the Athens Charter, a “sorted city” arose – in particular, the separation of working and living areas. After the Second World War, it became possible to live in modern housing units away from the rubble, with plenty of green space right outside one’s door. Longer distances were among the consequences, making a large proportion of society dependent on cars.

How can such cities transform into 15-minute cities without cars?

The cities of Europe have already been built – although they are subject to continuous transformation. Such changes always affect existing structures. The “New Leipzig Charter on Sustainable European Cities”, adopted in 2007, thus speaks of multi-level cooperation and a localized approach. For these reasons, it must be possible to develop individual solutions on a neighborhood-level while including all stakeholders involved. Due to climate change, a heightened level of awareness of this topic already exists among governments and residents. After all, in this country, motorized road traffic is responsible for roughly 15 percent of CO₂ emissions.

And what if new neighborhoods are planned and built?

Helpful perspectives for the planning of new neighborhoods include the human scale and the needs of future residents. We are talking about daily urban systems. If the daily life of all residents can be well reflected within the neighborhood, and if their lines of movement cross paths in a single place with public transit, much has been gained. Commercial units, day care centers, schools and co-working areas ensure vibrancy throughout the day. A walking distance of 15 minutes provides a rough guideline for the maximum expansion of the neighborhood. ■



An Optimistic Outlook on Life

It is not always easy to “think positive” – and the benefits are limited when it comes to feeling better. Instead of tinting negative thoughts with a rose-colored brush, it is better to consciously guide one’s thoughts towards something truly positive.

He who expects the worst is prepared for any eventuality. And those who do not expect anything will not suffer disappointment. The motto of dyed-in-the wool pessimists is “If it can go wrong, it will go wrong”. And so, every morning, they are disillusioned all over again. The meeting with the boss: What’s the point? Brainstorming among colleagues? A waste of time. The end of their miserable day, filled with negative soliloquy, is most likely spent in front of the television where the evening news will serve to confirm their view of the world. “Why don’t you try thinking positive”, is what pessimists are often told. If it were only that simple.

The glass is half full and not half empty! Think positive, and you will succeed! Every crisis is an opportunity! Supposedly encouraging advice such as this has been promoted by numerous self-help books, influencers and other well-meaning experts – and not only since the pandemic. In essence, what is being pushed is the effort to positively influence one’s thoughts on a continual basis. The hope behind this method of thinking, which is not a therapeutic measure in cases of depressive illness: a basic optimistic attitude leads to increased contentment and a happier life.

Optimists lead healthier lives

A positive outlook is indeed important for our well-being. For example, a team led by Alan Rozanski at Mount Sinai St Luke’s Hospital in New York, has shown that a fundamentally positive attitude lowers the risk of cardiovascular illness whereas pessimists have a higher risk of heart disease. Psychologist Martin Seligman of the University of Pennsylvania further discovered that pessimists who attribute their failures to personal weakness suffered more frequently from depression than people who chalked their failures up to experience and set out to do better next time. In a study looking at insurance salespeople, he even observed a connection between a positive attitude and performance: optimistic representatives sold 37 percent more policies than pessimists. A brain scan study conducted at Stanford University showed that positivity even enhances brain performance. The researchers studied the attitudes of elementary school students towards the subject of mathematics. They found out that a positive attitude towards the world of numbers allowed the brain to work faster when it came to calculations.

The caveat: a fundamentally positive attitude can hardly be achieved through positive thinking ►

Mindset

Whether you look at things negatively or see the good depends on your inner attitude

alone. First of all, especially those who tend to paint a bleak picture have a hard time turning their thinking around. Most of all, however, the advice to think positive often implies the suggestion of pushing bad feelings aside, with the result that this persistent embellishment suppresses negative emotions – which, according to studies, will potentially trigger stress.

Stress though “toxic positivity”

If the pressure to think positive originates from external sources, there is a chance that it will even increase negative emotions. “An excessive emphasis on positivity in contrast to negativity can create an unachievable standard which, ironically, compromises individual wellbeing”, says Egon Dejonckheere at Tilburg University who, together with colleagues from 40 countries, published a multinational happiness study in the journal “Nature”. The perceived social pressure not to feel negative plays an inciting role in depression, states Dejonckheere. Especially in countries with a higher global happiness index, this high level of happiness carries disadvantages for some people: it increases their risk of depression. In this case, the pursuit of happiness and perfection has the opposite effect – a phenomenon that is currently discussed in social media and that is known as “toxic positivity”.

Depressive illnesses warrant professional treatment. If, on the other hand, the goal is a more positive outlook on life, positive psychology offers a promising alternative to positive thinking. The “science of a successful life” concerns itself with the positive aspects of being human, including happiness, optimism, a feeling of safety, trust, individual strengths, forgiveness and solidarity. In practice, positive psychology offers a positive fundamental attitude by intentionally directing one’s focus towards the true positive aspects of one’s life using regular exercises (see p. 20) – without blocking out the negative. A flower growing from concrete is capable of bringing as much joy on a miserable day as praise from a colleague or being complimented by our partner. And instead of being upset about a bad presentation, I focus on the positive: I conducted a successful conversation with a customer, and later I helped a friend.

Moving away from weaknesses and deficits

Whereas in the second half of the 20th century, psychology focused on human “deficits”, towards the end of the 1990s, Martin Seligman, then president of the American Psychological Association (APA), was the first to emphasize the





*We can change our brains
by rearranging our minds
and cultivate mental habits
which improve our
wellbeing.”*

Richard Davidson,
University Wisconsin-Madison

advantages of “positivity” with respect to a sense of happiness, health and success. Since that time, this approach has also been dominating psychological research. Numerous studies indicate that our positive emotions help us navigate the difficulties of life more easily. Especially those who learned to view the world as a good place early on will have an easier time in life, found a team led by Angela Lee Duckworth at the University of Pennsylvania. People did better in life who thought that while the world posed dangers, it was overall a good place.

Unfortunately, many of us are not blessed with such a sunny disposition as evolution has taught us to be alert and prepared for danger at all times. When we humans still had to flee the sabre tooth tiger and our lives were constantly at risk, the “fight-or-flight” reaction secured our survival. This focus on threats has become an integral part of our brains. In the modern world, however, it is the cause of much unnecessary pessimism as our lives are rarely in actual danger. Instead, stress and negative thinking harm our health – and therefore, we ourselves represent the largest obstacle on the path to more positivity.

Our brains never stop learning

Will the pessimists among us be able to succeed in focusing on the positive? The good news is: Yes! “We can change our brains by rearranging our minds and cultivate mental habits which improve our wellbeing”, says Richard Davidson from the University Wisconsin-Madison. Characteristics such as resilience, empathy and emotional stability are anchored in our brains, and they can be shaped and changed through experience and training. According to Davidson, mental training with the goal of supporting wellbeing will have positive effects, for example, in the workplace – including leadership, creativity, staff health, productivity and collaboration.

No therapy is required in order to learn positivity – only regular practice. For example, the free App “Healthy Minds Program”, developed by Davidson and his team, is designed to help people make positive changes in their lives with only five minutes of mindfulness training per day. The everyday methods of positive psychology (see p. 20) often show remarkable effects: cannabis users who, during the course of a study, identified three positive aspects of their lives every evening for two weeks, went on to consume considerably less cannabis. Whether by App or using everyday methods: regular exercises make the difference. This is how the brain can be trained to focus on the positive. Sticking with it is worth it. ■



Happiness Can Be Learned

Every day presents us with plenty of reasons to despair. Nevertheless, by applying just a few scientifically tested tips and tricks, it is possible to train positive emotions – and thus strengthen wellbeing and self-healing powers.



Separate Fact from Fiction

1

Who is not familiar with these internal monologues that we use to berate ourselves: “I am always losing my things.” “I never let anyone finish their sentence, and this is why nobody likes me.” If the inner voice is programmed for pessimism, we will eventually believe all this negativity, warns Travis Bradberry, co-author of the bestseller “Emotional Intelligence 2.0”. One thing is certain: of course, we sometimes lose our things but not always. And we mostly let other people finish their sentences. Bradberry’s tip: write down your negative thoughts. If we stop our train of thought in order to make notes, the negative dynamic will also slow down – and we are able to test the amount of truth contained within our pessimistic thoughts in our own good time. Our brains have a tendency towards exorbitant exaggeration when it comes to the perceived frequency or gravity of an event. If our thoughts include words such as “always”, “never”, “consistently”, etc., these statements are incorrect. Most of the time. ▶



2

! Find the Positive

Even during the worst of times, positive things will happen to us, points out psychologist Judith Moskowitz from Northwestern University in Chicago. She trains positive emotions with gravely ill people. She advises them to identify a positive experience every day, however insignificant it may seem. Her tip: savoring the moment or telling someone about it. Patients who fell ill with HIV or diabetes were better able to cope with the stress of their disease following these positive emotion-based exercises. A simple way of elevating positive everyday events into one's consciousness: the "bean method". "For this approach, I place five dried beans in my left pant pocket in the morning", suggests Moskowitz. "Every time something good happens to me, I transfer one to my right pocket. In the evening, the beans will tell me how many times this day has presented me with something good. At that time, I should also revisit the concrete events that made the beans move from one pocket to the other.



3

! Keep a Gratitude Diary

The gratitude diary is another classic among the exercises of positive psychology. According to a study published in the "Journal of Personality and Social Psychology", regularly writing down of a minimum of three things for which we are thankful is proven to enhance positive emotions. This includes not only pleasant events – such as, for example, the effusive praise offered by the colleague. Small things, too, like the ray of sunshine falling through the leaves in the forest, are worth mentioning. Not least, we are reminded to honor our own personal and professional successes as this will strengthen our self-confidence and optimism. According to other studies, a gratitude journal is also connected with better sleep, improved cardiovascular health, decreasing pain and fewer depressive symptoms.



4

! Be Good to Others

A good deed every day: those who bring joy to others and thus strengthen their wellbeing are doing themselves a favor at the same time. This is what is behind the concept of "random acts of kindness". The recommendation: one friendly deed per day benefiting another person. Even small things may make a huge difference – from a friendly compliment for your neighbor to a donation for the homeless. A Japanese study on the meaning of friendliness in the context of the creation of subjective happiness, published in the "Journal of Happiness Studies", has shown that those who regularly write down their positive actions will give their optimism an extra boost. The participating students who had counted their own friendly actions over the course of a week increased their subjective feeling of happiness. Moreover, happy people will become even more friendly and grateful by also counting their friendly actions. The benefits of kindness are evidently not limited to the recipient alone.



! Surround Yourself with More Optimists

"Tell me with whom you associate, and I will tell you who you are": Many children will sooner or later be confronted with this quote by Johann Wolfgang von Goethe. It does contain a grain of truth, as according to researchers, emotions are contagious, the negative as well as the positive – a phenomenon known as "social contagion". According to sociologist Nicholas Christakis of Harvard University, happiness is transmitted from one person to another like the flu. If people who are close to us are happier when we are together, we ourselves will become happier. The flipside: if we are often in contact with negative people, the negativity can rub off on us. This is not only true for individuals: a miserable boss can poison the atmosphere in their entire department. If, on the other hand, you surround yourself with positive friends and colleagues, their optimistic outlook and positive stories will benefit your own thoughts and mood. This is why mother is right when she advises: choose your friends with care!

5

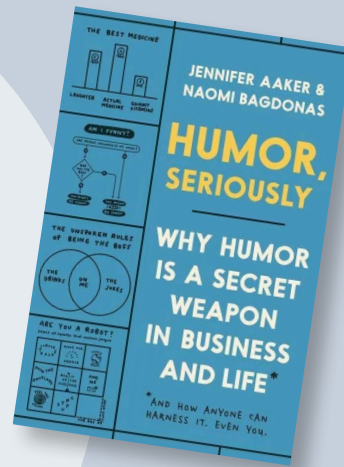


Humor, Seriously

Why humor is a secret weapon in business and life

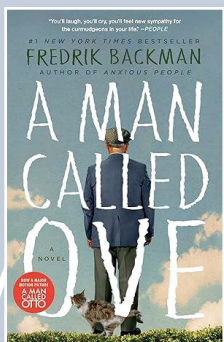
Psychologist Dr. Jennifer Aaker and comedian Naomi Bagdonas teach a course about the profound potential of humor at Stanford's Business School. Their book "Humor, Seriously – Why Humor is a Secret Weapon in Business and Life" breaks down the positive effects of humor on our lives and careers. Especially in workplaces humor seems underrated. Their studies show that humor has the power to boost our self-esteem and increase our sense of competence. This topic and book are so relevant that they have their own website: <https://www.humorseriously.com>

Jennifer Aaker & Naomi Bagdonas, 272 pages, Penguin Random House, approx. 21 euros



The Magic of Fun

Humor is an important part of positive psychology. Many a problem can be defused with just a little good humor. Give it a try!



A Man Called Ove

Ove is one of those people who walk through life with a bleak outlook. The pensioner is grumpy with his neighbors; he does not like children, and

he reports parking violations. Black humor is his daily companion – until a family moves in next door who will turn his life, with all its principles, on its head. The screen adaptation of the eponymous bestselling book by Fredrik Backman shows in a touching and at the same time sarcastic manner how a seemingly humorless person learns to take life easy.

Amazon Prime Video, approx. 6 – 10 euros

The Happiness Manual

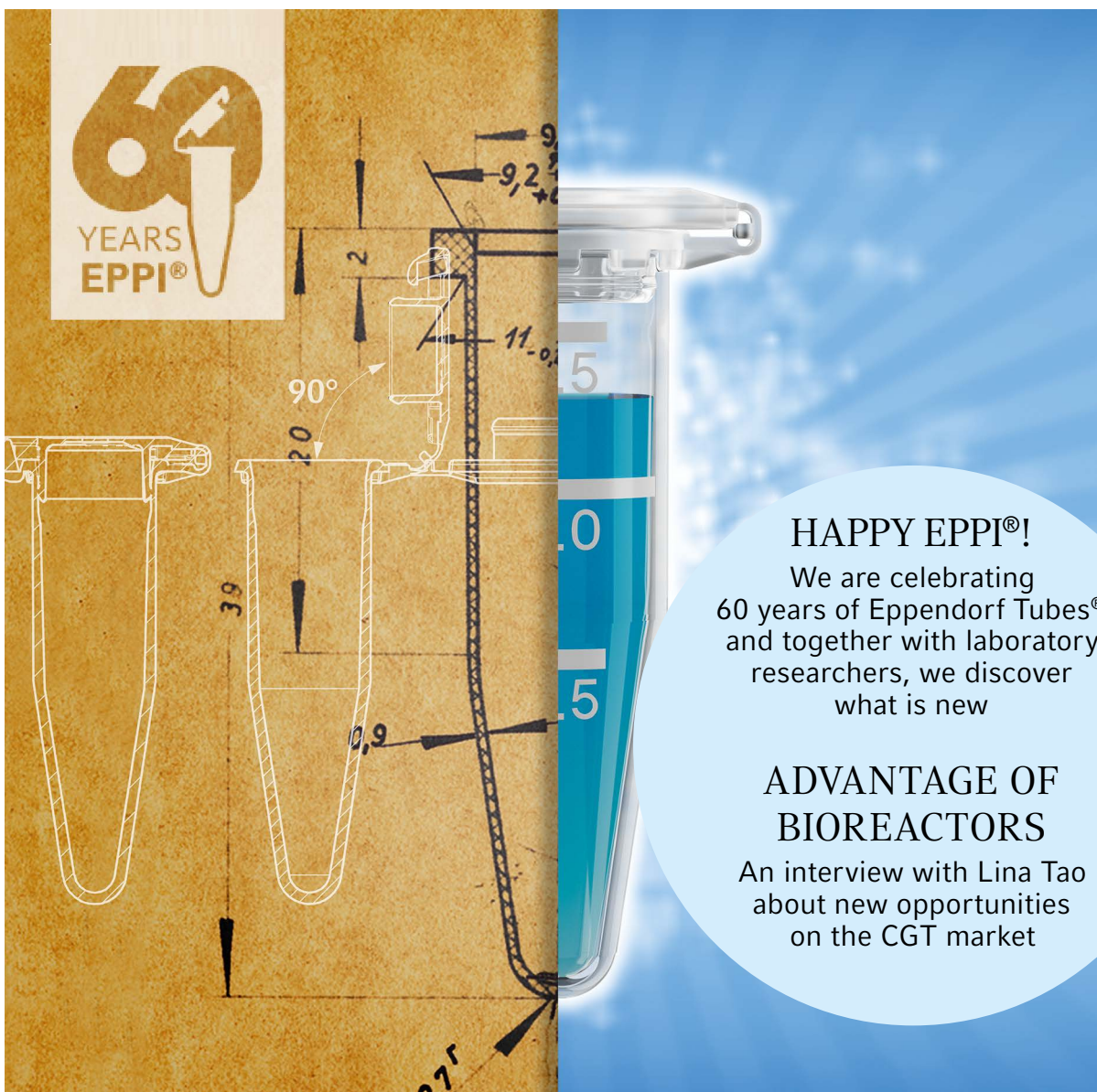
The word "humor" alone comprises much advice for an easier life, which may be derived from the five letters alone. Those who take them to heart have a more positive outlook:

- H** Here & now: paying mindful attention to what is
- U** Unto others: do something that benefits others
- M** Manage your mood: collect moments of happiness and humorous experiences; focus on what is good for you
- O** Orientation: what is it that is really important to me? Will it really help me if ...
- R** Repertoire of one's ways of thinking and acting – expand it! What is the positive that I can find in it? How else could I react?



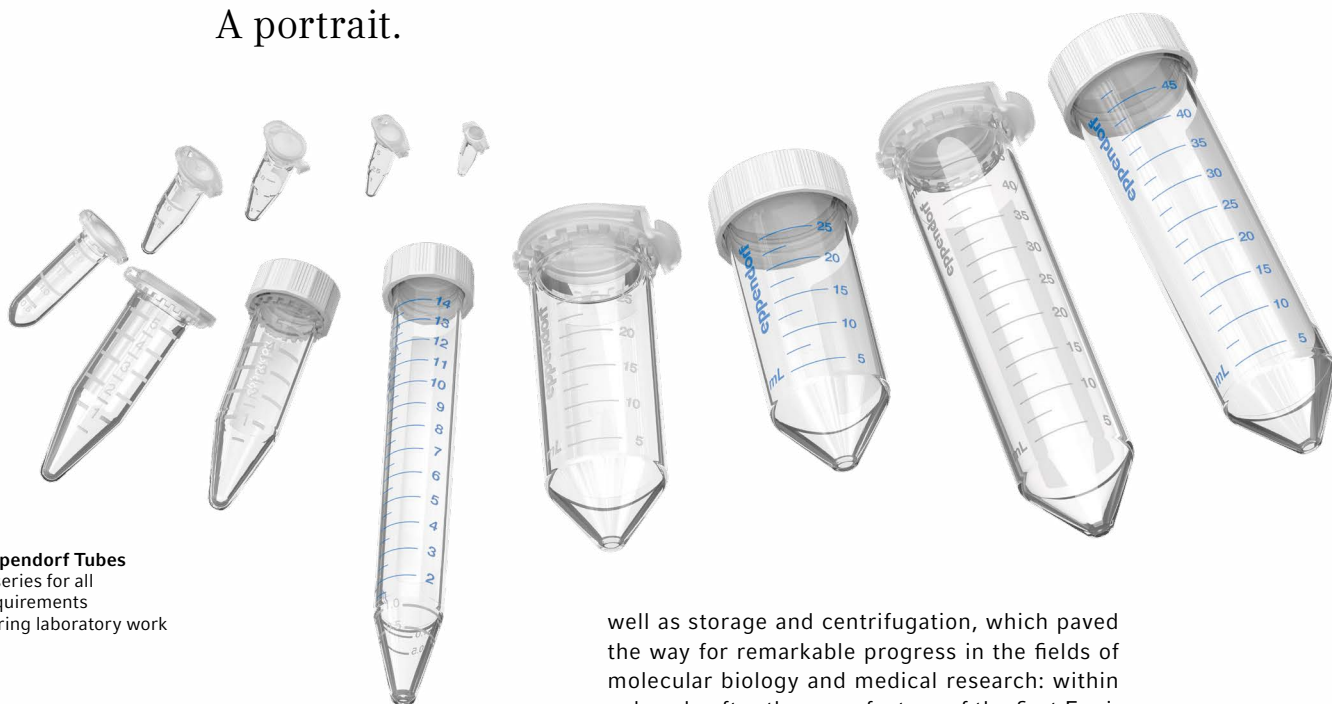
INSIDE Eppendorf

Eight pages are dedicated to interesting facts from the world of Eppendorf: the anniversary of the Eppi[®], an interview on the topic of bioprocessing – and what MiniSpin[®] is doing in space.



60 Years of Eppi®: Supporting Research

For six decades the Eppendorf Tubes® have been a guarantor of scientific discovery. A portrait.



Eppendorf Tubes
A series for all requirements during laboratory work

Eppendorf Tubes have always been a cornerstone among the consumables in the laboratory. As the first microcentrifuge vessel on the market, the Eppi has thus far been sold more than one billion times, and it has become synonymous with microcentrifuge tubes overall. Beyond that, the invention of the Eppi led to the development of a comprehensive series of Eppendorf Tubes – together with compatible laboratory instruments and consumables which defined the global standard for quality and performance.

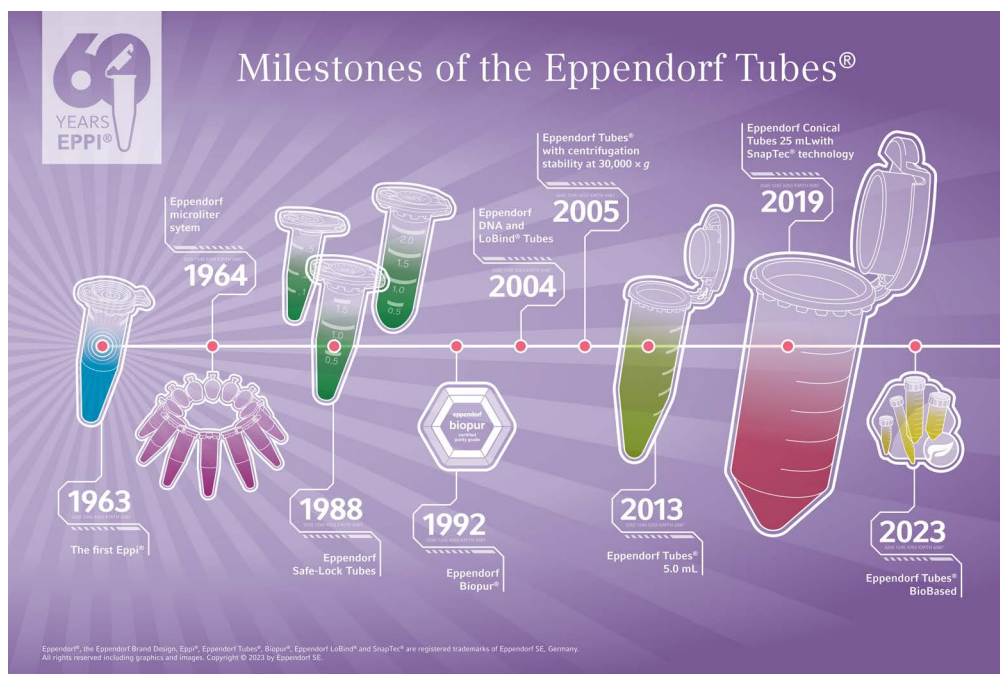
Small solutions solve big problems

The introduction of the Eppi tube revolutionized the way in which scientists measured small volumes of reagents and samples as these volumes could now be noticeably reduced. The “Tube 3810”, for example, allowed the mixing of samples as

well as storage and centrifugation, which paved the way for remarkable progress in the fields of molecular biology and medical research: within a decade after the manufacture of the first Eppi, gene cloning and PCR, as well as life-saving vaccines against hepatitis B and meningitis, were developed.

From tube to centrifuge

With the increasing popularity of the Eppi, scientists recognized a greater need for compatible laboratory benchtop instruments and consumables. In response, Eppendorf developed the microliter system for comprehensive sample processing solutions in the microliter volume range. The series comprised a mixer and a centrifuge as well as Eppendorf Tubes, which continue to make up the core of laboratory work as well as the Eppendorf product portfolio. In addition, since its launch in the year 1964, the microliter system has expanded even further, leading to today’s selection of pipettes, centrifuges and mixers, which is complemented by Eppendorf Tubes as well as pipette tips: it is now possible to process sample volumes between 0.2 mL and 50 mL.



Long tradition
The success story of the Eppendorf Tubes® – summarized on this poster

The innovations did not stop here: with the development of improved Eppendorf Tubes, which solved some of the most important problems, Eppendorf has taken its portfolio a step further. In addition, thanks to the development of new materials, designs and closure systems, the Eppendorf Tubes series have grown to conquer the challenges of a vast variety of applications.

Eppi evolution

Notable developments within the Eppi design include the Safe-Lock Tubes which prevent unintentional opening of the lid during centrifugation, incubation and storage. With the purity grade Biopur®, the Eppendorf Tubes set a further example: it met the highest demands from research as well as the medical, pharmaceutical and food industries, and it has now become the industry standard. With guaranteed freedom from RNase, DNase, DNA and ATP, as well as freedom from PCR inhibitors, plus sterility and freedom from pyrogens, all Biopur products offer the highest level of purity.

The next important milestone represented the development of DNA and Protein LoBind® Tubes which enable nearly complete recovery of DNA, RNA, protein and viruses. These tubes are particularly well suited to difficult experiments with valuable nucleic acid or protein samples and reagents.

These developments contribute significantly to increased efficiency, accuracy and safety when it comes to laboratory work. For example, Safe-Lock Tubes prevent sample loss in the context of

centrifugation, incubation, transport and storage, offering scientists additional security and confidence with respect to the storage of valuable samples and work with dangerous substances. This can prove especially critical in the context of shipping samples to other institutions for the purpose of collaboration or outsourcing.

And the next 60 years?

In recent times, Eppendorf has been focusing on inventions which are meant to help meet the challenges of a changing world. As a company dedicated to the production of forward-looking technologies and high-quality products and services which improve the standard of living of humans, aspects of sustainability are increasingly gaining in importance: Eppendorf wants to mitigate the effects of climate change on future generations – which is made possible, for instance, by the reduction of the environmental impact of packaging of single-use laboratory consumables. In 2022, Eppendorf Tubes Biobased were introduced: these vessels consist of a minimum of 90 percent recycled raw materials, which improves the sustainability of daily laboratory consumables without compromising the quality or the performance of the products.

Even 60 years ago, Eppi and other Eppendorf innovations succeeded in supporting researchers in their complex work. The next 60 years will not be any different: new technologies and products by Eppendorf will continue to support and encourage scientific excellence. ■

<https://bit.ly/439Sjem>

“Conquering Challenges Together”

Lina Tao and her team at Eppendorf Bioprocess Sales & Service help customers develop novel cell and gene therapies.

Dr. Tao, you have been leading the Bioprocess Unit at Eppendorf since early 2023. Would you like to tell us a little about your career so far?

I was born and raised in Hong Kong, and I have been working in the biology and life sciences sector for more than 20 years. Like most of my colleagues on the Eppendorf Bioprocess team, I am a scientist by education. During my time in the lab, I began working more closely with the marketing department to get to know and interact with customers. After holding positions in marketing and product management, I decided to join sales in 2005. This is how I came into contact with a company known as DASGIP GmbH, now part of the Eppendorf Bioprocess Unit. When I was offered the opportunity to lead the Eppendorf Bioprocess Unit, I did not hesitate for a second.

What are some of the key challenges facing the cell and gene therapy (CGT) market today, and what are the solutions that Eppendorf offers?

The past years have seen a number of breakthroughs; yet the establishment of standards and protocols, as well as practical application experience, remain a priority. One significant step forward has been achieved through shifting the

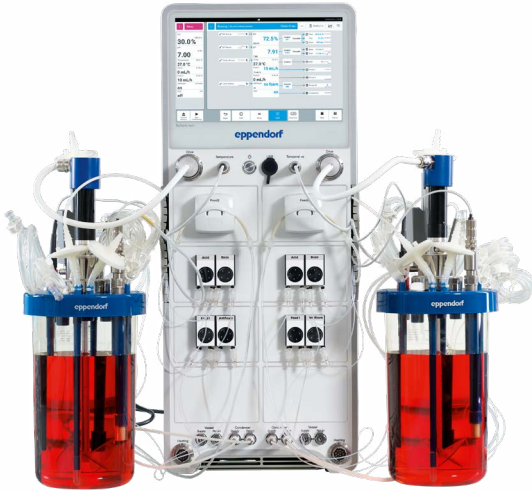
focus from autologous to allogeneic applications in industry, thereby expanding the potential reach of the respective therapies. But this now brings more challenges as the process must be standardized and scalable. Eppendorf Bioprocess bioreactors are the optimal solution for this task as they are scalable and allow high cell yields. Even sensitive cells such as stem cells can be cultivated in the stirred system. We have been cultivating stem cells for more than a decade now, and today, our customers achieve cell numbers of more than 35 million cells per mL! Bioreactors are superior to traditional 2D cultivation platforms in multiple ways: one advantage is that they can provide a more physiologically relevant microenvironment for cell culture, with improved mass transfer as well as improved nutrient distribution and waste removal (perfusion). They can facilitate the production of more complex cell types. In combination with the single-use technology of our BioBLU® system, they can provide additional advantages such as improved process flexibility, reduced risk of contamination, and easier scale-up. We are convinced that single-use bioreactors will become the new industry gold standard for CGT bioprocesses.

How does Eppendorf Bioprocess support its customers in the development of new cell and gene therapies?

We offer a range of solutions for the development of CGT therapies. Our bioreactor systems offer flexible and customizable platforms for the optimization of cell expansion and cell differentiation, as well as for the expression of viral vectors. Approximately 10 years ago, we introduced the first BioBLU single-use bioreactor which turned out to be an excellent problem solver for “pain points” in the development of complex processes such as CGT therapies. Since that time, we have continually expanded our portfolio, and with our BioBLU single-use bioreactors, we cover the perfect volume range that our customers require for the development and optimization of their CGT therapy processes (~60 mL), with the option of scaling up to 40 L. Moreover, our portfolio includes state-of-the-art software tools for process control to ensure a consistent and reproducible process. In this way, we are equipped to assist our customers in achieving success in the development of new CGT therapies.

You are familiar with the needs and demands of customers – is this the formula of success which will keep the

Clear priority
Lina Tao and her team
focus on improving
the processes of
Eppendorf customers

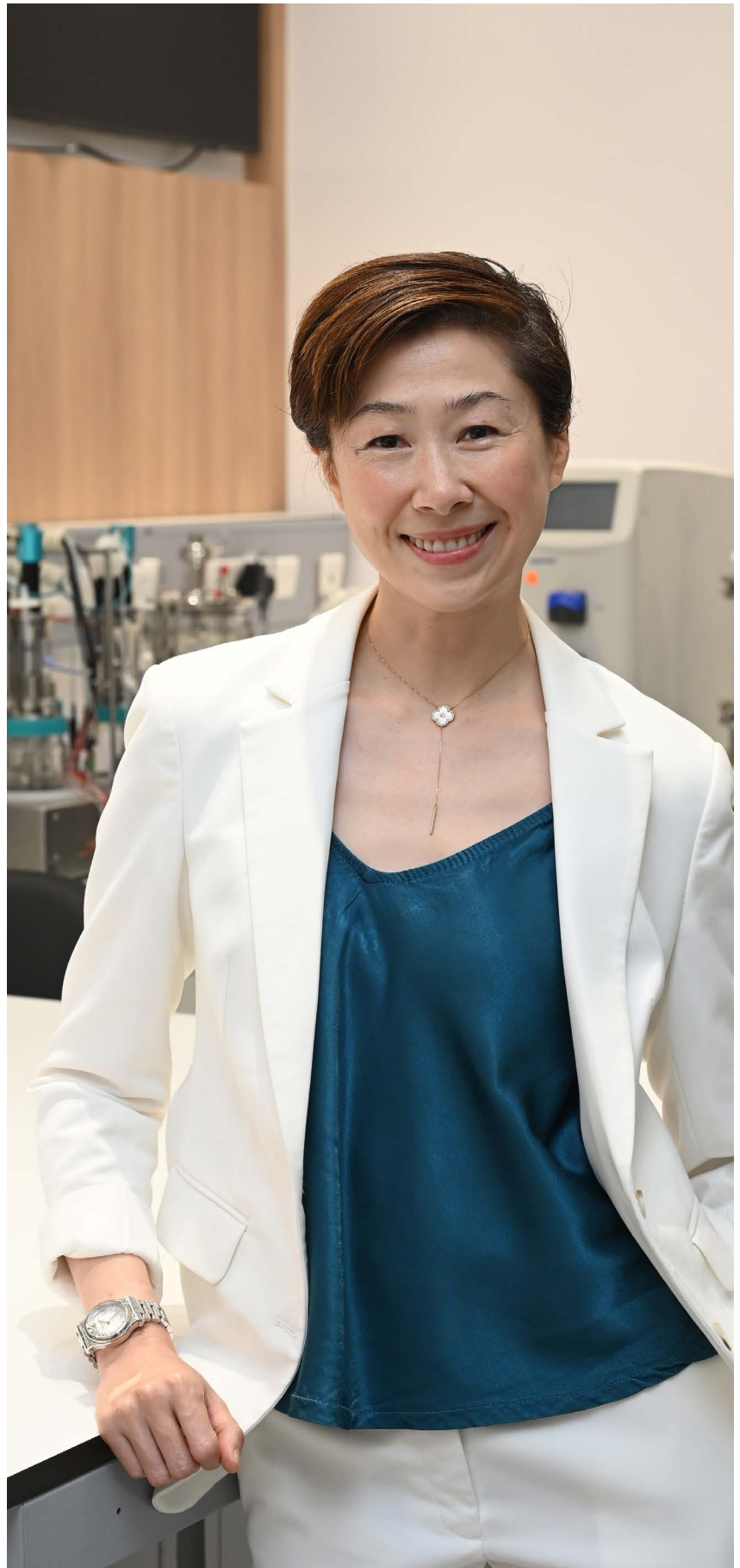


Eppendorf Process systems at the forefront of innovation?

Exactly! We take the approach of listening to and understanding our customers' challenges and pain points. And we aim to develop solutions needed to overcome these challenges. This is only possible thanks to the experience of our sales, service and in-field applications team which is active globally in all regions. We are engineers and scientists, and we are always looking forward to improving our customers' processes. The collaboration with our customers is an essential part of the Eppendorf DNA. With this, I encourage everyone to get in contact with us. We are always open to collaborating and co-developing together with our customers.

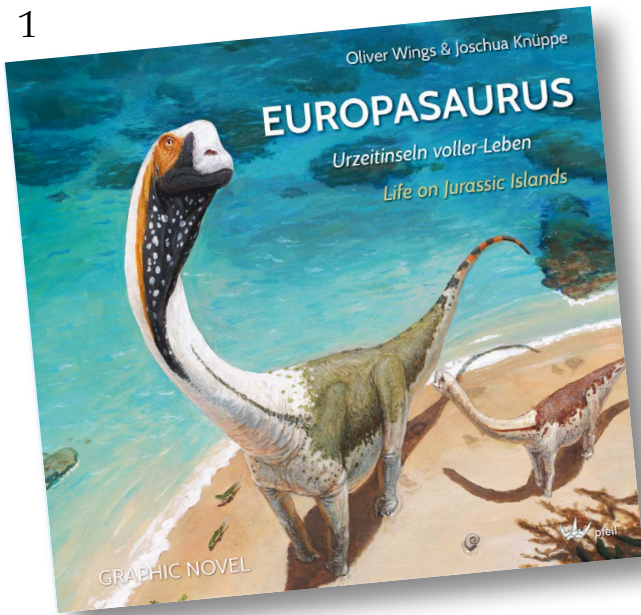
Finally, what message would you like to convey to potential customers and partners?

Since its founding in 1945, it has been the mission of Eppendorf to improve human living conditions. With this in mind, we at the Eppendorf Bioprocess Unit will do everything in our power to support our customers in bringing life-saving therapies to the world. ■

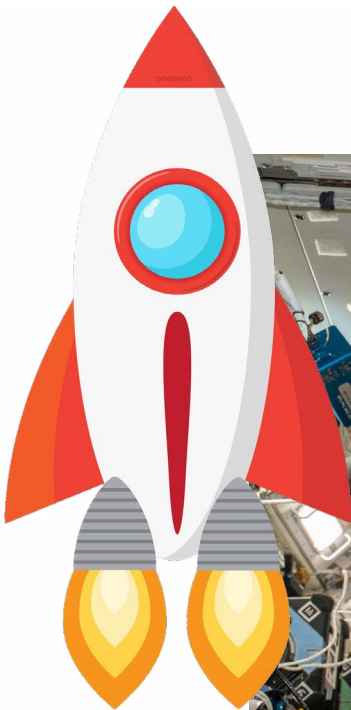


Lab

1



2



3

Lifestyle

1 Visually Powerful

It had a small head, a long neck, an even longer tail – and its stocky body was supported by short, strong legs. The sauropod dinosaur “Europasaurus”, whose fossil remains were found near Goslar in Lower Saxony, Germany, is the star of the eponymous graphic novel by Oliver Wings and other paleontologists. With this comic book, published in 2020, the head of the Natural History Museum Bamberg and member of staff at the Bavarian Natural History Collections (SNSB) intends to make the prehistoric world of this genus of dinosaur more tangible to interested lay people –

in an entertaining fashion. The researcher and his team are further interested in studying to what degree the comic is the suitable medium for this undertaking: to this end, they collected a variety of paleo comics worldwide and analyzed them. Their conclusions: dinosaur comics not only clear up common misunderstandings, but they also convey useful sources of information as well as infuse fun into education. It is the goal of the researchers to inspire others to also give graphic novels a try.

<https://youtu.be/ftkxBgQJslM> <

3 Mini Instrument on a Major Mission

In space since February, tested multiple times – and now deployed: the MiniSpin® centrifuge by Eppendorf was used for the first time in the International Space Station (ISS) in late May. “The long wait has finally come to an end, our MiniSpin centrifuge works in space!” Michael Blumentritt, Head of Product Innovation Separation & Instrumentation and responsible for the MiniSpin deployment in space, is overjoyed. “We help researchers on Earth and in space do their work – brilliant.”

First, astronaut Frank Rubio subjected the MiniSpin to a test at an elevation of roughly 400 kilometers, before it saw action during live experiments. This was the occasion of another premiere: four experiments were conducted by the first female astronaut from Saudi Arabia, Rayyanah Barnawi.

Multiple experiments – no problems

“Our centrifuge mastered a number of different experiments without any problems”, elaborates Michael Blumentritt. “Our work mainly centered around demonstrating that the thawing of stem cells from the state of cryopreservation could be carried out successfully and safely in space.” The Eppendorf centrifuge fundamentally simplifies research in space: until now, cells had to be kept alive for several days – a process that was not without challenges, especially during launch and the subsequent transport to the ISS. Thanks to the MiniSpin, frozen cells can now be transported to the Space Station. Blumentritt proudly states: “This is a groundbreaking change for space science.”

www.eppendorf.com/minispin <

2 Securing Knowledge

Dive deep into the Eppendorf Lab Channel, our virtual event platform, and discover a wide variety of webinars – live and on demand. From practical tips for your daily laboratory work all the way to lectures on the topics of digitalization and sustainability in the lab, we offer you a bandwidth of different topics. Our special feature: you have the option of interacting directly with our Eppendorf experts. Ask your questions and benefit from our expert knowledge. The upcoming year has another highlight in store for you: the Analytica exhibition in Munich, from April 9–12, 2024, at which Eppendorf will once again be represented with an exhibition booth and auditorium. As in 2022, you will be able to participate in different lectures through the Eppendorf Lab Channel.

Ready for a knowledge leap? Register for free today.

eppendorf.link/labchannel <

Short and Sweet

Sustainability is the topic of the hour at Eppendorf. Our products are made with sustainability in mind – and so are our tried-and-true publications.

BioNews – Now Online!

Eppendorf BioNews has been a respected and popular source of information for researchers and scientific staff since 1993. Among other things, our application-oriented customer journal offers product news, Application Notes and practical tips for

the laboratory. BioNews is published twice a year, and subscription is free. For example, in issue No. 59 (summer 2023), we reported on the epMotion®, one of the most precise systems for automated liquid handling. Additional topics in that issue included sustainability in the lab, documentation of sample data, pipette calibration,

PCR, cell culture and bioprocessing data. These are not the only reasons that perusing the magazine is definitely worth it: in each issue, we raffle off attractive prizes. BioNews – now online!


<https://corporate.eppendorf.com/en/news-media/magazines/bionews/>



Sustainability Has Reached the Pipette Tip

On the topic of “reducing plastic”, Eppendorf is taking further steps: especially for sterile pipette tips, a new packaging system has been developed which, depending on the size, now requires up to 54 percent less polypropylene when compared to single-use racks. Together with the newly designed epT.I.P.S.® Box 2.0, they comprise a system which saves up to 30 percent of plastic waste in the laboratory. Following the successful introduction of the Eppendorf Tubes® BioBased made from bio-based polypropylene (PP), the pipette tip variants of the new sterile Reloads are now also manufactured from a bio-based PP. In the case of this PP, crude oil was largely replaced with second-generation cooking oil. The bio-based plastic, as well as all production steps involved in the manufacture, are ISCC PLUS certified, and the products carry the distinguished My Green Lab® ACT label.

www.eppendorf.com/epTIPS-News

A portrait of Maurice Michel, a man with dark, wavy hair and a beard, wearing a light-colored button-down shirt. He is standing with his arms crossed, looking directly at the camera. The background is a blurred indoor setting with warm lighting.

Inside the DNA Workshop

Enzymes and the roles they play within the context of DNA repair are Maurice Michel's focus of expertise. His latest discovery has the potential to open up new perspectives for drug development – as well as for personalized medicine. ▶

In the beginning, Maurice Michel set out to contribute to the development of novel inhibitors. Biochemically speaking, inhibitors are molecules which inhibit the action of an enzyme. In addition, inhibitors also include, for example, drugs used in oncology for the purpose of blocking certain proteins and thus limiting tumor growth. The background: many proteins are involved in the development of cancer or Alzheimer's disease. But then, things started to move in a different direction: instead of inhibitors, the biochemist discovered a novel mechanism of action. "A real breakthrough", he says.

The fact that Michel's scientific background is based on a broad foundation was helpful: "In those moments where we were stymied, the chemist in me was able to ask the right questions." After finishing his undergraduate degree in chemistry in the town of Clausthal (Germany), his passion for biochemistry subsequently led him to complete his doctorate at the Max Planck Institute of Colloids and Interfaces in Potsdam. "Early on, I had my fingers in every pie", recounts Michel who now holds the position of Assistant Professor at the Karolinska Institutet in Sweden. Those who visit his LinkedIn profile will be able to peruse his many competencies – from vaccine developer to university lecturer.

Your top scientist next door

Born in 1986 in Torgau, Saxony, with a yard to call his own, he "observed flowers and collected potato beetles". Maybe this is where his passion for science first took root. When "National Geographic" was first published in German, he subscribed immediately and started a private diary in which he jotted down his own ideas on a number of different subjects, or, as he calls them, "nerdy notes". At the ten-

der age of 16, he drew his own conclusions.

This past summer, at 36 years old, Maurice Michel was awarded the Eppendorf Award for Young European Investigators 2023. The biochemist is currently conducting research at the Science for Life Laboratory on the campus of the Karolinska Institutet in Stockholm, and he has already guided 20 students to their Master's degrees.

In 2017, Maurice Michel arrived as a postdoc in Sweden, and joined the Department of Oncology and Pathology of department head Thomas Helleday, who had newly focused on inflammatory processes. In his award-winning study, Maurice Michel and his team improved the function of the OGG1 protein. This enzyme was of special interest to the researchers for its involvement in DNA repair. DNA repair, per se, is nothing special. "It happens 10,000 times a day in each cell of

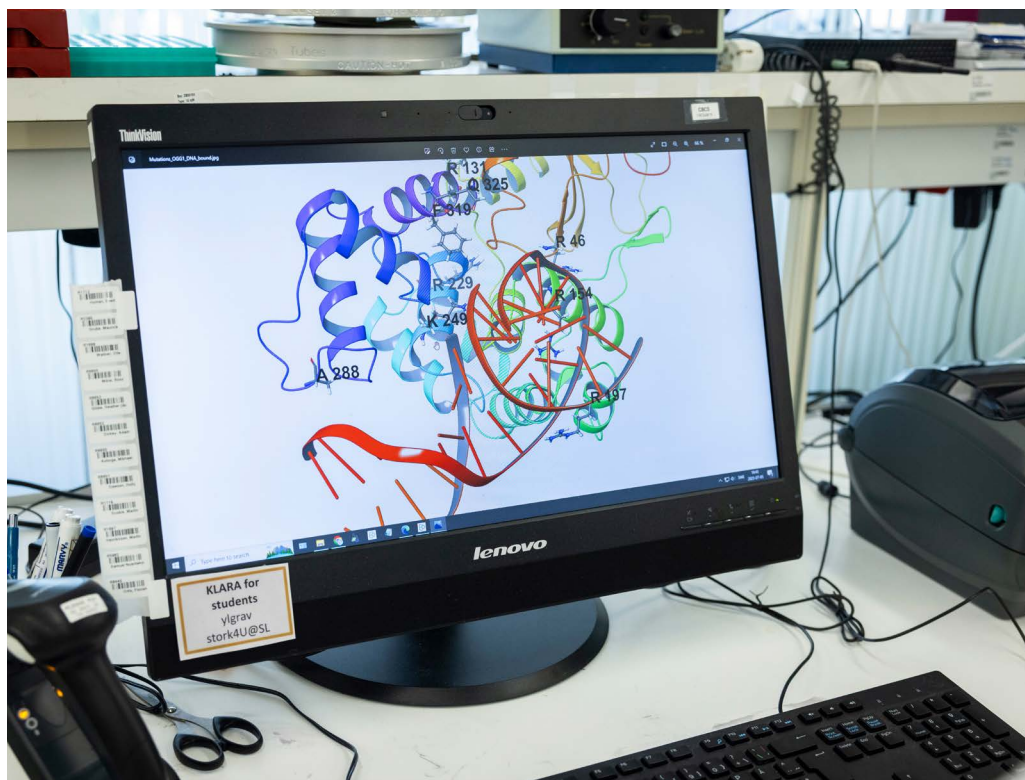
“

The path to knowledge is characterized by mistakes, much discipline, weeks of standstill and one sudden flash of inspiration.”

Maurice Michel

Illustrated in color

The components of the enzyme OGG1 are colored differently on the screen. This also applies to mutations that often occur as a result or cause of diseases



the body”, explains Michel. With increasing age and oxidative stress, however, chronic inflammation accumulates, and with it the amount of DNA damage which, in turn, may be responsible for a variety of illnesses, including cancer, Alzheimer’s, diabetes or chronic organ inflammation. It is this OGG1 to which Michel coupled certain catalytic molecules, and he noticed something unusual: the small bound molecule acts as an activator rather than as an inhibitor.

Small molecules which participate in the reaction of an enzyme and then emerge unchanged – according to Michel, this is “completely new in a living cell”. It turned out that only these catalyst-molecules were capable of triggering new reactions which the enzyme alone could not initiate. As a further aspect to this discovery, Michel was able to improve the function of the enzyme. “The enzyme is ten times more effective in the repair of oxidative DNA damage”, states Michel. This offers opportunities for new therapy options. Laboratory head Helleday even envisions a possible “paradigm shift” in pharmacological and medical research. Personalized cancer medication would give therapeutic options a considerable boost.

A flash of inspiration

The fact that Michel is gifted was already evident during his school days. He never had to study for chemistry – even the Krebs cycle immediately made sense to him. At some point, the desire to apply his talents to do good, perhaps develop vaccines and novel diagnostic avenues, arose in him. His success brings him a lot closer to his goal, and still, the award-winner remains humble.

“In retrospect, scientific discoveries tend to be presented in a way that is a bit polished”,

admits Michel. One looks back on the five years at university and only sees the rigor. But the path that led to the finding was paved with mistakes, much discipline, “weeks of standstill and one sudden flash of inspiration” that pointed in the right direction. “In research, you need good luck.”

These days, Maurice Michel lives in a small house in the country with a beautiful garden near the Baltic Sea. The beach and forest are not far away, and the train takes him to Stockholm in no time. “The seclusion helps me think. Often, the best ideas come to me when I am not actively pursuing them”, says Michel. In this way, he can relax while he cycles many kilometers to stay fit, lifts weights or dedicates his time to gardening. Last summer, he and his wife preserved roughly 200 jars of pickles which are extremely popular when it comes to bartering – for example, in exchange for elk meat. He also reads a lot – of course, mostly specialist literature. “More lately, I often let ChatGPT presort the articles.”

He especially enjoys those moments when he can read to his wife – a fellow scientist. The couple met when they were both pursuing their doctoral degrees and they then moved up north together. Their interest in reading is broad – from nonfiction to the benefits of gene technology, all the way to the fantasy series “The Witcher”. When he reads to her, she likes to crochet. In the summer, her focus was on baby shoes – the couple recently became parents for the first time.

The benefits of Sweden

Sweden is not only a “paradise for young families”, says Michel. In addition, the research landscape offers “a very good setting”: even without his own lab, he enjoys “all the freedoms”, and the synergies are also great. At the Karolinska Institutet, which is de facto a university, researchers

from different disciplines work next door to one another. “It’s very inspiring, I have access to expertise everywhere, and I can also obtain cell samples directly from the university clinic.” It is also one of the leading hospitals worldwide. His team includes a variety of specialists: chemists, biochemists, medical doctors and pharmacologists, as well as a veterinarian. There are also collaboration projects: with Spain for cardiovascular diseases, but also a specialist clinic for liver diseases in Shanghai. “At the same time, we at the Karolinska Institutet study the processes involved in pneumonia as well as Hutchinson-Gilford progeria syndrome which leads to rapid aging beginning in childhood”, reveals Michel. His research into DNA repair is well on its way to practical applications. ■



Part of the laboratory work
Maurice Michel uses a few free minutes to document experiments on the computer and update protocols

LEARN MORE?



Click here for the website:

<https://t1p.de/12jt0>

<https://helleday.org>



“Absolute Objectivity Is Not Possible”

Gender clichés influence many parts of our lives. In the area of brain research, too, these have far-reaching consequences. With her feminist approach, Anelis Kaiser Trujillo would like to introduce some changes. An interview.

Dr. Kaiser Trujillo, you are a brain and gender scientist, and within this field of research, your work focuses on what is known as neurofeminism. What exactly is this?

Anelis Kaiser Trujillo: Researchers often declare that there is so-called objectivity in the natural sciences – that our observations of the processes of nature are entirely neutral. Taking aside the fact that this allegedly neutral view of things has been formed mostly through the lenses of men, feminists like myself will respond: absolute objectivity in scientific work is not possible. As a researcher, I have a gender; I act economically, or from a certain position, and I have interests that have an impact on the questions I will ask about a specific topic. Neurofeminism is interested in the perspective of women in the neurosciences. The field of feminist neurosciences concerns itself mainly with questions about the brain, for example, the question whether female and male brains display differences, as well as how these differences are to be evaluated from a neurobiological standpoint and how they are interpreted within our society.

Why is this feminist perspective on research important?

Questions surrounding gender have biological and social, but also physiological, dimensions, and for these reasons, they cannot be disregarded. Within brain research, supposedly scientific discoveries on the differences between the female and the male brain have been produced and communicated for far too long. A majority of these were incidental findings – side products of other research questions – which is the reason why methods and results were not reflected upon to a large degree. If, in addition, research teams are not established in an interdisciplinary fashion, and if for that reason a question is approached from one and the same direction only, stereotypes will be cemented and perpetuated in our society.

What is the stereotype, or allegedly scientific finding, concerning female and male brains that you encounter most frequently?

One common assumption is that the brains of women and men are fundamentally different. This is not at all the case. In fact, differences, if they can be found at all,

occur periodically, locally, and in isolation. It is also widely assumed that differences in behavior between women and men can be derived from the brain and are therefore, to some degree, natural. This, too, could not be determined to date. A brain is never to be looked at from a purely biological perspective, and its biology should never be viewed in isolation from social context; instead, it is strongly influenced by its environment from birth. Meaning: what was there from the beginning, and what we, over the course of our lives, have been exposed to with respect to feminine and masculine behavior, cannot be separated.

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Research teams
must be
interdisciplinary
to answer gender
questions on a highly
complex level.”

Anelis Kaiser Trujillo

After all, it is often stated that it is evident from the brain that women and men are different with respect to their abilities and interests. One stereotype states, for example, that women are bad at science. The correct fact: they are only afraid of validating the cliché. This fear in effect blocks them, with the result that they often cannot approach scientific topics in an objective manner.

Typical for a man, typical for a woman – why are we so fascinated by these (alleged) differences?

The experiences on a specific topic that one has, as a woman, a man, or someone of a different gender, can be very different indeed, and at the end of the day, everyone’s perspective is valid. I am personally interested in the subject of discrimination which, in our societal context, may arise in the realm of work based on erroneous assumptions and alleged scientific findings.

If, on the basis of improper research methods, it is assumed that a woman is less capable of certain things than a man, it is possible that she will find herself at a disadvantage. On the other hand, it is not fair to a man to assume that he, based on the structures in his brain, will contribute less to child rearing or household chores.

In order to reduce gender clichés in the area of brain research, you founded the “NeuroGenderings Network”, an interdisciplinary collective in the field of neurofeminism. What is your goal?

At the time, we got together because to us, the pure search for gender-specific differences in brain research was too “unscientific”. NeuroGenderings uses a critical approach to questions about gender and the brain which go well beyond the study of gender differences. Gender is always interlinked with biology, with psychology and with social structures. We bring together female experts from the fields of neurology, the social sciences, sociology and science studies, and we address the question, for example, of how studies must be designed to avoid reproducing genderist clichés. And in my view, the same applies here: research teams must be composed of interdisciplinary members in order to be able to answer questions of gender on a highly complex level. In the case of questions about gender-specific differences in the brain, the neurosciences and gender studies must always work together. These days, monodisciplinary approaches are no longer scientific enough – this does not only apply to the field of neurofeminism. ■



SHORT PORTRAIT

Anelis Kaiser Trujillo is a psychologist and neuroscientist at the University of Freiburg. Her scientific work focuses on gender-specific brain research. For this work, she was awarded the Emma Goldman Award in 2021.

Sleep Smart



Relaxed learning
Learn, sleep, learn,
sleep: those who plan
wisely absorb new
knowledge better

While we rest, the brain switches into phases of high gear. It is during rest that it recaps newly acquired knowledge, to be stored in our memory. Biopsychologist Björn Rasch studies the connection between learning and sleep. His four tips for improved learning.

Sleep as a Memory Aid

Nightly sleep, or even just a nap after cramming for an exam or after practicing an instrument, has an immediate, positive influence on the storage processes within the brain. Those who learn something and subsequently sleep will be better able to recall this newly acquired knowledge during the exam. For this to work, it is important not to leave too much time between learning and sleeping. Neurobiology works on the premise that during sleep, a kind of reactivation of the contents of our memories takes place – in other words, that the brain trains itself. During this isolated state of sleep, few outside stimuli will interfere – allowing the brain, especially during the deep sleep phase, to look after itself and store new knowledge effectively.

How to Study – When to Sleep?

An exam is coming up, and we study within a short period of time, for hours on end, and sometimes into the night? Much potential will be lost as regular breaks are missing, and the nightly recovery phase is way too short. The next day will leave us not only tired and less receptive, but memory suffers too. It is much better to start studying early and organize the material well, as the brain likes content that has been arranged in meaningful sets. The best way to jog one's memory, however, is to review the material often, as well as query oneself, for example, by using notes on index cards. Reproductive learning has a positive effect on our brains. Don't panic: one does not have to understand a subject while it is being studied. It helps to start by memorizing – understanding will follow later, after the respective networks have been allowed to form.

Tips for Improved Sleep

With increasing age, sleep changes – on average, it will get worse. After the age of 35 or 40, the wakeful phases during sleep get longer. This will unsettle many people; they will worry and sleep even less. Those who know this fact and accept it will be much more relaxed about it. If, however, a person does not sleep well over extended periods of time, they should not make the mistake of going to bed earlier and earlier. Instead, it will be helpful to shorten the nightly rest a little to make sure one is actually tired. In addition, there is what is known as insomnia, a common long-term sleep disorder that does not have a biological cause, but which is compounded by stress and worry. In this case, it is worth seeking help – according to Björn Rasch, cognitive behavioral therapy for insomnia is very effective. Many people are robbed of their sleep by apnea, leaving them tired and less receptive during the day. Sleep apnea, too, is amenable to efficient treatment.

Simply a Matter of Concentration

In order to be able to concentrate on one's studies, optimal conditions are paramount: a quiet environment and little distraction, along with sufficient breaks, sleep, exercise and a healthy diet. It also helps to visualize on a regular basis what it is that one is studying for, and the goal one is aiming to achieve. Clear goals elevate motivation. Each person has their very own phases of attention that should be respected. As a rule, people are most receptive in the morning and less so in the afternoon or evening. If those phases are ignored, and one pushes through them to study, concentration will falter. Instead, a walk or a power nap would make more sense. That being said, according to Björn Rasch, much of this advice – from tips about studying to tips on concentration – will only help if one starts studying early. ■



ABOUT BJÖRN RASCH



Björn Rasch is a sleep researcher and biopsychologist. He teaches at the University of Fribourg in Switzerland, and he studies how sleep can alter cognitive behavior, learning and memory. He is further interested in how our thoughts and ideas can influence sleep, for example, through hypnotic suggestions and relaxation techniques. His studies show that sleep and cognition are closely connected.

Giants Taking Over?

Generation after generation, Europeans have been getting taller. Why this is so, and whether this trend will continue into the future – a conversation with Swiss Professor of Evolutionary Medicine, Frank Rühli.

You study the growth in the height of humans. How tall are we going to be in the future?

Frank Rühli: Based on roughly 150 years of compulsory military service, we have a very good database for Switzerland, and we also have access to microdata from up to 90 percent of all men aged 18 to 21 years of certain birth years. This includes information on height, body type and weight. These data can even be broken down into individual districts, allowing us to compare cities, for example, Zurich and Basel. Until approximately 2010, the Swiss had continued to become taller, on average by an impressive 15 centimeters. We have now arrived at an average of close to 1.80 meters.

We were wondering, does body height always correspond to shoe size? Tall people – large feet?

Yes, this correlation exists in principle. If you are taller, the long bones that are found in your extremities will also be longer, as well as the metatarsus and the phalanges. To a certain extent, body height correlates with shoe size; however, a tall person will not necessarily have the corresponding large feet, and a shorter person will not always have small feet.

Back to the Swiss: is a height of 1.80 meters considered tall when compared to other countries?

In comparison on the international level, this is actually quite tall. The record holders, however, for men as well as for women, are the Dutch, at 1.83 meters for men and 1.71 meters for women. Even if there are differences, the Swiss data can be applied in part to other Nordic countries such as Germany, the Benelux countries, and also northern Italy. Body height is dependent on, among other things, social status, income, access to health care and nutrition – factors which are quite similar among the Nordic countries. Continuous malnutrition has a negative effect across generations; the human body does not receive sufficient nutrients to invest in growth with respect to height. These are the reasons why Switzerland cannot be compared with countries in the poor regions on Earth.

Your data concern exclusively men. What about the women?

Our research is based on data from the Swiss military where the proportion of women is known to be small. Of course, these days, more and more women volunteer for military service, but it is still a modest number. Those women who volunteer typically represent a group that meets a certain physical

FRANK RÜHLI



Frank Rühli is Professor of Evolutionary Medicine and the Director of the Institute for Evolutionary Medicine at the University of Zurich. Rühli made his mark studying mummies: in 2005, generating major media interest, he examined the mummies Ötzi and Tutankhamun. He is also fascinated by the growth in height of humans: in one study, he investigated the heights of Swiss servicemen.

Rising trend
Scientific studies show that people's height is increasing. But is there a limit?



standard, which means that they are not representative of the general population. These data are thus sparse, and they also do not reflect the past. The data that are available to us from the past are derived from passport applications dating back to the 19th century which sometimes include information on height. But even here, the data do not represent a good average of the population, as only people from the upper strata of society possessed a passport – those who could afford to travel and better-quality food, and who were thus more likely to develop in healthy ways. The same is true for long-bone data from cemeteries: who was buried? Unfortunately, data that were not compiled in the past cannot be generated later. Thus, we in Switzerland can only make solid statements about the male part of the population. We do assume, however, that the body height of women has developed in a similar way.

You mention factors like social status and access to health care which have an influence on growth in humans. What else influences our height?

Generally speaking, tall parents will have tall children. It has been discovered that there are genetic markers – known as Single Nucleotide Polymorphisms (SNPs) – for body height and growth. The stronger they are represented within a population, the taller the people will be on average in this region. Besides the factors already mentioned, consistent physical as well as psychological stress will impact how tall people in certain regions in the world will grow. In countries where political suppression is commonplace and a free,

self-determined life is not possible, people tend to be smaller. Several studies by Australian anthropologist Maciej Henneberg from the 1990s prove that people in South Africa have been growing taller since the end of apartheid.

Is there a connection between body height and health?

Due to genetic factors, it is probable that height has an influence on the prevalence of certain diseases. Evidence to this effect has been compiled in a study by the team led by physician Sridharan Raghavan at the University of Colorado, published in the journal "PLOS Genetics". According to this study, certain illnesses will be more or less prevalent according to body height – for example, the increased risk of atrial fibrillation and varicose veins in tall people. At the same time, the study states that tall people carry a decreased risk of coronary heart disease, high blood pressure and high cholesterol. Short people, on the other hand, have an increased risk of type 2 diabetes.

What does the future hold: will we grow taller and taller?

Interestingly enough, the increase in human body height has – at least according to the Swiss data – reached somewhat of a plateau over the past ten years. This means that we are not currently seeing significant growth in height, but rather a growth in width. People are gaining weight, and this applies globally: nowadays, there are more overweight people than people who are malnourished, also in countries like China, Saudi Arabia or Egypt. One-quarter of all 19-year-old Swiss people are overweight – it used to be exactly the other way around. Excess weight is a big problem. One other factor that may have an influence on the current plateau of body height: Switzerland is a country of immigration, and the military does not differentiate between the country of origin of a person's ancestors when compiling data. Finally, it is also possible that we have reached a kind of genetic limit. We will continue to grow taller, but only in very small increments. Most likely, humans are not genetically predestined to grow three meters tall. ■

AUSTRALIA**The cane toad:
scourge with a warty skin**

Approximately 90 years ago, there was not a single toad in Australia; today, Down Under is afflicted by a plague. In 1935, 100 cane toads (*Rhinella marina*) were brought to Australia from Central and South America—in the hope that they would eradicate the pests in the sugar cane fields. Cane toads, however, proved useless for this task; instead, they became a menace in their own right. The size of a small dog, they jumped out of the plantations and, while exploring their new home, proceeded to devour snakes, lizards, rats, mice and birds. If they themselves ended up as prey, their predators would succumb to their venom. These toads, which have a life span of approximately 40 years, with an impressive procreation rate of up to 35,000 eggs per female, have over time developed even longer legs which allow them to jump even farther and thus spread even more effectively. In order to stop them, scientists had traps installed and came up with countless methods aimed at limiting their procreation. To no avail. They saw a glimmer of hope as they fed sausages made from cane toads to local animals. This offensive, but not deadly, meal was intended to teach the animals that cane toads are an inedible prey. According to a study by the Cane Toad Coalition, the animals thus instructed indeed gave the invaders a wide berth rather than chasing them.

The cane toad, the brown tree snake or the common starling: animals which expand their habitats beyond their native environment are known as neozoa. Neozoa are considered invasive if they spread without limitation and thus endanger the local ecosystem. In most cases, humans are responsible.

GERMANY**The Chinese mitten crab:
nuisance or delicacy?**

The Chinese mitten crab (*Eriocheir sinensis*), with its claws reminiscent of woolen mittens, originates from China and Korea. Brought to Germany by cargo ships, it has spread predominantly along the North Sea coastline. There, as well as in the Baltic Sea and the Elbe River, it digs up the ground underwater and thus inflicts damage to dikes and riverbanks. It also destroys fishing nets. In Germany alone, these invasive crabs are said to have caused damages worth 80 million euros. For this reason, researchers at the Leibniz Institute for the Analysis of Biodiversity Change are suggesting reducing the population of the mitten crab within the European Union by approving it as a food. This could work as the crab is considered a delicacy in East and Southeast Asia.

The Come t



y've to Stay

USA

The common starling: for the love of Shakespeare

In Germany, the common starling (*Sturnus vulgaris*) is listed as an endangered species. In contrast, in the US, it is considered a scourge. The culprit, with respect to the invasion of the starling in the US, was a Shakespeare fan: In 1890, Eugene Schieffelin released sixty starlings imported from England in New York's Central Park. It was his intention to bring all the bird species mentioned in Shakespeare's works to North America. These days, between 150 and 200 million starlings are raiding the corn fields, orchards and vineyards of America, and they transmit diseases such as toxoplasmosis. As early as 1931, the US Department of Agriculture published a recipe for the culinary preparation of starling breast in order to advertise the bird as a delicacy and thus limit its population. Without success.

USA

The brown tree snake: spiders are delighted

As stowaways on board a military transport plane, specimens of the brown tree snake (*Boiga irregularis*) flew from New Guinea to the US island territory of Guam in the Pacific, roughly 70 years ago. The reptiles slithered out of the hold of the plane and proceeded to slowly eat their way through the local fauna. Since then, the brown tree snake has exterminated ten of the twelve native species of bird and significantly diminished the populations of fruit bats, lizards and bats. This triggered a chain reaction: the absence of birds left spiders without their natural predators which, in turn, allowed their populations to explode. Furthermore, the seeds of the fruit trees are no longer efficiently spread by birds and fruit bats. The rainforest no longer grows. In order to stop this plague of snakes, scientists are attempting to kill them via mice prepared with poison.

USA AND EUROPE

The red lionfish: curse of the Caribbean – and the Adriatic Sea

Originally, this beautiful fish with its colorful stripes and long spikes was native to the oceans between Malaysia and Japan. However, it is suspected that it was aquarium owners who released the first specimen of the red lionfish (*Pterois volitans*) off the East Coast of America. Since they eat all fish and crustaceans and produce approximately two million eggs every four days, the population of the red lionfish has been expanding rapidly in the Caribbean, driving back the original occupants of the reefs. At the same time, the devil firefish (*Pterois miles*), starting from the Red Sea, has been heading for the Adriatic by way of the Suez Canal. Due to rising ocean temperatures, scientists are doubtful that the expansion of this warmth-loving species can be brought to a halt. A dark prognosis.



With Charm and Cream

Vienna without a visit to a coffee house? Only half the fun! The coffee houses in the Austrian capital are more than just places to eat, they are a second living room and a cultural institution – as well as an oasis of slowness. A stroll.

Traditional Viennese restaurant
Sigmund Freud and Leon Trotsky enjoyed their coffee in the popular and lively Café Central



Downtown Vienna, 7:30 in the morning. The morning sky stretches wide between the ornate palaces, the color of cream and vanilla ice cream, on Kärntner Strasse. This traffic corridor is part of the famous ring that surrounds the center of Vienna, and which connects the most important attractions of the city. The trams squeal along the tracks, and at number 17, directly across from a baroque plaza with the statue of a horseman, the first cup of coffee gurgles and drips through the machines. Café Schwarzenberg opens early; at the height of the ball season in January and February, it opens so early that the waiters in their black three-piece suits are ready to serve dancers a fortifying meal with a small goulash before sunrise.

The Viennese culture of idleness

The fact that this traditional coffee house, one of more than 1,000 in Vienna, is brimming with activity almost around the clock, showcases how important the culture of idleness is to the city and its inhabitants. These oases of coziness and comfort are a part of Vienna, just like the famous schnitzel or the giant ferris wheel in the amusement park Prater. In 2011, UNESCO even declared the coffee houses of Vienna an intangible cultural heritage. In this cozy atmosphere, people drink a “small black coffee”, mocha, no sugar and milk, or a *mélange* which is reminiscent of cappuccino. They read newspapers suspended from a wooden hanger, or they simply do nothing. After all, there is enough to see: inside the Café Schwarzenberg, the wood panel walls, petite marble tables and impressive crystal chandeliers recall the turn of the century. Nothing much has changed since its opening in the year 1861. Of course, the cake inside the glass showcase, steeped in golden light, is always fresh.

With all this comfort and coziness, who would want to move along? But one must also pay a visit to the Café Sacher. It is located only a few minutes’ walk from the Café Schwarzenberg, close to the Vienna State Opera and the Hofburg Wien, residence of the Habsburg dynasty from the 13th century to 1918. The smell of horse manure, at times noticeable on the way to the Café Sacher, originates from the Spanish Riding School which is connected to the Hofburg. This is where members of the royal family were instructed in riding – exclusively on Lipizzans – white stallions. White is also the color of those horses that are harnessed to the traditional carriages, known in Vienna as “Fiaker”, which await their customers outside the entrance to the Hofburg and other central locations in Vienna.

The Café Sacher, located inside a corner Renaissance building, is easily recognized by the long lineups forming outside its door. Everyone is here to enjoy a piece of the namesake pastry that Chef Franz Sacher had baked for his employer, Prince Metternich, in ►

1832. In the mornings, one stands a good chance of being led to a table in this elegant room, which is reminiscent of a plush living room, without much of a wait. The walls are covered in coral red damask, with countless mirrors framed in ivory color, and the stucco under the high ceiling bears witness to the splendor of the fin de siècle. The chocolate cake with apricot jam and glistening dark-brown surface is particularly delicious when one is enjoying it seated comfortably on the red-upholstered circumferential bench.

Fortified by caffeine and cake, one is now off to explore the neighboring Palace Garden, planted around 1818 for Emperor Franz I in the style of an English landscape garden. From here, it is not far to the Café Demel by the Kohlmarkt. This coffee house is famous most of all for its sweet cakes and pastries, for strudel and candied violets – Empress Elisabeth’s favorite flowers. This café delivered sweets to Sisi and her husband, Emperor Franz Joseph – which explains the name “k.u.k. Hofzuckerbäckerei” – “k.u.k.” stands for “kaiserliche und königliche” – “imperial and royal”. Waitresses in black-and-white traditional dress still address the guests in a peculiar third person plural: “Have had a chance to choose?”, or: “Would like to see the menu?” This is known as Demel-German – a polite form of address dating back to the times of the monarchy.

A second home for artists and writers

Our next destination is most likely the best-known coffee house in Vienna, the Café Central. Its rooms are located in the neoclassic Palais Ferstel inside the former Vienna Stock Exchange. One’s gaze wanders past the cake display, towards the dome supported by countless marble pillars. At the end of the 19th century, the beautiful café located in Herrngasse was home to mostly artists and writers: Arthur Schnitzler, Oskar Kokoschka, Stefan Zweig, Leon Trotzki, Robert Musil, Hugo von Hofmannsthal, and also Sigmund Freud who lived only a fifteen-minute walk from the Central. Today, his former home has been converted into a museum.

The Café Sperl, on the other hand, was frequented mostly by composers and painters; after all, this heritage café is located in the 6th district, not far from the city’s theaters – which means it is also a little removed from the city center with its tourists. In the smoke-yellowed room, Thonet armchairs, marble tables and imposing gas lamps welcome the visitor. Here, too, guests enter what Stefan Zweig described as a club where one “can sit for hours and discuss, write, play cards and, most of all, consume an unlimited number of newspapers and magazines.” ■

LET’S GO!

Vienna at a leisurely pace – and fast-paced

A marble piano on the grave of Udo Jürgens, a pink sculpture by Franz West, and a granite obelisk on the grave of Beethoven: the Vienna Central Cemetery is a place of peace and quiet for more than 330,000 people, among its lilac bushes and old beech trees. With its spectacular graves of honor, it is also reminiscent of an open-air gallery. Visitors have the option of exploring this park measuring almost two-and-a-half square kilometers on their own or participating in guided tours.

Simmeringer Hauptstraße 234,
1110 Wien



<https://viennatouristinformation.com/en/things-to-do/parks/cemetery/>

Sweet original

You can enjoy the wonderful Sachertorte in Café Sacher



Baroque experience
A must-see in Vienna is Schönbrunn Palace in the 13th district





The Imperial Butterfly House in the Burggarten palace gardens is considered one of the most beautiful glass Art Nouveau buildings in the world. The amazing butterfly zoo is located in its west wing. At a constant temperature of 26 degrees, several hundred tropical butterflies whirl around here, among them the large tree nymph with a black marking on its wings. At the sight of these peaceful, gorgeous creatures amidst the exotic plants, near a waterfall, Kaiser Franz Joseph is said to have found tranquility in his day.

Butterfly House Burggarten Hofburg, 1010 Wien

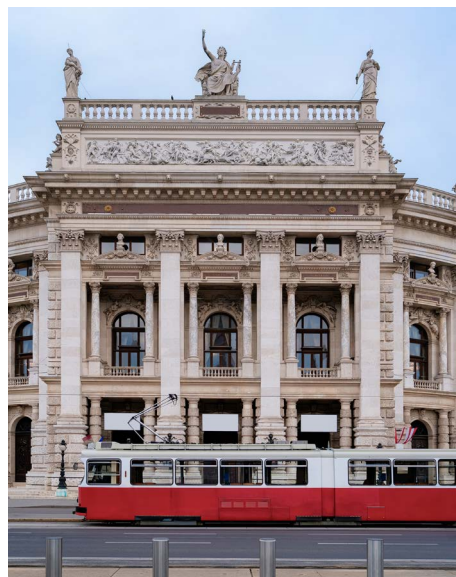
www.schmetterlinghaus.at/en/

A 250-meter-long sandy beach, a water playground, a huge trampoline area, a whitewater channel for kayak-tours, and a climbing park: a visit to the Danube Island promises relaxation and fun for the entire family. This artificial island within the City of Vienna and Klosterneuburg is used as a part of flood management, raised between 1972 and 1988. Since then,

it has served as a worthwhile destination for outings, located only 20 minutes from downtown Vienna. Its green surroundings invite all visitors to unwind from the impressions of the big city.

Donauinsel, 1220 Wien

<https://t1p.de/uk08n>



Traditional institution
The Burgtheater – one of the most important stages in Europe



EPENDORF IN VIENNA

Eppendorf Austria is the regional distribution and service office for the Austria/SEE/CIS distribution zone, and in addition, it serves multiple area functions for Eastern Europe. Its 40 employees include area managers, quality managers, HR business partners as well as colleagues from controlling, distribution and marketing. One area of focus is corporate social responsibility; this location is collaborating with the Vienna Open Lab. In addition to product support, there is the Kids Academy for Young Scientists between 5 and 11 years of age which has been jointly organized since 2016. Eppendorf Austria is further engaged in "Projekt 2028": this project supports beekeepers in their efforts to protect bees. Companies purchase a bee starter set from trained beekeepers and thus support the propagation of bee colonies.

Teaching Ingenuity

After a fulfilling career as a college biology professor, I'm retiring. "What will you miss most?" a colleague asked. My answer was something that, 30 years ago, I would never have expected myself to say: "I will miss the creativity of teaching." When I was a new faculty member, I considered teaching a necessary evil that took me away from the lab bench. I wanted to focus on research, guiding graduate students in what I hoped would be groundbreaking studies on nerve growth. I believed imagination lived not in the classroom, but in the laboratory – to be used for inventing techniques, designing experiments, and interpreting data. But when my life took an unexpected turn, I realized how wrong I had been.

I was 10 years into my career, happily plugging away at my research as a tenured professor, when my teenage niece was orphaned and I became her guardian and single parent. After taking some time to adjust, I decided that I wouldn't be able to manage a full-fledged neuroscience lab and give my niece the attention that she needed. So, I decided to shift my focus to teaching mostly undergraduate classes. Teaching made it easier for me to get home at the same time each evening and spared me the stress and time required to manage people and projects in the lab.

It was hard to drop a research program that – up to that point – had defined my career and fueled my passions.

To stay close to the research world, I began to assign journal articles in my upper-level undergraduate course, anticipating lively discussions about the latest discoveries. This failed miserably. My students would skim the papers, but they'd rarely dive into them fully. Many wouldn't even look at the figures, which I had expected them to focus on.

A clue to the problem came when I took a look at the introductory biology textbooks they had studied in earlier classes. There were abundant illustrations of scientific facts – the array of bones in a bird's wing, the structure of a bacterial flagellum – but hardly any of the figures looked like the data presented in scientific papers. Equally problematic, the books had vanishingly few illustrations of how key findings had been made, or of who did the work. Now it made sense: My students were comfortable memorizing facts, but they lacked insight into how those facts were generated and how the conclusions were drawn. The ingenuity of research – what I loved most about being a scientist – was lost on them.

This epiphany changed the way I used the primary literature in my teaching; I started to go for depth over breadth. I spent multiple class sessions deconstructing a single paper with my students, analyzing each figure and table. I then asked, "If you had co-authored the paper we just studied, what would you do next?"



Some balked. “I’m not creative,” they’d say. But I asked them to give it a try – adding a sense of urgency by announcing that, in a later class, we’d form “grant panels” that would rank their proposed studies and decide where to invest an imaginary pool of research funds.

After taking part in the panels, the students changed their tunes. They were amazed by the variety of follow-up studies their classmates had thought up. They argued passionately about which ideas were superior, expressing surprise when other panels made different choices: “Isn’t it obvious that No. 6 is best?” It was a thrill to see each student commit to an idea, in the process discovering something about their own powers of invention. Afterward, one whip-smart woman told me that – for the first time – she realized that it was OK to come up with her own scientific ideas.

Could I have conveyed more information per minute by talking at my students? Sure. But that’s not how I wanted to teach. My students already knew how to learn facts. I wanted them to think deeply about the research process and to develop their own inventiveness. I wanted them to tap into their imaginations.

In a famous lyric, Stephen Sondheim writes, “Look, I made a hat – where there never was a hat.” To my decades of students, I tip my hat – hoping that what they learned about their own creativity is the knowledge that lasts. ■

Science
AAAS

i THE SOURCE

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Sally G. Hoskins is a professor emeritus at the City College of New York. Send your story to SciCareerEditor@aaas.org





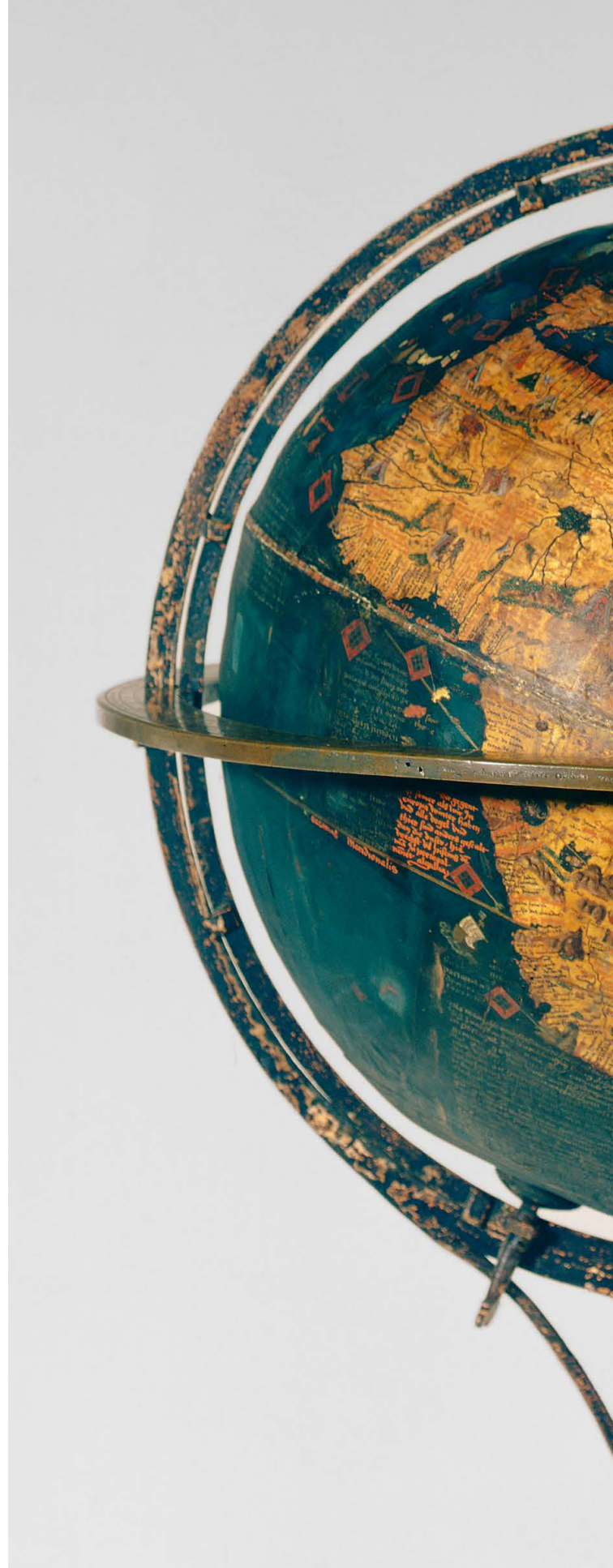
With Europe, without America

Martin Behaim's "Erdapfel" is the oldest globe in the world – and it has now been included in the UNESCO Memory of the World Programme. On a time when Europeans saw the world through a different lens.

Ships cross the Indian Ocean. Imaginary islands are depicted, along with mythical creatures – among them the human-like skiapod who uses his large foot to protect himself from the sun. It is easy to lose track of time before this more than 500-year-old Behaim Globe, the attraction of the Germanic National Museum in Nuremberg. However, no matter how long one gazes across Martin Behaim's "Erdapfel": America is not there.

Australia, too, is nowhere to be found – no wonder, as this globe, named after seafarer and merchant Martin Behaim, stems from the year 1492 – the exact year that Christopher Columbus set sail from Andalusia to discover India.

And now, the oldest globe in the world, a witness to contemporary history, has been inducted into the records of the UNESCO Memory of the World Programme. An occasion for celebration, but also an opportunity for reflection – as this representation of Portuguese exploration and the colonization of the African coast bear witness to the origins of the international slave trade. In this regard, the work also marks "one of the darkest chapters in the history of globalization", says Daniel Hess, Director General of the museum.





UNESCO world documentary heritage

The well-preserved Behaim globe shows us the world as it was seen more than 500 years ago

MASTHEAD

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