

ROYAL BELGIAN INSTITUTE OF NATURAL SCIENCES

# ANNUAL REPORT 2018





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# FOREWORD

**Looking back at the 14 years I have spent at the head of the Institute, I take stock of our progress. The Institute's organisation and activities have profoundly evolved, as has our impact. Certainly, our fundamental missions remain unchanged: research, expertise, conservation and dissemination of knowledge. But developments in science, technology and society have completely transformed the way we approach these missions. Two such developments have a particular impact: the ubiquity of digital technology and people's environmental awareness.**

The Institute is indisputably a place of authenticity, a "sanctuary of the real". But today our researchers document their findings online, and visitors have access to more information in their pockets than is contained in the entire Museum. The Institute therefore has an active digital life too. We have one of the best 3D imaging platforms in Europe, and the digitisation of collections is at the heart of our strategy to add value to our research. Our scientific publications have long opted for open access online. We are beginning to use mobile technologies to enhance museum visits and the Institute has a long-standing presence on social networks. To me, it seems vital to be able to continue to invest in skills and equipment to at least maintain our current levels of effectiveness and recognition in all our fields of activity.

The society we live in has also become more aware of environmental issues. Thanks to decades of scientific work, and despite powerful denialist movements, the urgency to act against climate change and biodiversity loss has finally made its mark on politics and the media. We have contributed to this awareness to a modest extent, both as experts and by playing an active role at the interface between science and policy. Contributing to the conservation of biodiversity, and engaging our fellow citizens to find their connections with nature: these aspects of our work will certainly develop further in the future.

The establishment has also been reorganised. Today, the Institute is structured along the lines of our missions and not by scientific discipline. All departments now make their voices heard in decision-making.

Over the years, the Institute and its team have shown an ability to anticipate challenges and adapt. It is true that this has required a great deal of effort, especially in recent years: since 2014 despite losing 13% in the purchasing power of our structural funding, our own revenues have increased by €4 million, from 39% to 47% of our means.

## **What does the Institute want for the future?**

First, we want to increase our diversity and enjoy the benefits that come with it. It is extremely enriching to have among one's office neighbours not only a zoologist or a geologist, but also a lawyer, an anthropologist, a journalist, a computer specialist, a carpenter or a guide. Working with different people, who do different things and speak different languages, brings personal and professional benefits, helping us all to be citizens in a globalised world.

We also want to be proud of our role in society. The increasing weight of environmental issues sets challenges for the Institute to take on new responsibilities. As well as our traditional role of exploring and explaining nature, we are asked to engage in civil action: to be whistleblowers, advising political decisions, encouraging people to take action. To ensure we do not lose our soul or our credibility, we need a constant concern for quality and rigour, and a great capacity for resistance to trends. To be of our time while being timeless, so to speak. A beautiful and difficult challenge.



**Camille Pisani,**  
*General Director*

# 2018 AT A GLANCE

13.01

The WWF Young Rangers visit our *MONKEYS* exhibition with our guides before taking part in the many activities planned for them on Ranger Day.



18.01

HRH Princess Esmeralda of Belgium presents her film *Virunga, Hope for a Whole People* at a nocturne event of the exhibition *MONKEYS*, putting this national park in the spotlight.



26.01

A successful launch for *The gesture of throwing in the Neolithic Mosan Basin*: Caroline Polet wins the prize for best poster at the 1843rd scientific meeting of the Society of Anthropology of Paris.



01.02

Mother Nature Fever! The party is in full swing and the public is out in force for this year's edition of *Museum Night Fever* where nature is in focus.



21.02

Learning together and jointly promoting the quality of education: the educational service runs a training session for 30 Dutch-speaking colleagues from the *Leren doe je samen* project.



24.02

You can have your eyes on the stars and still help save the planet. Famous astrophysicist Hubert Reeves gives a biodiversity talk and signs copies of his comic strip.



08.03

The Peruvian government calls on our experts who provide a "Response to the problems of the marine environment in coastal regions using a computer model."

08.03

At the RBINS, photoshoots, debate and video projections are on the agenda for International Women's Day on the theme *Mind the Gap*, going beyond gender.



29.03

The *Falcons for All* project is a finalist in the 2018 visit.brussels Awards in the "International Event 2018" category. Its blog has had over 3,200,000 hits from 136 different countries.



17.04

Three of our geologists help ensure that the Famenne-Ardenne Geopark, which includes the caves of Han, is the first Belgian park to obtain the *UNESCO Global Geopark* label for its geological heritage of international interest.



19.04

The educational service presents its work and resources to an Egyptian delegation of museum professionals visiting the Mariemont Museum.



26.04

Back to school for primary teachers: for the third day of the *Prof Day Classification* event, our educational service runs a workshop on the classification of living things.



29.05

The 20th International Conference *Communicating the Museum* asks the question "ready to participate?" The Museum answers with presentations about our participatory projects "XperiBIRD.be" and "Ben: crowdfunding & communication".



06.06

The Chinese press pays homage to Belgium's work on monitoring and regulation of ship emissions at an event for the second anniversary of the implementation of *Domestic Emission Control Areas in China*.

22.07

So different and yet much in common: minerals and insects are sources of wonder for the 13th edition of *Science and Culture* at the Royal Palace.



26.08

Closing of the exhibition *MONKEYS*: 120,000 visitors came to explore the world of primates. A big hit, despite the mixed success of the evening programme of screenings and conferences.



12.09

The Institute's Nature directorate and the Shanghai Centre of Ocean Affairs discuss their experiences in protecting the marine environment and scientific expertise at the service of public authorities for future long-term collaboration.

13.10

Over a hundred people from some forty Belgian schools participate in *XperiBIRD.be Day* to learn more about the project and hear about the first results, taking project kits back to their classes with them.



22.10

The first complete list of all known parasites of freshwater fish in Africa is made available in the 18th issue of the journal *Abc Taxa* - a tool that can lead to healthier, safer and more sustainable fishing and aquaculture.



25.10

A fin whale, stranded on October 25 on the beach in De Haan, died of natural causes, according to an autopsy carried out by the UGent, the ULiège and the RBINS. This species is very rarely seen in the North Sea.



31.10

Beware, all those who dare to sleep over at the Museum! Scary makeup, scary activities and even scary cakes: a full house for our *Halloween Night*, as usual.



06.11

The *RV Belgica* will be replaced! Secretary of State Zuhair Demir announces that a construction contract for the new vessel has been signed. She launches a competition to name it.



09.11

Marie-Christine Marghem, Federal Minister of Energy, Environment and Sustainable Development holds a press conference at the RBINS about biodiversity loss in the run-up to the 14th Conference of the Parties of the Convention on Biological Diversity (COP 14).



12.11

After two years of works, 55 colleagues settle into their new offices on rue Vautier. All the services of the RBINS except the North Sea cluster in Ostend are now all together on one site.



25.11

Morocco, Burundi and Guinea-Bissau, three partners in our development cooperation programme, win an award for their *Clearing House Mechanism* at the COP14.



27.11

Out of the shadows: ARTE premieres a film on the scientific studies conducted in the *Bruniquel cave* by a team including the RBINS. It contains the oldest cave structure known to date.



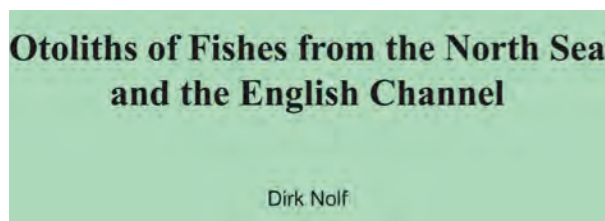
01.12

The RBINS' first ever *Citizen Science Day* shines a spotlight on the dozens of volunteers who work alongside our researchers and within the collections, underlining the importance of their work.



01.12

A new volume of the *Fauna of Belgium* series is devoted to otoliths. It is available in French and English and is an important tool for identifying and researching North Sea fish.



02.12

Our educational service hosts a day full of activities for families of people working for Solvay - a founding member of the *Fondation Entreprises - Institut* that developed our science truck *XperiLAB.be*.



12.12

Patrick Roose, Operational Director of the RBINS' Nature directorate is appointed to the two-year post of President of the *International Scheldt Commission*, an intergovernmental body for sustainable management of the Scheldt district.



# RESEARCH

## **WHISTLEBLOWING: RESEARCH WITH AN URGENT MESSAGE**

On the DNA trail of animal trafficking in Brussels  
North Sea sands: running out?  
Taking the pulse of our North Sea  
Keeping weeds under control: are sawflies safe to use?

## **OUT AND ABOUT: FIELDWORK**

Expedition to the Jurassic graveyard  
The ancient city at the heart of a conflict zone  
Blitzing our park  
Mining for treasures: return to Tadkeshwar  
Exploring a Congolese hotspot for fish biodiversity

## **WORKING TOGETHER: COOPERATION AND DEVELOPMENT**

Building on excellence in Guinea-Bissau  
Eleven projects, made to measure  
Biodiversity and the Arab world

## **SCIENCE HACKS: NEAT SOLUTIONS TO COMPLEX PROBLEMS**

Shelling out: a circular economy for seafood waste  
Cutting the cost of DNA sequencing

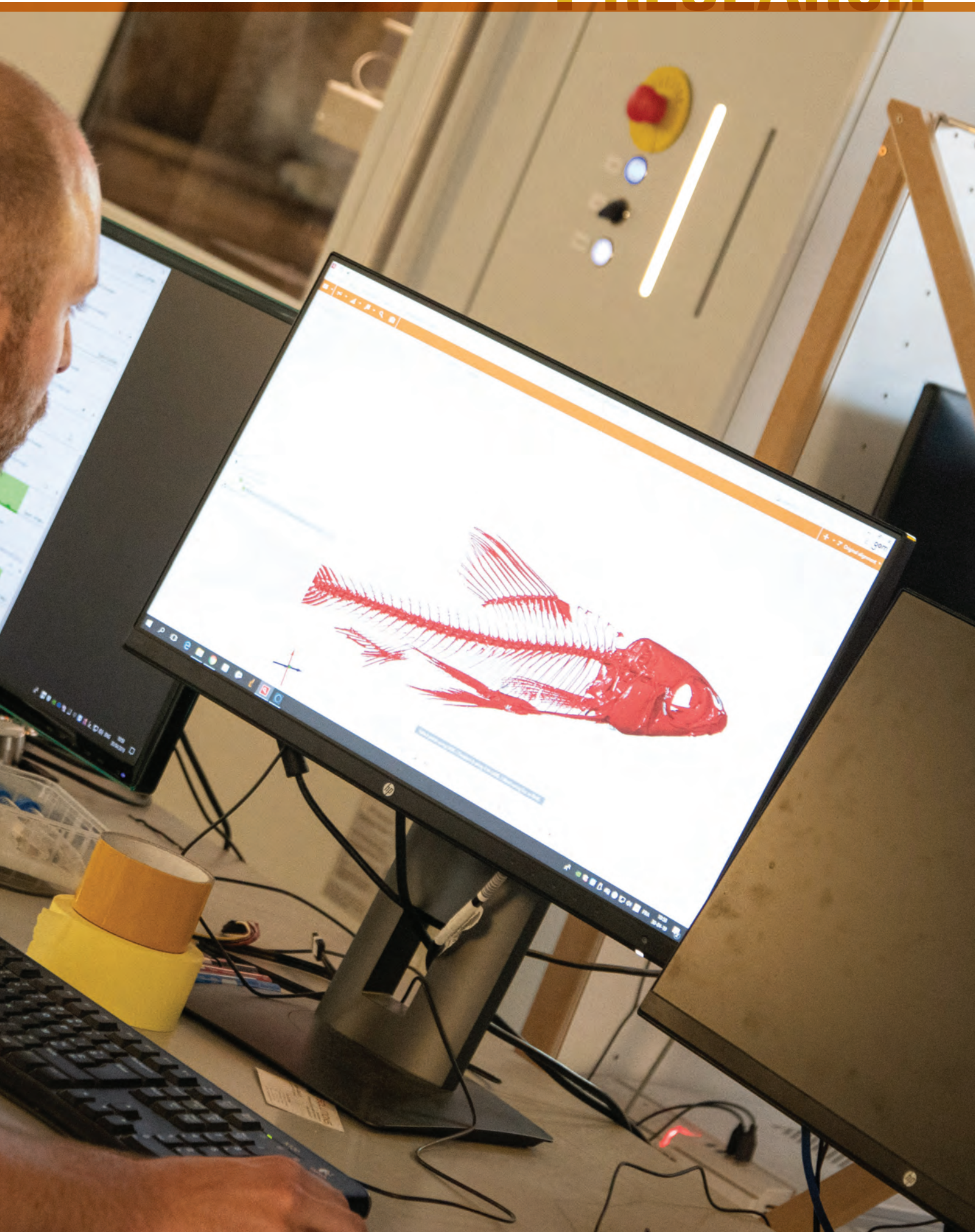
## **STORIES OF EARTH AND LIFE**

Changes in diet put mammoths in danger  
The secrets hidden in periwinkle DNA  
A magnetic history of the Earth  
The modern whale has a fierce ancestor  
Found in Belgium: 6,000 year-old tools made from animal bones

## **PROVIDING THE FACTS: POLICY SUPPORT**

Wind power: what impact on our seas?  
Challenging assumptions about biodiversity and conservation  
New outlooks on marine issues: Year of the North Sea  
What the sprat can tell us about managing Lake Tanganyika  
Geothermal energy: closer than we thought?

# 1 RESEARCH





# WHISTLEBLOWING: RESEARCH WITH AN URGENT MESSAGE

*The Institute's research looks back at millions of years of our planet's natural history. However, much of our work could not be more current. In 2018 the Institute's work highlighted a number of pressing topics, drawing on our past and present to raise urgent warnings to protect the future of our planet's species and ecosystems.*

## On the DNA trail of animal trafficking in Brussels

How can we identify meat from endangered species on sale in Brussels? The international illegal trade of meat from wild animals, known as bushmeat, is thought to be on the rise, further endangering wildlife populations and ecosystems across tropical rainforest regions. Researchers from the Institute helped raise awareness about the issue with an exhibition and two documentaries that highlighted the role of DNA analysis in identifying bushmeat on sale.

Bushmeat trade is a huge challenge for law enforcement, and is happening on a massive scale, with an estimated 1 to 3.4 million tonnes of wild meat harvested annually in the Congo Basin alone. It's also a serious public health concern, since up to three quarters of emerging infectious diseases in humans are transmitted from animals.



The Institute worked with a team of partners on an exhibition entitled *Stop Wildlife Trafficking* held at the European Parliament in Brussels in July 2018. We also supported the Belgian public TV channels VRT and RTBF with scientific expertise for documentaries where undercover journalists both purchased bushmeat in Brussels and smuggled it into the country from the Democratic Republic of the Congo. The meat DNA was barcoded by the Institute's BopCo facility, using COI and cytochrome b sequences for species identifications. Among the results was confirmation that the bushmeat smuggled into Belgium was chimpanzee: a species which is both endangered and protected.

## North Sea sands: running out?

Sand is the most used material on the planet, after water and air. But like water, it is a limited resource. The North Sea might seem like an endless supply, but extraction is on the increase, while sand is also essential for infrastructure at sea. In recent years, sand resources in the North Sea were qualified and quantified, right the way along the Belgian stretch to Rotterdam, for the first time.



The Institute coordinated the BRAIN-be project TILES, developing an innovative 3D model with blocks that help to visualise sand resources in the North Sea that can be up to 2 million years old. Sand quality varies from area to area, as does the level of certainty with which we can determine what is present. The model was launched in 2018 with a conference where participants could explore the model using 3D headsets. It is already being used to guide marine spatial planning, determining the best locations for sand extraction and potential wind farms. The more informed we are about the state of the sea bed, the more our visions for the future of the North Sea can be rooted in the geological reality.

## Taking the pulse of our North Sea

You might not guess it when you're taking a dip at the beach in Blankenberge, but the area off our coastline is one of the most intensively used stretches of sea on our planet. From sand extraction to renewable energy to dredging, finding a balance between human activity and sustainability is essential to ensure our marine environment's good health. The Institute's MUMM unit plays a crucial role in conducting this check-up.

The European Commission aims to achieve 'good environmental status' in the marine environment of all EU countries by 2020, and European cooperation is essential since the state of our marine areas is so dependent on our neighbours. The Institute works with the Belgian Federal Authorities to coordinate a review every six years to see how well Belgium is meeting this objective, looking at over 50 indicators of our sea's health.

The 2018 report shows improvements. Illegal oil discharges have declined sharply since the Institute's aircraft started monitoring spills. Many fish like plaice are increasingly sustainably fished and the European health standards for contaminants in seafood are met.



Still even if we see some improvements, marine litter, eutrophication and pollutants remain a problem. Fishing activity continues to affect species composition by disturbing the sea floor. And seabird populations are in decline. As such, the target of good environmental status the Belgian part of the North Sea remains, for the moment, out of reach.

## Keeping weeds under control: are sawflies safe to use?

Biological control is a crucial tool: introducing one species to keep another in check. But how can you be sure the new species doesn't pose even more of a risk to the ecosystem?

If you've been to Florida on holiday you will have spotted the bright red berries of the Brazilian peppertree. It's an invasive weed, introduced in the late 1800s, that has spread rapidly, replacing mangroves and forming thickets that choke out other plants. The spread of the peppertree could be limited by biological control, breeding and releasing sawflies that feed on its leaves. However, sawflies can produce chemicals to defend themselves against predators. Little was known about the levels of toxins they produce and whether they might be a danger to the ecosystem in themselves.

Researchers at the Institute set up a study to discover whether such chemicals are present in two sawfly species of the family Pergidae and that are potential biological agents to keep Brazilian peppertree under control.



Using a technique called liquid chromatography-tandem mass spectrometry, they revealed that populations of the two species do contain toxic peptides of four different types. The study supports the view that the concentrations of these toxins would pose a threat to local wildlife and livestock if these insects were used for biological control.

## OUT AND ABOUT: FIELDWORK

*All scientists' work depends on data. But as an institute of natural sciences, getting hold of our data often means travelling a little further, climbing a little higher or digging a little deeper than most. Fieldwork is central to our research, and what we pack for each trip depends on the conditions on the terrain, including potential dangers. This year's highlights take us from the rocky heights of Wyoming to the depths of a lignite mine in India, before coming back a little closer to home.*

### Expedition to the Jurassic graveyard

The small, dusty village of Kaycee, Wyoming, may not ring any bells. Unless, that is, you're a seasoned palaeontologist. The nearby Morrison Formation is a mecca for dinosaur hunters, with a plethora of well-preserved fossils, formed about 155 million years ago. And in 2018 a team of the Institute's palaeontologists headed out to the cowboy state to participate in a dig.

Morrison is known for its fossil finds of all the Jurassic Park stars: *diplodocus*, *stegosaurus*, *apatosaurus* and *allosaurus* have all been discovered here. And this dig was no exception. Whole skeletons were not to be found – the dig site is a former riverbed where bones would have been washed away by the current. But our team found numerous bones from *diplodocus* and carnivorous dinosaurs, including some huge vertebrae and an *allosaurus* tooth. A number of them were brought back to Belgium to be worked on and conserved as part of the Institute's collection.



### The ancient city at the heart of a conflict zone

Iraq is a country rich in history, both recent and ancient. And in 2018, for the Institute, the former posed specific challenges to studying the latter. When a researcher from the RBINS had an opportunity to travel to Basra province, it became clear that this would be no ordinary fieldwork.

In the wastelands there lie the remains of Charax Spasinou, an important trading port founded by Alexander the Great in 324 BC. It was to study the relationship between the history of the site and its physical environment that a geologist from our Institute joined an international research team in the field in November 2018.



The main challenge was ensuring the team's safety thanks to close cooperation with the local partner, the Iraqi State Board of Antiquities and Heritage. They organised contacts with the local authorities to ensure the researchers had a police guard both at base camp as well as at the dig. Local knowledge was essential to avoid a nearby minefield and get the collected samples through the seven security checkpoints between the field and the airport gate.

## Blitzing our park

Not all the Institute's fieldwork takes place quite so far away from home. In June 2018, the Institute organised sampling of insects and other invertebrates just a few metres from the Institute: in Brussels' Park Leopold. And this time the people collecting the specimens were not only entomologists, but also Brussels locals volunteering their time, exploring biodiversity as citizen scientists.

Over twenty people aged 7 to 72 came along to be trained by our researchers while inventorying the park's wildlife in two rounds: first in the afternoon for freshwater invertebrates and diurnal insects, and again in the evening for the nocturnal insects, using the Institute's equipment.



This "Bioblitz" helped to track the park's biodiversity since the addition of a flower meadow and replanting around the lake. The preparation of the specimens is now underway and the next step will be to identify the species to draw our conclusions about the biodiversity in Park Leopold.

## Mining for treasures: return to Tadkeshwar

In the 2016 annual report, we looked at a dig at the Tadkeshwar lignite mine in Gujarat, India: a treasure trove of paleontological finds. This year our researchers couldn't resist a return visit, leading an international team of eight paleontologists funded by the Leakey Foundation and Belspo, as part of the BRAIN-be PalEurAfrica project.

This year, the strategy was to excavate in different parts of the mine at the same time. This allowed the team to better compare the order and position of layers of paleontological remains where the fossils were found. And the findings were no less remarkable, including some of India's oldest modern mammals at a time when India was a land raft in the ocean, heading towards Asia.



Our team uncovered a jaw of the oldest known tapir that was the size of a small dog, as well as a jaw belonging to a new family of mammals known as ungulates – the group which includes large mammals like horses and pigs.

## Exploring a Congolese hotspot for fish biodiversity

Elephantfish can generate an electric field with an organ in their tail. Lungfish breathe air, burrowing in mud holes during dry periods. And *Synodontis batensoda* is known as the upside-down catfish due to its unconventional swimming style. These and many more species can be found in rivers of the Democratic Republic of Congo and Congo-Brazzaville, hotspots of global fish diversity that have largely been overlooked by research. A team from the Institute set out to address this, discovering 17 likely new species of fish.

Scientists sampled over 700 specimens from the Lower and Middle Congo River and three major drainage basins, examining their morphology to identify almost 200 putative species from across 82 genera and 25 families.



A DNA barcode analysis helped to show that some species were not yet described and some had previously unknown variations in their morphology. A 2011 large-scale DNA analysis of freshwater fish in the Lower Congo only found a fraction of the fish found this time around. These findings help to paint a much clearer picture of fish biodiversity in the region, building a reference library for future research.

## WORKING TOGETHER: COOPERATION AND DEVELOPMENT

*Our work abroad goes far beyond fieldwork. As an international reference on biodiversity, the RBINS has key responsibilities. The United Nations' Strategic Plan for Biodiversity 2011-2020 provided an overarching framework on biodiversity, within which countries set up national strategies and action plans. To help implement these plans, structures known as Clearing House mechanisms began to be put in place to provide information, at global and national level. The Institute has a lead role in supporting Belgium's partner countries in setting them up and building capacity in other ways.*

### Building on excellence in Guinea-Bissau

With lush tropical forests, dense mangrove swamps and one of the richest fishery resources in West Africa, Guinea-Bissau is a country well aware of the importance of its vast biodiversity.

The Institute was invited there to run a training workshop to work further with national stakeholders on the use of the Clearing House mechanism. 15 people from ministries and research institutes participated in the workshop, which built on Guinea-Bissau's excellent foundations: at the United Nations COP14 conference they were received an award for their work on their Clearing House mechanism.



Practical barriers such as internet infrastructure remain an issue, but Guinea-Bissau also has many talented researchers in natural sciences with a good deal of experience in international projects. The workshop helped to build the national network, and participants were trained as trainers to build capacity in their own institutions.

### Eleven projects, made to measure

How do we assess the state of biodiversity in contexts as diverse as Uganda, Palestine and Tanzania? Our CEBioS programme works to build knowledge on biodiversity, biodiversity policy and the role of international environmental conventions in developing countries. In 2018, it oversaw eleven Measurement, Reporting and Verification projects in developing countries. These projects reinforced the link between science and policy, developing practical indicators that policymakers could use to evaluate their conservation work in the buffer zones of protected areas.

The CEBioS team travelled to Uganda to facilitate the closing workshop of the eleven projects. The workshop also produced a joint policy brief for implementing agencies and local authorities about how biodiversity indicators in protected areas can play a key role in national development plans, drawing on case studies from Uganda, Rwanda, Palestine, Ghana and Tanzania.

### Biodiversity and the Arab world

Cairo was the setting for another workshop in 2018 on Clearing House mechanisms (CHMs), this time bringing together eight Arabic-speaking countries, each looking to build capacity for their own national structures and how to sustain them. The main challenge? Getting national institutional networks in place where every biodiversity stakeholder actively participates.

Some of the eight, like Egypt and United Arab Emirates, have a well-established CHM already. Others are at an earlier stage. The workshop was a chance to draw on national experiences and work together to help build national roadmaps, setting out the next steps for each country in putting the structure in place to help protect their genetic resources.

The training included use of Bioland, the online tool developed by the Institute and partners to manage their CHMs, accessible via [www.chm-cbd.net](http://www.chm-cbd.net).

## SCIENCE HACKS: NEAT SOLUTIONS TO COMPLEX PROBLEMS

*What does the price of DNA sequencing have to do with the waste shells from your plate of oysters? Research this year came up with some remarkably practical and accessible solutions.*

### Shelling out: a circular economy for seafood waste

The farming of molluscs like clams, scallops, oysters and mussels is big business: a sustainable food source that is on the rise. Produced by aquaculture, the calcium carbonate shells of these molluscs are considered a waste product. How could that pot of empty mussel shells come in useful once you've finished your moules-frites?

Research from the Institute this year looked at ways to make the most of waste shells on a large scale. The calcium carbonate in the shells can be used as a replacement for limestone, which has a whole range of uses. And since limestone is a non-renewable resource that we are currently mining, the shells can be an ecological option.

The Institute spoke to aquaculture farmers and industry stakeholders as part of EU project CACHE. The outcomes highlighted some of the most sustainable and potentially profitable uses.



One of the most promising is returning shells to the water to help create new habitats, and balance water acidity. Oyster shells that are deposited help young oysters grow, supporting populations that have been in decline, which in turn act to filter and purify the surrounding water. Another simple and effective use is in agriculture. Clean shells can be ground up and spread on soil instead of lime, to counteract acid soil issues. However, some of the more exciting-sounding uses have proven to be overly complex. Using shells as a catalyst for diesel production, for example, requires the shells to be first burned at 800°C – certainly not the most energy-efficient option.

### Cutting the cost of DNA sequencing

For taxonomists, DNA sequencing is a gift: it means they can have a full overview of the entire genome of any living thing, helping them classify it. To obtain sound taxonomic results, they need to gather DNA from as many specimens as possible. Usually, this doesn't come cheap.



But by adapting some new technologies when collecting DNA sequences from a set of wild bees *Halictus smaragdulus*, our team found a solution that made them able to tell them apart at a relatively cheap cost.

Our JEMU team, with scientists from the Institute and the Royal Museum for Central Africa, used this new, cheaper approach: a few targeted DNA fragments are sequenced in parallel. The whole genome is not sequenced, meaning it is cheaper and only requires some adaptations to the lab. The team also produced guidelines in the journal *Apidologie* to help scientists choose the most appropriate and cost-effective technique when analysing DNA sequences for themselves.

## STORIES OF EARTH AND LIFE

*The tales that our researchers uncover can be found in the most unexpected of places. Piecing together the evidence is the work of our archaeologists, taxonomists and geologists, using a range of analytical techniques to draw their often surprising conclusions.*

### Changes in diet put mammoths in danger

Climate change has been one of 2018's highest-profile issues, posing a huge danger to food security for human populations across the planet. But 18,000 years ago, it was the woolly mammoth *Mammuthus primigenius* that was threatened by climate change. And new research, published in *Quaternary Research*, shows that it was a change in diet that led to its demise.

Our Institute worked with a team from the Senckenberg Centre for Human Evolution and Palaeoenvironment on the study of the isotopic composition of carbon and nitrogen in mammoth bones from Ukraine and Russia dating back from 17,000 to 18,000 years ago. The results show a low level of nitrogen, unlike the high levels found in older mammoth bones.



This indicates that their diet changed. Steppe grasses became less available due to climate change and mammoths were forced to compete for food with other big herbivores like horses, for food that was not even optimal for them. This probably made them easier prey for the humans who hunted them.

### The secrets hidden in periwinkle DNA

*Melarhaphe neritoides* is a periwinkle – a sea snail you could easily find in European waters. Like many other sea snails, the species releases its larvae as plankton that can live several weeks, spreading easily from one place to the next, and so usually have a similar level of genetic diversity right across Europe. Or so we thought.

The Institute carried out a large-scale study of mitochondrial DNA (mtDNA) in the periwinkle which told a very different story. After screening several hundred specimens, nearly every individual showed different mtDNA - even specimens that had been neighbours. This species appears to have some of the most diverse mtDNA ever recorded in a sea snail.

How can we explain this seemingly highly fragmented genetic diversity, in a species that so easily exchanges its planktonic larvae from one place to another? The diversity seems to be due to an exceptionally high mutation rate. It means the periwinkle is in fact a great candidate to help us study patterns of genetic exchange between marine populations.



## A magnetic history of the Earth

We take the Earth's poles for granted: magnetic north in the north, and magnetic south in the south. But 700,000 years ago, the polarity was switched. And the Earth's magnetic north and south alternated many times before then. These changes are recorded in certain minerals in rocks, studied by paleomagnetists. And this year, a trip to Italy helped to reveal when exactly some of these changes took place.

The Institute's field work, in cooperation with the University of Pescara, involved drilling for rock samples 2cm in diameter, in the Apennines, west of Ancona, where these changes are particularly visible.

A total of 4,000 cores were taken from three different areas where layers of limestone are interspersed with black shale. The research focused on the layers from the Cretaceous period, around 130 million years ago, when these geomagnetic reversals were particularly frequent. Data visible within sedimentary rock about the evidence of the Earth's orbit around the Sun is known as a cyclostratigraphic framework.

Researchers used this to determine the dates of the geomagnetic reversals in the Tethys region. With this data, we can make correlations with other basins of the same age, and the information can be used to help estimate the age of fossils found.

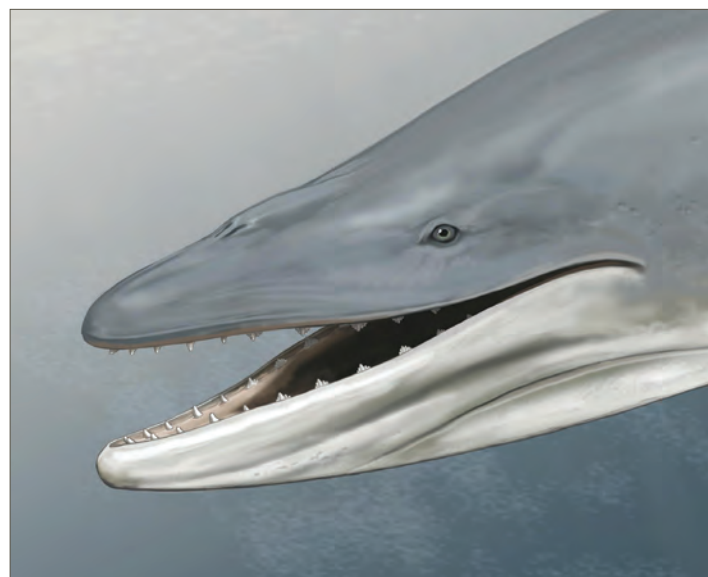


## The modern whale has a fierce ancestor

We see modern whales as gentle, graceful creatures, filtering huge volumes of prey through the comb-like baleen in their mouths. But the same can't be said for all their ancestors. A new study from the Institute shows *Llanocetus denticrenatus* was a ferocious predator, with real teeth.

The research was carried out on a 34-million-year-old whale skull from Antarctica—the second-oldest “baleen” whale ever found. It suggests that this early whale actually didn't have baleen at all. Its mouth was equipped instead with well-developed gums and teeth, with the latter being apparently used to bite large prey. Until recently, it was thought that filter feeding first emerged when whales still had teeth.

*Llanocetus* shows that this was most likely not the case. The findings suggest that large gums in whales like *Llanocetus* gradually became more complex over evolutionary time and, ultimately, gave rise to baleen. The skull also shows that at least some whales became giant far earlier than previously thought: *Llanocetus* was eight metres in length.





## Found in Belgium: 6,000 year-old tools made from animal bones

Not all archaeological findings came from abroad this year. A team also identified tools from a 6,000-year-old grave in the Abri des Autours cave, near the Belgian city of Dinant. It is the fourth Neolithic burial site in Belgium where carved animal bones have been found.

Researchers from the Institute and the University of Liège analysed around 230 animal bones from Abri des Autours. The remains of snails, toads, birds and both domestic and wild mammals were found in and around three graves.

Six mammal bones found at one of the three, dating from the Middle Neolithic (6,200 – 6,000 years ago), show signs that they have been carved into working tools. These include an awl made from half a sheep or goat metatarsal, a needle from a pig fibula and two rods made from red deer antlers.

Outside of the graves, a red deer tooth was also found with a piercing through it, possibly to string it on a necklace. Lab analysis showed the tools were intensively used before they were buried. The full results are published in *Anthropozoologica*.



## PROVIDING THE FACTS: POLICY SUPPORT

*Being a federal research institute comes with some key responsibilities. Policymakers look to us for scientific expertise, particularly under Belgium's various international commitments on the environment. We develop tools and methods for monitoring on land and at sea. And we advise on conservation and sustainable use of natural resources, both at national and European level. In 2018 we certainly stepped up to policy challenges.*

### Wind power: what impact on our seas?

By 2020, offshore wind farms in the North Sea could produce over 40% of Belgium's renewable energy. But how will the marine ecosystem be affected? The RBINS and partners made a thorough assessment and revealed exactly how a wind farm can affect our North Sea.

Four offshore wind parks are already up and running in the Belgian part of the North Sea, with a fifth being built and four more projects on the way. Together with planned wind farms off the neighbouring Dutch and French coasts, the impact on the North Sea will be significant. The Institute coordinates the monitoring programme that checks this impact and designs ways to mitigate unwanted effects on the marine ecosystem.

And as well as describing changes to be monitored across a wide variety of species and sediments, the report makes some innovative recommendations.

One example is that to limit the sound pollution affecting ecosystems during pile driving, a shield of bubbles should be created using a perforated hose on the sea floor. Some species will even benefit from wind farms: the tadpole fish *Raniceps raninus* is one such example, that is known to dwell around wrecks and was previously only rarely reported in Belgian waters.



## Challenging assumptions about biodiversity and conservation

Conservation of tropical forests is essential to combat climate change. And it was also assumed that old forests were the best way to maintain biodiversity. But a new study in lowland rainforests of the Congo Basin suggests that regenerating forests, alongside conservation, may play a more important role than previously thought.

The study, published in the journal *Science Advances*, looked at biodiversity across ten species, comparing those found in “old-growth” forests where trees are conserved, with younger “regrowth” forests which are in the process of growing back.

It found that although older forests do show more biodiversity in trees, that is not the case for all species. Slime moulds, for example, showed higher levels of biodiversity in younger forests.

The conclusion for forest management policy is that conservation of old-growth forests alone will not necessarily maintain biodiversity across species, and that a combination of older and younger forests alongside each other may help to find a better balance.



## New outlooks on marine issues: Year of the North Sea

The North Sea begins where you are. This was our message for the Year of the North Sea 2018. It doesn't begin at the coast, but on our streets, in our bathtubs, in the plastic we throw away. This year was a great opportunity not only for us to raise awareness across Belgium, but also to work closely with policymakers.

It was a concerted effort: an initiative of the WWF, it assembled a range of partners from across civil society, research and policy, on regional and federal levels. The launch event was a huge success, with the *Clean Beach Cup* in Blankenberge bringing together 3500 people. The RBINS opened up a giant truck for people to come engage with marine issues.

Other highlights included three evenings about marine plastic pollution held at the Institute, in conjunction with the *Ocean Plastics Lab* travelling exhibition that set up for two weeks in front of the European Parliament. Another creative idea was *ZeeUitzicht*, where locals on the coast opened up their homes for an evening of conversation about marine topics, with a view on the North Sea.



## What the sprat can tell us about managing Lake Tanganyika

Between DR Congo, Tanzania, Burundi and Zambia lies a lake 700 kilometres long: Tanganyika. And according to a genetic study this year, the sprats in Lake Tanganyika form one homogeneous group. The implications for policy in the way the lake is managed are significant – these countries are going to have to really work together.

Biologists from the RBINS, the Royal Museum for Central Africa and KU Leuven studied 96 sprats sampled at five locations and data indicated that local sprats *Stolothrissa tanganicae* form one single genetic group with no subgroups. This would suggest fish move along the length of the lake and must be considered as a single resource, no matter what the country along the shore. Overfishing in one zone affects the entire lake.

The sprat is vital for the food security of millions of Central Africans. Shrinking populations mean the four countries will have to work together and establish fishing quotas together in a consistent manner.



## Geothermal energy: closer than we thought?

Could the answer to our energy problems be under our feet? The Brugeo consortium has been drilling 120 metres deep in Anderlecht to map the Brussels subsoil and test the possibility of geothermal energy.

No longer seen as the poor cousin of renewables, geothermal energy is an increasingly attractive option for Belgium. In 2015, more than 20,000 geothermal heat pumps were installed in Belgium, producing about 432 GWh of heat, according to Brugeo. But for the partners of this project, including geologists from the Institute, its potential is still greatly underexploited, especially in urban areas.

Brugeo has already gathered a lot of data. However, there are still some "holes" to fill. The exploratory drilling conducted in Anderlecht is the first purely scientific purpose in Brussels to reach the hard Paleozoic rocks, which have particularly interesting thermal properties. The next steps? Thanks to two new European projects, in 2018 the Institute began work on seismic campaigns and deep subsoil exploration in the region for deep geothermal energy and started to study the viability of enhanced geothermal systems in a range of contexts.





# COLLECTIONS

## GROWING OUR COLLECTION

Accessing the snow petrel

A taxonomic hotspot off the coast of Mozambique

## GOING PUBLIC: PRIVATE DONATIONS

Stormy weather uncovers a unique fossil

A record year for insect donations

From an asteroid to the Ardennes: the Tintigny meteorite

Fossil collectors unite

## DIGITAL TRANSFORMATIONS

A 3D-printed doppelganger for the Lier mammoth

A digital revolution in natural sciences

Belgium's most ancient art objects now online

Opening up the archives on marine data

## A NEW KNOWLEDGE CENTRE FOR THE INSTITUTE

# 2 COLLECTIONS



## GROWING OUR COLLECTION

*Our natural history collection is one of the world's largest. And one of the biggest challenges for the team managing it is that it never stops growing. In 2018, the sources of new additions to our collection took us from the depths in Mozambique to the heights of Antarctica.*

### Accessing the snow petrel

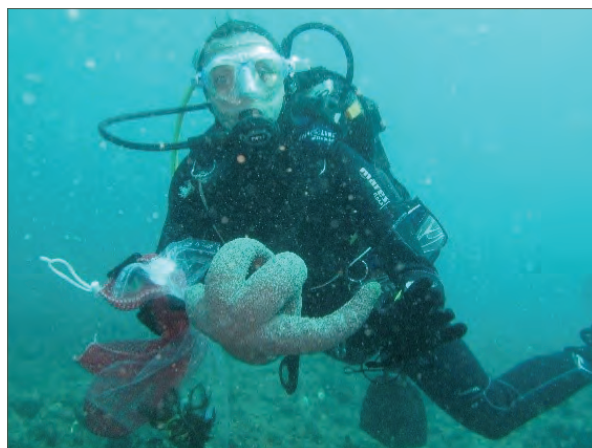
The beautiful snow petrel is found in Antarctica – not the easiest places for researchers to collect feathers and carcasses for study, even with a snow scooter. On top of that, it nests in cavities high up in cliffs, meaning ropes are a must. And once you've scaled the cliffs, watch out for living petrels: they are known to spit oil if they feel threatened...

A researcher from the Institute travelled there in 2018 to study populations and take samples for subsequent genetic assessment of the species, reconstructing its evolutionary history and how its distribution has changed over time. More colonies and individuals of snow petrel than expected were detected and counted, and 109 samples collected made it safely to RBINS which will all join the Institute's collection. It is important that the collection is non-invasive: the majority are feathers, but 30 bodies of birds that had died were also collected and used for DNA analysis and ecological niche identification with stable isotopes.



### A taxonomic hotspot off the coast of Mozambique

Some parts of the world tend to get overlooked by taxonomists. This is certainly true of Mozambique's 2,300 km coastline, that hosts a wealth of marine biodiversity.



In spring 2018, researchers from the Institute, the Royal Museum of Central Africa and the University of Ghent joined colleagues from Universidade Eduardo Mondlane, the Natural History Museum of Maputo, and the Escola Superior de Ciências Marinhas e Costeiras in Mozambique to study algae and echinoderms.

The locations had to be selected carefully. Where the Zambezi flows into the sea it churns up mud, limiting visibility which makes for perfect conditions for sharks to hunt their prey. Over 320 specimens of echinoderm and 465 of microalgae were collected by diving, snorkelling and wading through the water at low tide. As well as identifying new species for Mozambique and contributing specimens to the Institute's collection, this fieldwork plays an important role in building capacity in Mozambique. The more early career scientists are trained to collect, preserve and study specimens, the better biodiversity can be measured and valued.

## GOING PUBLIC: PRIVATE DONATIONS

*It's not just fieldwork that helps our collection grow: amateur scientists are a huge source of specimens too. For many amateurs, collecting is more than just a hobby - it's their life's work. But collections take up space. They require maintenance. And this is one of the reasons that every year hundreds of collections are donated to the Institute – anything from a single fossil to 60,000 beetles.*

### Stormy weather uncovers a unique fossil

We have a storm to thank for the latest shark fossil to join our collections. This is the partial skeleton of a 100-million-year-old shark, discovered in 1996 at the foot of Cap Blanc-Nez in France by an amateur paleontologist. The wind whipped up the sand, uncovering the fossil that was then dug out in a dramatic race against the rising tide.

This specimen is unique: since shark skeletons are made of cartilage, it is very rare to find fossilised remains other than teeth. This one belongs to a small group of sharks, *Synechodus*, that survived the meteorite impact of the dinosaurs' extinction.



### A record year for insect donations

2018 was an exceptional year for entomology in particular, with around 150,000 new specimens joining our entomology collections. One of this year's donors was living in Diest, and needed to move to a smaller flat with less space for his butterfly and moth collections. He saw the Canvas documentary *Er was eens* about the Institute on TV and realised this could be a great way to ensure his collections lived on.

For the Institute it was a treat to receive a lot of Belgian specimens collected in the 50s and 60s from areas once well-conserved that are now lost, not to mention butterflies found in Turkey and Mongolia. They will be maintained by our collections team and may well contribute to future research.





## From an asteroid to the Ardennes: the Tintigny meteorite

An example from further afield takes us back to February, 1971. The Schmitz family in Tintigny, in the Ardennes region of Belgium, discovered a hole in their roof and a strange-looking rock on the barn floor. Over forty years later, this meteorite has joined the Institute's collection – the sixth Belgian meteorite to be found in the Museum.

The son of the Schmitz family had brought the rock to school the day after it landed, and entrusted it to his teacher. It was only now that the teacher, now a parish priest, came across the rock again and asked the Schmitz family whether they might like to have it identified. An expert at the ULB proposed to examine and preserve the specimen at the Museum. It is a rare eucrite, one of only eight ever found in Europe, and it testifies to the volcanic activity on the asteroid Vesta.



## Fossil collectors unite

The town of Egem is home to a sand and clay pit that is a rich source of fossils. The Institute reached out to a number of amateur fossil hunters and with their help, was able to document the bird life in the North Sea basin 52 million years ago.

Bird bone fossils aren't easy to come by. They are fragile and often scattered since they don't share habitats with land and sea animals.

In the Egem pit, thousands of shark tooth fossils have been found, but for bird bones, the Institute worked with seven enthusiasts who had been rummaging in Egem for years. 53 bird bone fossils from across over 20 taxons were used for the research, working together with the Senckenberg Research Institute in Frankfurt, and were added to the Institute's paleontology collections.



## DIGITAL TRANSFORMATIONS

*We live in the age of the instant, where the digital world has transformed the way we access information in a way that even 20 years ago would have been unimaginable. And as a museum and an institute of natural sciences, the possibilities this opens up are endless, from 3D replicas to online sharing.*

### A 3D-printed doppelganger for the Lier mammoth

From now on, the Lier mammoth can also be admired in its town of origin. This year Stedsmuseum Lier unveiled the world's first full-size mammoth skeleton ever to be 3D printed. And thanks to the help of our palaeontologists, the copy shown in Lier is even more scientifically correct than the original skeleton displayed in our 250 Years of Natural Sciences Hall.

3.6 metres high, 5 metres long and 30,000 years old, the Lier mammoth is one of our Museum's star exhibits. It was the Kiwanis service club Lier Twee Neten that took the initiative to make a double of the mammoth, in partnership with the Institute, ArcheoLier, Lier city council and a Belgian 3D-printing company Materialise. A painstaking bone-by-bone comparison ensured that the 3D scanned model was even more accurate, thanks to new research highlighting mistakes made when the original was mounted 150 years ago. For example, we now know that the tail of a mammoth is shorter than originally thought.

In 3D printing, a UV laser targets UV-sensitive resin layer by layer, hardening it where the object is to be printed. Printing the entire Lier mammoth required nine machines and seven days of printing – still, a lot less preparation time than to excavate the original from its rocky bed.



### A digital revolution in natural sciences

A single point of access to 1.5 billion specimens: this is the game-changing ambition of DiSSCo. 115 institutions across 21 European countries are coming together with a vision to position European natural science collections at the centre of data-driven scientific excellence.

The scale of this project is unprecedented: even Europeana, the ten-year-old EU digital platform for cultural heritage, only has 58 million items in its digital collection. In five years, DiSSCo will more than double this figure thanks to a European distributed infrastructure. As partner and Steering Committee member, the Institute takes a leading role, with a particular focus on the legal

aspects of this new entity. And with national and regional constraints, defining a common European framework will be no easy task.

For researchers, this initiative will shift the landscape completely. DiSSCo opens up access to digital collections to tackle a wide range of complex scientific challenges, but also puts in place new ways of working together, to manage data better and to innovate. Its focus on training on big data, joint research programming and policy harmonisation will mean the stage is set for closer cooperation across European borders in the years to come.

## Belgium's most ancient art objects now online

Art in Belgium has quite some history to be shared. With the launch of an online museum of paleolithic art in Belgium, anyone can access unique artefacts over 12,000 years old. The Institute teamed up with Belgium's Royal Museums of Art and History, the University of Liège and a number of private collectors to find a way of opening up access to many artefacts that are just too fragile to be exhibited in a physical museum.

Visitors can now explore jewellery, ornamented hunting objects, and the only Belgian Venus statuette from that era, all visible in 3D from a range of angles, thanks to scans performed by the team at our Institute with the help of a structured light scanner. The website is searchable by category or by Belgian archaeological site: you can explore the Spy Cave, the Trou de Chaleux or the caverns of Goyet. The museum is now online at [paleo-art.naturalsciences.be](http://paleo-art.naturalsciences.be)



## Opening up the archives on marine data

Open access to data is a must for research and innovation. But much of our data comes from a time when open access wasn't quite the buzzword it is today. The BRAIN-be 4DEMON project faced this challenge head on, digitising, quality checking and calibrating datasets on the Belgian part of the North Sea dating back as far as the 1970s. The selected themes were contaminants, eutrophication and ocean acidification – all key indicators of the health of a marine ecosystem.

Digitising data is a painstaking job, not to mention encoding handwritten reports and searching for missing information. Quality is also a massive issue: combining older, patchier datasets with solid recent data was another of the challenges 4DEMON faced. But the hard work of a partnership coordinated by the Institute resulted in a data portal that allows the study of long-term environmental changes to support policymaking.

It shows some interesting trends - a steady decline in phosphates, changes in phytoplankton species, algal blooms developing earlier in the year, and acidity dropping until 1985 when it started to rise again. Besides these conclusions which are relevant for policy makers, the portal has also already had a great deal of interest, particularly from PhD students and scientists keen to apply the data to their work.



## A NEW KNOWLEDGE CENTRE FOR THE INSTITUTE

*Twelve kilometres of shelves of journals: further than the distance from the Institute to Brussels Airport. This was the scale of the challenge our team faced when bringing together the collections and catalogues of our multiple libraries. The result is a beautiful new space, our Knowledge Centre, launched in December 2018.*

Researchers consulting and borrowing our publications, both in-house and external, now have a central point of access, thanks to our multifunctional, modern Knowledge Centre. Gone are the 1970s carpets: this is a modern space complete with reading room, three meeting rooms and library, housed in a bright and peaceful space just off our dinosaur gallery. It combines traditional library functions with digital services like databases and e-journal consultations. The knowledge centre team had previously been scattered across the Institute. Now they share a space and are able to cooperate more easily. The multiple libraries of the Institute are still being integrated – the next step being the biodiversity library.





## PUBLIC

### **NEW CONCEPTS, NEW AUDIENCES**

Tagged teddies bringing bears to life  
Pencils, paper and paleontology  
Educational workshops with a new approach to perception

### **ANY QUESTIONS? NEW WAYS TO LEARN**

10 years of curiosity  
Belgium's got biotalent

### **MAKING HEADLINES: NEW APPROACHES TO OUR MEDIA WORK**

Once upon an Institute...  
Paleontologists in the press

# 3 PUBLIC



## NEW CONCEPTS, NEW AUDIENCES

*We want our Museum to be a space for everyone, and it's not enough just to open the doors and hope for the best. It means asking ourselves difficult questions about how we are perceived. Actively reaching out to new audiences is a constant challenge for every museum, requiring not only creativity and innovation, but a listening ear and an open mind.*

### Tagged teddies bringing bears to life

Our autumn exhibition in 2018 brought all kinds of bear to the Museum: some more cuddly than others. *TEDDY & BEAR* gave visitors a chance to explore every aspect of bears: from their history to how they live today and their complex relationship with us humans. How did bears evolve? Do they all go to sleep in winter? Thanks to our partnership with the WWF, protecting bear species was a key focus: with six species of endangered bear out of eight, how can we ensure their future?

Four-year-olds are a challenging audience for the Museum. Our team saw an opportunity to put a twist on this exhibition that we hoped would be a way to make them feel it was a space for them. Every teddy brought to the exhibition got a special necklace with an electronic tag in it according to the child's preferred language. So every time the child saw a teddy in the exhibition, they could hold their own bear up to it to activate the exhibit – the teddy's eyes blink and maybe it told a story in your own language, or played a game with you to learn more about bears, thanks to RFID technology. As such, the children's experience was a big hit. The only difficulty was finding enough tags for all the adults that asked for them too...

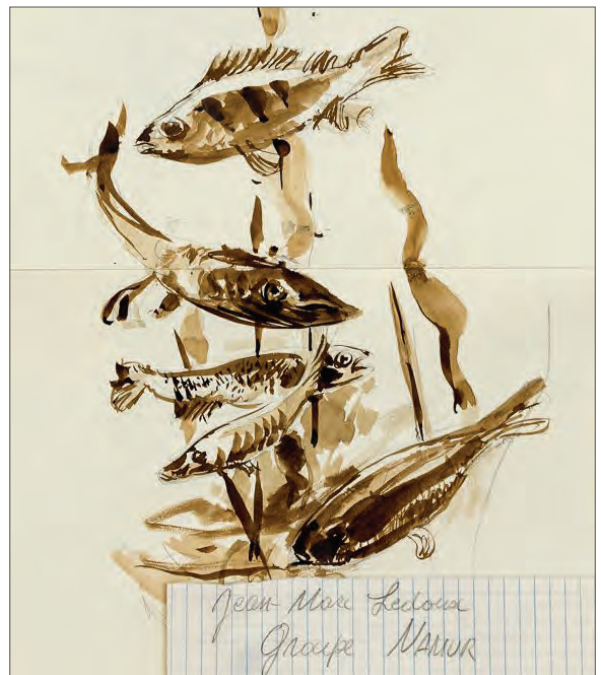


## Pencils, paper and paleontology

A new temporary installation this year at the Museum on scientific illustrations proved to be the perfect opportunity. We launched a Sketch Marathon to inspire creative new audiences to come through our doors.

Our installation, *Fusion18*, bridged the gap between the natural sciences and drawing. It was a chance to discover our collections through scientific illustrations of our specimens and works by well-known Belgian artist Frans Gentils. Visitors witnessed the skill behind scientific illustrations that makes it possible to show several aspects of a specimen – its texture, material and thickness – in a single image.

What's more, the more artistically-inclined among our visitors, who brought their sketchbook along, received half-price entry to our galleries. And on May 4th we celebrated this with our 12-hour Sketch Marathon, with free entrance for artists, filling our exhibition halls with sketchers and filling Instagram and Facebook with beautiful artworks hashtagged *#museumfusion18*. A selection of the works was also added to the exhibition for visitors to enjoy.



## Educational workshops with a new approach to perception

Co-creation was the key to a set of four new workshops piloted and launched this year, thanks to cooperation with a group of blind and partially-sighted people. Our team worked closely with the Antwerp branch of the Flemish association VeBeS to come up with concepts that would ensure an inclusive approach.

The group's first visit already transformed the Museum team's idea of what to expect. Participants' feedback was clear: with museum tours, even if some exhibits cannot be touched, it is always worth taking the time to experience being among them and having them described.



And where possible, the group was keen to have a moment not only to touch specimens, but also to engage in dialogue, having a chance to ask their questions and share their own knowledge. The result is a set of workshops that explore the evolution of life, the human body, dinosaurs and evolution of humankind from new angles, breaking down barriers to ensure we are meeting the needs of a broader range of people.



## ANY QUESTIONS? NEW WAYS TO LEARN

*Curiosity is where science begins, and the Institute continues to explore new ways of piquing people's interest in the natural sciences. And the highlights this year took learning experiences from offline to online, as well as the other way around.*

### 10 years of curiosity

In 2008, a website was launched: *Ik heb een vraag* (*I have a question*), where anyone could send their queries to be answered by scientists. 42,000 answers later, we realised it was time to preserve the memory of these questions by writing a book about it.

The success of *Ik heb een vraag* makes sense in our age of quick fixes. Some questions just can't be answered in a Google search, and among the 200 in the book are some great examples. "Can fleas see bacteria?" "If lightning hit corn, would it pop?" "Why does dark chocolate make me so happy?" It takes a carefully thought-out response from a scientist to put a real, evidence-based answer together. And with the RBINS and over 30 other research institutes on board, *Ik heb een vraag* certainly has no shortage of scientists.

The curiosity of the questions is captured beautifully in the illustrations that bring the hardback book to life. It is not only a great gift but also the perfect way to thank the contributing scientists for their hard work. And no, in case you were wondering - fleas can't see bacteria, it turns out.



### Belgium's got biotalent

In between trips to the Museum, how can you satisfy your enthusiasm for biodiversity from the comfort of your laptop or mobile? 2018 saw the launch of a new project BIOTALENT. It's a new, free e-learning course that plunges participants into the world of biodiversity, building knowledge and skills, for anyone working in science education, or for science fans who simply can't resist.



The project to develop the course is coordinated by the Institute as part of a European collaboration, and the museum partners' collections are at the heart of the content, along with an enquiry-based learning approach. Registration opened in October 2018 with over 650 people signing up. The course looks first at biodiversity in a changing climate, over six weeks. Next, participants choose between six-week case study modules on medicinal plants or amphibians and reptiles.

20 lucky participants will be selected for training days in the field in Crete. And everyone completing the course receives the ECVET-compliant Training Certificate and the Europass Certificate Supplement, certifying the skills and knowledge they have acquired. For more information, see <http://biotalent.myspecies.info/>.

## MAKING HEADLINES:

### NEW APPROACHES TO OUR MEDIA WORK

*As the media environment shifts, so does our strategy to ensure the Institute's work gets the coverage it deserves. Central to this strategy has been the concept of a single point of contact – a single, multilingual press contact at the Institute to put journalists in touch with the right person. New profiles in our communications team have raised the profile of the Institute online too. The results build on years of work with our long-term, well-established contacts to ensure success stories, as our highlights show.*

#### Once upon an Institute...

In November 2018, Sunday nights were RBINS nights. Dutch-speaking TV viewers can't possibly have failed to see it: the stunning six-part documentary series about the Institute, *Er was eens* ("Once upon a time"). A massive 190,000 people tuned in to see the first episode, and reviews both in the press and online sang the praises of this spectacular glimpse behind the scenes at the Institute.

For such a large-scale co-production, two years in the making, the entire team at the Institute had to pull together. The young filmmakers from the aptly named production company Diplodokus followed forty of our researchers and technicians during their work, and joined us on expeditions in Belgium and abroad.



Their images portray a Museum in evolution, between tradition and modernity. But the most striking aspect of the documentary is written all over the faces of our colleagues: the passion for their work. It's a reminder for all of us that being part of the Institute is so much more than a job.

#### Paleontologists in the press

140 years ago, the Museum's famous Bernissart iguanodons were first revealed to the world. And we couldn't let this anniversary go by unmarked – both in French and Dutch. We worked with publishers to produce a 74-page special edition of *Fossiles*, the French paleontology journal. We were also happy to secure a special edition of the highest-profile popular science magazine in Flanders: *EOS Wetenschap*, featuring 82 pages and a poster of the iguanodons drawn in 1880. Staff from across the Institute supplied the majority of the text, illustrations, photos, archival work and even translations.

Our media partnerships also stretched significantly further afield this year, with a feature-length article for the Chinese journal *Man and the Biosphere*.

This came about thanks to our work with the Chinese Academy of Sciences in Beijing, and was a cooperation between our communication and palaeontology teams. It will be translated into Chinese and published in 2019 in a double edition featuring natural history museums across China and worldwide.

This year's palaeontology expedition to Wyoming, mentioned on page 12, also had a stowaway: a member of our communications team came along to document the trip. The result, *Dino Hunting in Wyoming*, is a fascinating, funny and revealing set of blog posts published both on the websites of both the Institute and *EOS Wetenschap*, that show you don't have to be a palaeontologist to catch a bad case of "fossil fever."

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- Breakdown of income
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- Breakdown of research income

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- Profile of the museum user

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- Online and social media

# 4 FIGURES



# FINANCES

In 2018, there was an increase in both the RBINS' income and expenditure. The financial balance shows a positive result of €1,289,000. The increase in this balance since the previous year is almost entirely the result of a partial use of the general grant for the research vessel Belgica, due to a delay in invoicing.

On the income side, it should be noted that personnel funding and general funding now form a single category. This is the result of the integration of personnel funds in the RBINS' general grant. Previously, this budget was managed by the Science Policy PPS, but as of 2018, management has been transferred to the federal scientific institutions, so this budget now forms an integral part of the general grant.

The income of the Museum has increased on the whole by €500,000 compared to 2017. Revenues from ticket sales, the rental and sale of exhibitions, the Museum shop, educational activities, events and the Dinocafé have all risen. The greatest increase was in event revenue, which is up from €165,000 to €248,000. The success of the temporary exhibition *MONKEYS* pushed up revenue from ticket sales and the Museum shop compared to 2017, and certainly compared to 2016. In 2018 it proved more difficult to attract income from donations, sponsoring and subsidies.

Overall, the RBINS' research activity generates more income than in the previous years 2016 and 2017. The rise is mostly due to a significant increase in EU funding, from €1,030,000 in 2017 to €3,810,000 in 2018.

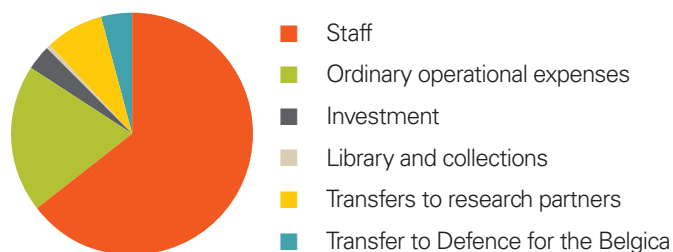
The reason for this is that the RBINS is coordinating two European projects, which means that it also manages the entire project funds. Belspo continues to represent an important and stable share of the income earmarked for research. The decrease in other federal project subsidies is due to a 2017 advance payment of a tranche of €1,200,000 intended for 2018 in the context of a project with the Directorate-general Development Cooperation of the FPS Foreign Affairs. Income from Belgian federal entities is increasing as a result of new projects such as the start of the five-year convention on the geological map of Wallonia. Revenues from the private sector are also increasing in relation to the previous two years. This primarily concerns income from monitoring the impact of human activities in the North Sea, such as sand and gravel extraction and concessions for offshore wind farms.

In addition to these revenues from museum and scientific activities, a number of other revenues can be distinguished, such as those related to the staff canteen, revenues from copyrights and administrative fees charged to third parties.

On the expenditure side, total expenditure rises from €32,170,000 to €33,451,000. It is clear that salary costs account for the largest share of expenditure. This human capital brings the RBINS to life and the search for the means to maintain it in continuous periods of savings remains a constant challenge. The overall operating costs amount to €6,590,000, returning to 2016 levels. Of all these operating costs, the structural funding amounts to €2,266,000, of which 52% (€1,188,000) are spent on basic services such as energy and maintenance.

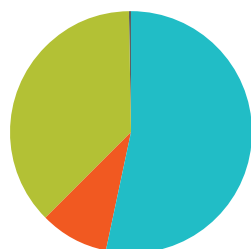
## BREAKDOWN OF EXPENSES (IN €)

	2016	2017	2018
Staff	21,362,000	21,655,864	21,631,365
Ordinary operational expenses	6,820,000	6,138,251	6,590,608
Investment	3,318,000	1,367,352	1,057,306
Scientific	1,313,000	315,174	194,234
Museum	24,000	69,748	233,734
Others	1,981,000	982,430	629,338
Library and collections	278,000	226,189	222,771
Transfers to research partners	595,000	388,745	2,639,276
Transfer to Defence for the Belgica	4,260,000	2,394,075	1,310,326
<b>Total</b>	<b>36,633,000</b>	<b>32,170,476</b>	<b>33,451,652</b>



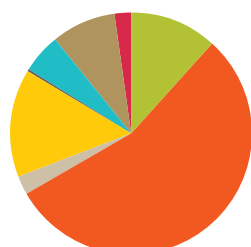
## BREAKDOWN OF INCOME (IN €)

	2016	2017	2018
<b>Staff budget</b>	<b>10,596,000</b>	<b>10,311,692</b>	<b>16,833,000</b>
<b>General grant</b>	<b>9,275,000</b>	<b>6,457,555</b>	
<b>Museum: own income</b>	<b>3,865,000</b>	<b>2,417,472</b>	<b>2,916,035</b>
Museum renovation grant	1,527,000	0	343,891
Ticket sales	1,292,000	1,504,235	1,600,279
Exhibition hire and sales	35,000	63,000	80,510
Museumshop	332,000	408,148	418,195
Donations - sponsorship - grants	86,000	100,228	4,240
Education	166,000	127,730	157,804
Events	166,000	165,311	248,009
Dinocafé	18,000	48,820	63,107
<b>Research: own income</b>	<b>10,400,000</b>	<b>9,727,302</b>	<b>11,679,764</b>
Belspo	3,419,000	3,156,077	3,183,643
Federal administrations (excl. Belspo)	1,694,000	1,667,425	198,760
European Union	1,313,000	1,030,745	3,810,546
Belgian federated entities	1,483,000	1,313,615	1,579,670
Private sector	2,392,000	2,337,572	2,746,322
Outside the EU	99,000	221,868	160,823
<b>Various: own income</b>	<b>121,000</b>	<b>312,805</b>	<b>44,503</b>
Belgica Grant	-	3,109,000	3,134,000
Public Observatory Grant (all federal museums)	-	132,000	134,000
<b>Total</b>	<b>34,257,000</b>	<b>32,467,826</b>	<b>34,741,302</b>



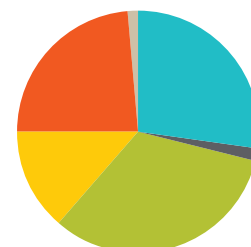
- Staff budget and general grant
- Museum: own income
- Research: own income
- Various: own income

### BREAKDOWN OF INCOME OF THE MUSEUM



- Museum renovation grant
- Ticket sales
- Exhibition hire and sales
- Shop
- Donations - sponsorship - grants
- Education
- Events
- Dinocafé

### BREAKDOWN OF RESEARCH INCOME



- Belspo
- Federal administrations (excl. Belspo)
- European Union
- Belgian federated entities
- Private sector
- Outside the EU

# STAFF

The workforce has been declining for many years, mainly as a result of the government-imposed cuts on personnel. The results are particularly noticeable in the figures for statutory staff. The increase in contractual scientific staff reflects the vitality of research projects. The trend of cuts in recent years has led several (support) services to reach the critical minimum level of staffing.

The number of women within the organisation has remained virtually stable compared to 2017, for both statutory and contractual staff. However, in 2018 we do notice a slight increase in the number of women in senior positions (scientific and level A).

The average age of the staff is now 44 years old. In recent years we have invested heavily in attracting young people, bringing the number of under-26-year-olds to 4.86%, whereas the legal requirement is 3%. However, approximately 1/5 of our workforce is in the 55-65 age group.

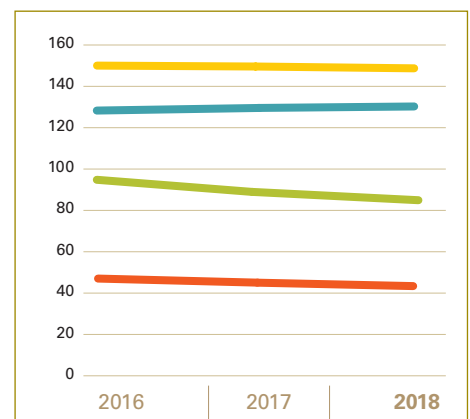
Absenteeism has increased since 2017 (from 5.67% to 6.51%), an increase also seen in the total figures of the federal government but also in the private sector which reached an average record percentage of 7.06%. The number of accidents at work has decreased slightly compared to 2017, both for accidents in the workplace and while commuting.

The number of volunteers who came to assist us in 2018 dropped slightly as far as scientific research is concerned, but there was a strong rise in the number of volunteers for the collection and Museum. Given the heavy cuts on staff budget, this is a welcome support within the various departments of the organisation.

The colleagues from the Gulledelle campus moved to the central campus of Vautier in November, where they occupy two completely renovated floors. All of the organisation's services have now been brought together on a single site, which will facilitate cooperation with other services and strengthen personal ties. Only in Ostend will a field service be maintained, which focuses on research on the North Sea.

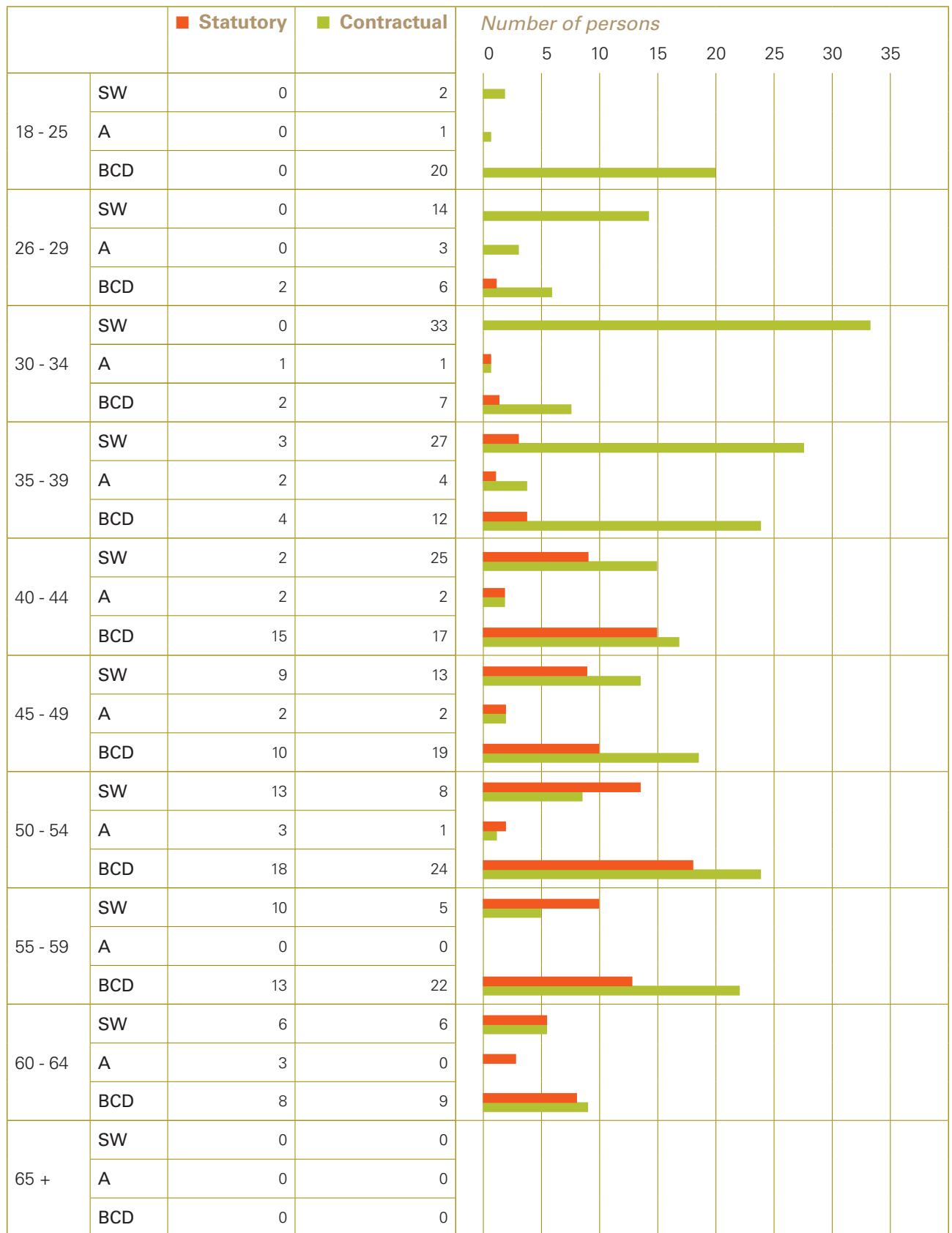
## STAFF BREAKDOWN BY STATUTE (NUMBER OF EMPLOYEES / IN FTE)

	2016	2017	2018
■ Statutory scientists	46 / 44.6	45 / 42.6	43 / 41.4
■ Statutory administrative and technical staff	95 / 83.76	90 / 81.26	85 / 78.16
■ Contractual scientists	130 / 117.75	132 / 121.35	133 / 120.6
■ Contractual administrative and technical staff	153 / 129.8	152 / 130.15	150 / 130.25
<b>Total</b>	<b>424 / 375.91</b>	<b>419 / 375.36</b>	<b>411 / 370.41</b>



The first number refers to the number of employees, the second to the number of full-time equivalents (FTE).

## AGE PYRAMID



**SW** = Scientists

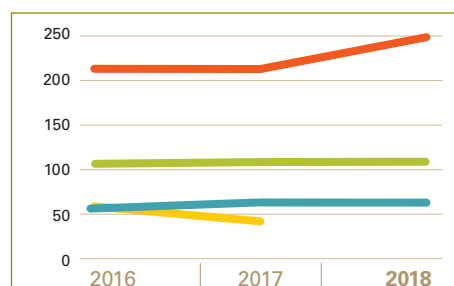
**A** = Level A (Master)

**BCD** = Levels B (Bachelor), C (secondary education) and D (no degree)



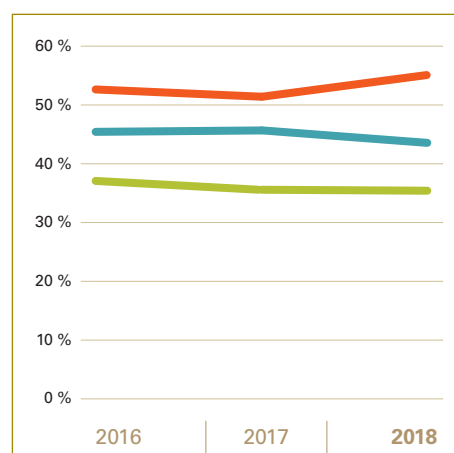
## SOURCES OF FINANCING OF THE STAFF (NUMBER OF PERSONS / IN FTE)

	2016	2017	2018
■ Staff budget	209 / 187.56	209 / 190.36	250 / 228.21
■ General grant	54 / 44.1	46 / 41.75	
■ Ordinary income	54 / 46.3	57 / 47.5	57 / 47.9
■ External projects	107 / 97.95	107 / 97.75	104 / 94.3
<b>Total</b>	<b>424 / 375.91</b>	<b>419 / 377.36</b>	<b>411 / 370.41</b>



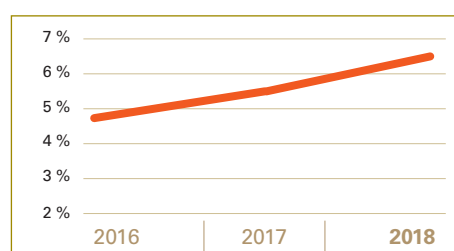
## PERCENTAGE OF FEMALE STAFF (%)

	2016	2017	2018
<b>Statutory staff</b>	<b>34.04</b>	<b>34.07</b>	<b>33.59</b>
■ Scientists	26.09	26.67	27.91
■ Level A	41.18	35.71	38.46
■ Levels B, C and D	37.18	38.16	36.11
<b>Contractual staff</b>	<b>51.59</b>	<b>51.06</b>	<b>50.53</b>
■ Scientists	48.46	46.97	45.86
■ Level A	64.29	66.67	71.43
■ Levels B, C and D	53.24	53.28	52.94
<b>Total</b>	<b>45.75</b>	<b>45.58</b>	<b>45.26</b>



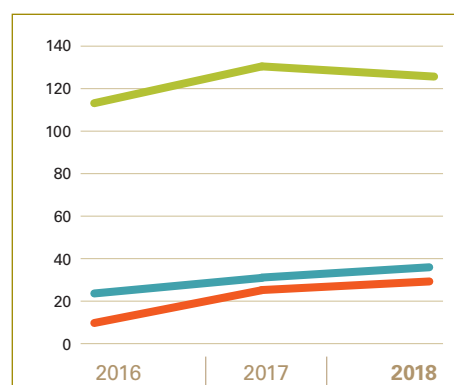
## ABSENTEEISM AND WORK ACCIDENTS

	2016	2017	2018
Work accidents	14	7	5
Accidents on the way to work	6	12	9
■ Absenteeism RBINS	4,87 %	5,67 %	6.51 %
Absenteeism federal level	6,2 %	6,1 %	Not available



## VOLUNTEERS

	2016	2017	2018
■ Research volunteers	115	131	124
■ Collections volunteers	10	23	31
■ Museum volunteers	22	27	38
<b>Total</b>	<b>147</b>	<b>181</b>	<b>193</b>



# ENVIRONMENT

To ensure the continuous improvement of our work, the RBINS obtained in December 2015, within a specific scope, external certification for its integrated Quality, Safety and Environmental management system: ISO9001:2008, OHSAS18001 and ISO14001 (EMAS).

At the end of September 2018, this first certification cycle ended and the next cycle should have begun. In the meantime, the ISO standard tightened up its requirements. The renewed ISO 9001:2015 quality standard would have had to be implemented, requiring additional capacity and resources. The current cost-cutting measures, both in terms of budget and human resources, meant that the organisation could no longer guarantee these resources and therefore could not implement these new elements.

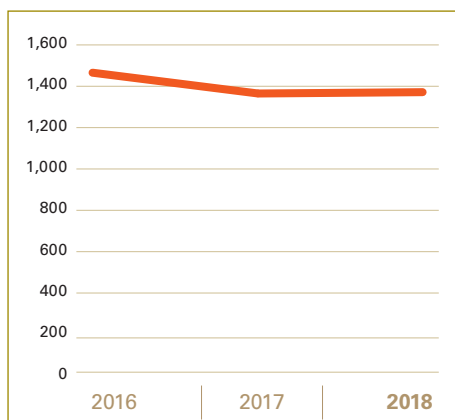
The certification ensured that methods and processes were clearly described. To maintain this knowledge, the Board of Directors decided to continue working in accordance with the current integrated quality system in the near future, but without the external certification.

With the Ecoteam, there have been a number of actions on biodiversity and mobility this year as well. For example, during mobility week, brochures and cycling maps were distributed, with a focus on events such as Car-Free Sunday and the car-sharing fair. In the summer, staff were invited to visit our flower garden, raising awareness of the growing problems around the bee population and the biodiversity project in Leopold Park.

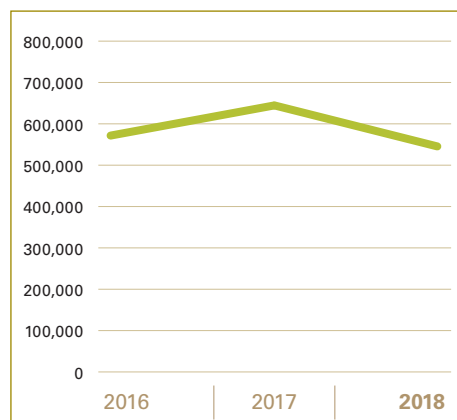
## ENVIRONMENTAL INDICATORS

	2016	2017	2018
■ Electricity consumption in equivalent tonnes of CO2 emissions	444.1	451.7	454.7
■ Gas consumption in equivalent tonnes of CO2 emissions	982.6	943.4	941.8
Total energy consumption in kWh	6,557,178	6,407,280	6,412,413
■ Pages of paper printed	589,002	586,056	558,705
Percentage of commutes using public transport	83,7 %	Measured every two years	Survey postponed to the first semester of 2019.

**ENERGY CONSUMPTION**  
IN EQUIVALENT TONNES OF CO2



**PAGES OF PAPER PRINTED**



# RESEARCH

The number of scientific publications decreased slightly compared to last year. The number of publications in leading scientific journals with an impact factor (IF) is also falling. In 2018, approximately 15% of scientific publications were available in Open Access (and therefore freely available to all). The number of popular scientific works has once again risen sharply, after a decline in recent years.

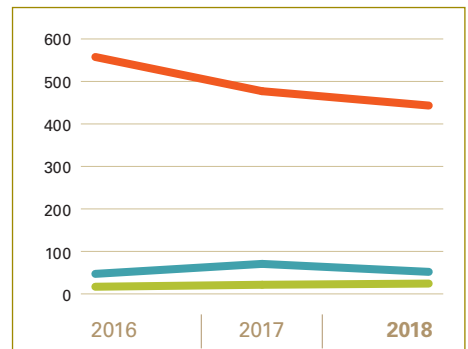
The number of publications per scientist is slightly lower than last year. The number of publications per researcher - scientists engaged in fundamental research - was calculated for the second time in 2018. We see 19% fewer than 2017.

In 2018 there were 144 ongoing scientific projects, a slight increase compared to 2017. We coordinate some 63% of the projects in which we participate.

The number of projects per source of funding remains stable, but the figure for European Union funding almost quadruples in absolute terms, as we are the coordinator of two major EU projects: HIGHROC and HYPERNETS.

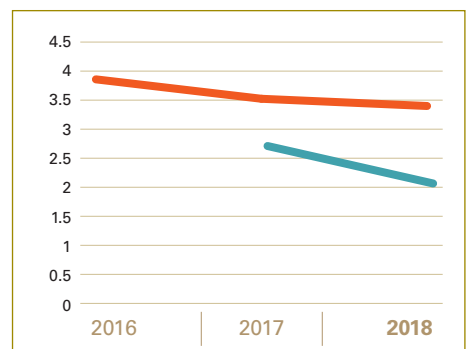
## PUBLICATIONS

	2016	2017	2018
Scientific publications	567	484	450
of which Open Access	97	115	66
of which journals with impact factor	189	207	142
Popular works	22	23	38
Expert reports	44	71	41
<b>Total</b>	<b>633</b>	<b>578</b>	<b>529</b>



## AVERAGE NUMBER OF PUBLICATIONS PER SCIENTIST (IN FTE)

	2016	2017	2018
All publications per scientist	3.90	3.52	3.42
All publications with impact factor per researcher	Not available	2.69	2.17



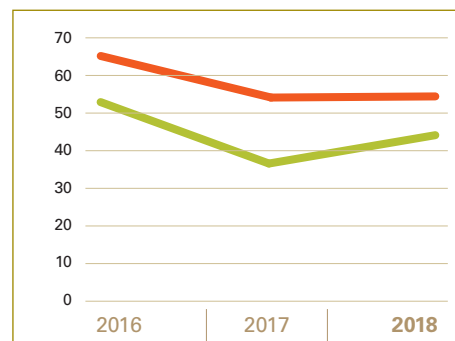
## FUNDING OF CURRENT SCIENTIFIC PROJECTS

	2016	2017	2018	2018
	Number	Number	Number	Amount (in €)
<b>Belpo</b>	57	61	60	
Number of projects coordinated by RBINS	42	43	40	3,183,643
<b>Federal funding from other sources</b>	13	12	14	
Number of projects coordinated by RBINS	13	12	14	198,760
<b>European Union</b>	23	25	27	
Number of projects coordinated by RBINS	3	3	4	3,810,546
<b>Federated entities</b>	24	21	25	
Number of projects coordinated by RBINS	14	13	14	1,579,670
<b>Private sector</b>	8	6	9	
Number of projects coordinated by RBINS	8	6	9	2,746,322
<b>Outside the EU</b>	10	9	9	
Number of projects coordinated by RBINS	10	9	9	160,823
<b>Total</b>	<b>135</b>	<b>134</b>	<b>144</b>	
projects coordinated by RBINS	90	86	90	11,679,764

## SUPERVISION OF STUDENTS

	2016	2017	2018
■ PhD	64	54	54
■ Master	52	37	44
<b>Total</b>	<b>116</b>	<b>91</b>	<b>98</b>

The supervision of both doctoral and master's students remains fairly constant on the long term, but shows a small increase compared to 2017. The rise is highest among master's students.



# LIBRARY AND COLLECTIONS

It has been a year of transition for the library, one of the country's largest natural science libraries. The library was transformed into a knowledge centre, which opened at the end of the year in a renovated building. This move was possible thanks to the digitisation of the card catalogue, the main inventory of books for acquisitions before the year 2000, with around 300,000 cards.

A new library website was also launched, providing direct access to the Limo catalogue, Web Of Science and the bank of PDFs managed by the library. The number of paper consultations is still down, while digital consultation is on the rise. In 2018, 18,249 pages were digitised.

Our scientific collections include about 38 million specimens. No fewer than 129,636 were added in 2018. The number of visitors to our collections for scientific research is going down, but the number of visiting days is increasing significantly. There are fewer visits, but they last longer.

The number of loans from the collections has remained stable for some years. In 2018 we registered 398 loans, involving 35,479 specimens.

The digitisation of the specimens comprises two parts: introducing metadata about the specimens, and digitising the specimens themselves, with as many as seven different techniques. Priority is given to type specimens, that is, those that describe or help describe a species. In 2018, the metadata of approximately 23,500 specimens were introduced or completed. To date, data for 90,753 model specimens are available; about 45% of the 200,000 total.

For non-type samples, there are 2,783,932 samples out of a total of about 38 million, or about 7%.

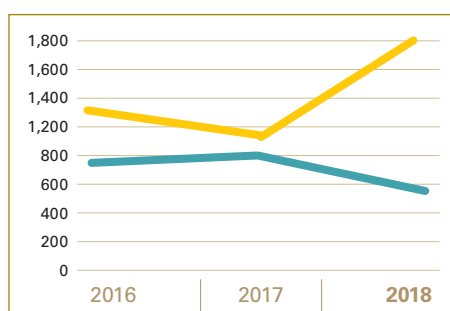
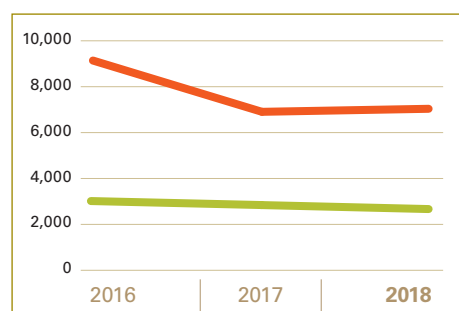
## SIZE

	2016	2017	2018
<b>Library</b>			
Size of the library	405,070 items	410,149 items	414,320 items
Growth of the library	Not available	Total growth of 1.2%	Total growth of 1.0%
<b>Collections</b>			
Number of collections acquisitions	+209,804	+300,936	+129,636

\* item = physical unit

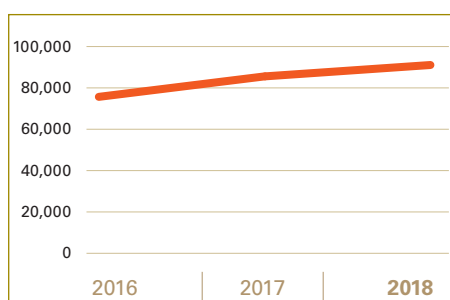
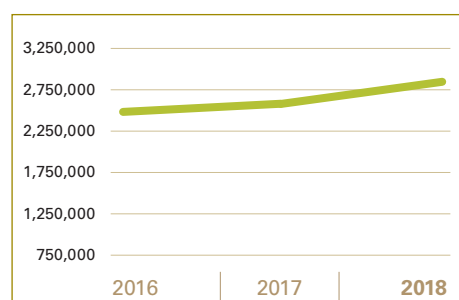
## CONSULTATIONS

	2016	2017	2018
<b>Library</b>			
■ Paper documents	3,496	2,879	2,676
■ Electronic documents	8,852	6,986	7,121
<b>Collections</b>			
■ Number of scientist visits	593	648	477
■ Duration of scientific visits (days)	1,361	1,050	1,800
Number of loans from the collections	386	370	398
Number of loaned specimens	-	36,788	35,479



## DIGITISATION

	2016	2017	2018
<b>Library</b>			
Back-cataloguing	5,917	5,601	3,891
Digitisation of the catalogue of the library	0	60,000	380,000
Number of digitised pages	110,000	50,000	18,249
<b>Collections</b>			
Type specimens	1,986	1,811	2,270
Non-type specimens	232	195	2,900
The new registrations in the databases	20,062	24,409	23,496
The number of new types	2,182	748	1,039
■ The total of digitised specimens (metadata)	2,580,717	2,764,880	2,874,685
■ The total of digitised type specimens	86,901	89,714	90,753
The total of digitised species (all specimens)	76,210	79,780	81,823
Scientific archives	58,590	24,943	70,693



# MUSEUM

With 328,183 visitors, the Museum has had a similar year to 2017. The difference is minimal: 317 more visitors, or 0.1%. With these figures, we are once again in line with the success of 2012 and 2013, after the slightly less successful years 2014-2016. We note that the visit is limited by the capacity of the exhibition halls and the lack of a smooth flow of visitors. The current renovation works should provide a solution by improving visitor comfort, even if numbers increase.

The similarity to 2017 is also repeated in the visitor profiles. After all, there is hardly any difference between the two years in the number of visitors coming in groups and the number coming individually or in a family context. The ratio between the two categories has therefore remained stable (76.3% individual or family, as opposed to 23.7% in a group). We have seen this pattern since 2015, with a remarkably lower proportion of visitors in groups than in previous years (28% on average between 2008 and 2014 and more than 35% between 2002 and 2006). The overall number of visitors to the Museum is therefore increasingly dependent on mainly individual and family visits. If we look at the profile of the visitors by age category, we see the same stability in the proportions in recent years. Only the proportion of very young children (0-5 years) decreases slightly (from 16% in 2015). This is explained by the programming of temporary exhibitions in recent years that attract older children (WoW, *POISON* and *MONKEYS*).

However, there is a difference compared to the previous year in the pulling power of the temporary exhibitions. The number of visitors to the temporary exhibition decreased by 17,608 (down 13%), but this was fully compensated by more visitors to the permanent exhibitions (up by 17,925 or 9.3%). In 2018, 36% of all visitors visited a temporary exhibition. In the two previous years, this was 40% and 41% respectively. However, the temporary exhibitions in 2018 did not do badly: *MONKEYS* attracted 84,618 visitors (120,048 across the whole duration) and the exhibition *TEDDY & BEAR* already attracted 33,763 visitors in 2018 and is still running in 2019.

Finally, the number of customers of the Museum shop increased by almost 4% to 26,166 customers. This represents a significantly higher increase than the number of Museum visitors (up 0.1%). However, spending per customer decreased slightly, to €15.94, so the income remained virtually the same.

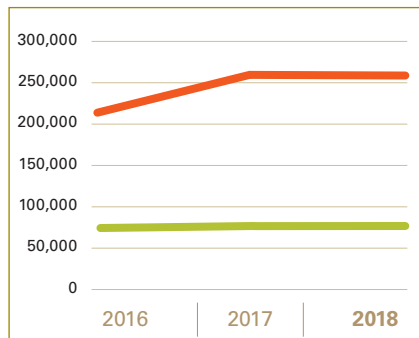
## MUSEUM VISITOR ACTIVITIES

	2016	2017	2018
<b>Total Museum visitors</b>	<b>284,865</b>	<b>327,866</b>	<b>328,183</b>
Permanent galleries	170,642	191,877	209,802
Temporary exhibitions indoor	114,223	135,989	118,381
<b>Museumshop customers</b>	<b>20,556</b>	<b>25,178</b>	<b>26,166</b>
Expenses per customer	€16.42	€16.21	€15.94
<b>Participants in educational and cultural activities</b>	<b>49,885</b>	<b>54,626</b>	<b>54,068</b>
Participant per activity (global)	20,7	21	21,3
Guided tours	15,264	17,550	15,156
Workshops	13,584	14,435	15,408
Other indoor activities	7,108	8,791	9,190
Outdoor activities	13,929	13,850	14,314

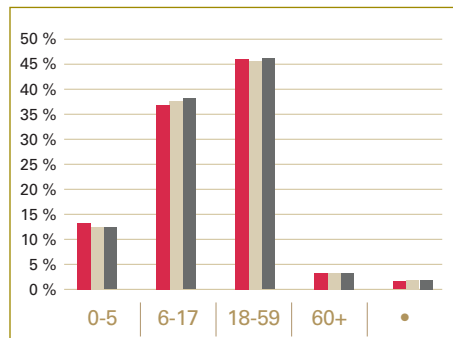
## PROFILE OF THE MUSEUM USER

	■ 2016	■ 2017	■ 2018
<b>By type</b>	<b>284,865</b>	<b>327,866</b>	<b>328,183</b>
■ Visitors in groups	67,956	77,398	77,631
■ Individuals and families	216,909	250,468	250,552
<b>By age</b>	/	/	/
Small children (0-5 years)	13.23 %	12.42 %	11.96 %
Young people (6-17 years)	36.71 %	37.42 %	37.88 %
Adults (18-59 years)	45.78 %	45.46 %	45.90 %
Senior citizens (60+)	2.60 %	2.73 %	2.72 %
Not known •	1.68 %	1.97 %	1.54 %
<b>Participants in educational and cultural activities</b>	<b>49,885</b>	<b>54,626</b>	<b>54,068</b>
■ Visitors in groups	44,372	48,534	46,840
■ Individuals and families	5,513	6,083	7,228
Average participants per activity	20.7	21	21.3

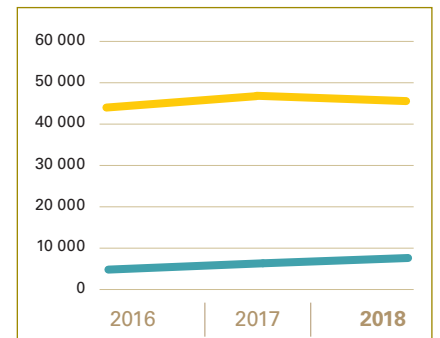
**MUSEUM VISITORS: VISITORS IN GROUPS VERSUS INDIVIDUALS AND FAMILIES**



**MUSEUM VISITORS: AGE**



**PARTICIPANTS IN EDUCATIONAL AND CULTURAL ACTIVITIES**





# PRESS AND INTERNET

In 2018 we were mentioned 1,466 times in the press: about four times a day. In both the first and second semesters, the emphasis was more on scientific topics and research, both in the national and international written press and in broadcast media.

The international press focused mainly on the stranding of a whale, a school of dolphins spotted, and the scientific expertise contributed to the 3D printing of the mammoth for the City Museum of Liege.

Nationally, we received the most attention for falcons, geothermics, stranding of marine mammals and other subjects related to the marine environment. The Canvas documentary series *Er was eens* showed many researchers from different disciplines who were also interviewed in the printed press.

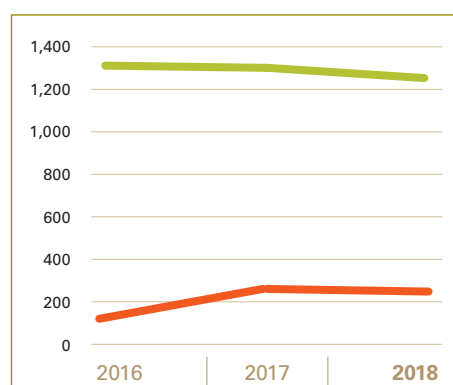
In more than half of the articles or reports, an employee is quoted. This is a consequence of the deliberate strategy of always quoting spokespeople or giving their contact details in our press releases. We see that the media are keen to use this to quote someone from the RBINS.

With all our websites - about 50 - we reach about 755,000 visitors, a small decline compared to 2017. Our corporate website ([naturalsciences.be](http://naturalsciences.be)) reached 392,000 visitors in 2018 (more than half of visitors to all our websites). We can see the evolution of the corporate website from 2015 onwards, and it remains stable.

The number of followers on social media continues to increase, with 11,000 followers on both Facebook and Twitter, and around 1,800 on Instagram. Facebook remains stable with a reach of 2 million people, while Twitter does fall to a good 670,000. Instagram does not yet offer a handy analysis tool to export figures, but about 40 posts achieved more than 1,000 views.

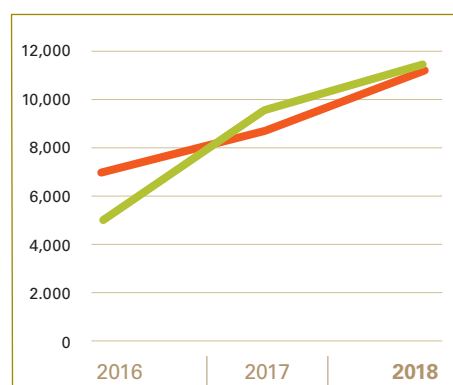
## IN THE MEDIA

	2016	2017	2018
<b>Printed press</b>	1,364	1,281	1,242
Of which research	901	776	858
Of which Museum	463	505	384
<b>Radio and TV</b>	149	229	224
Of which research	Not available	109	178
Of which Museum		120	46
<b>Total</b>	<b>1,513</b>	<b>1,510</b>	<b>1,466</b>



## ONLINE AND SOCIAL MEDIA

	2016	2017	2018
<b>Websites</b>			
Website visitors	Not available	764,829	755,644
Website visits		3,362,919	2,123,583
Visited pages		13,382,919	11,080,535
<b>Social media</b>			
Facebook followers	7,018	8,861	11,187
Twitter followers	5,000	9,900	11,500



# THE RBINS IN BRIEF

## Missions

RBINS has been entrusted with four major missions:

- ▲ Scientific research into natural sciences;
- ▲ Scientific expertise at the service of the public authorities;
- ▲ Conservation and management of scientific and heritage collections;
- ▲ Dissemination of scientific knowledge in society.

## Research & expertise

One out of every three people at the RBINS is a scientist. The scientific personnel includes mainly biologists, palaeontologists and geologists, but also oceanographers, anthropologists, prehistorians and archaeologists, as well as geographers, physicists, bio-engineers and mathematicians, which enables it to conduct multidisciplinary research.

### Lines of Research

- ▲ Biodiversity and geodiversity;
- ▲ Biological evolution and the history of life;
- ▲ Marine and freshwater ecosystems' management;
- ▲ History of the human/environment relationship;
- ▲ Applied geology.

### Service Provision

- ▲ The RBINS provides scientific expertise under Belgium's international commitments in relation to environmental protection.
- ▲ It develops tools and methods for monitoring natural land or marine environments.
- ▲ It also offers useful advice for the development of national and European policies for the protection and conservation of biotopes and biodiversity and the use of natural resources.

## Collections

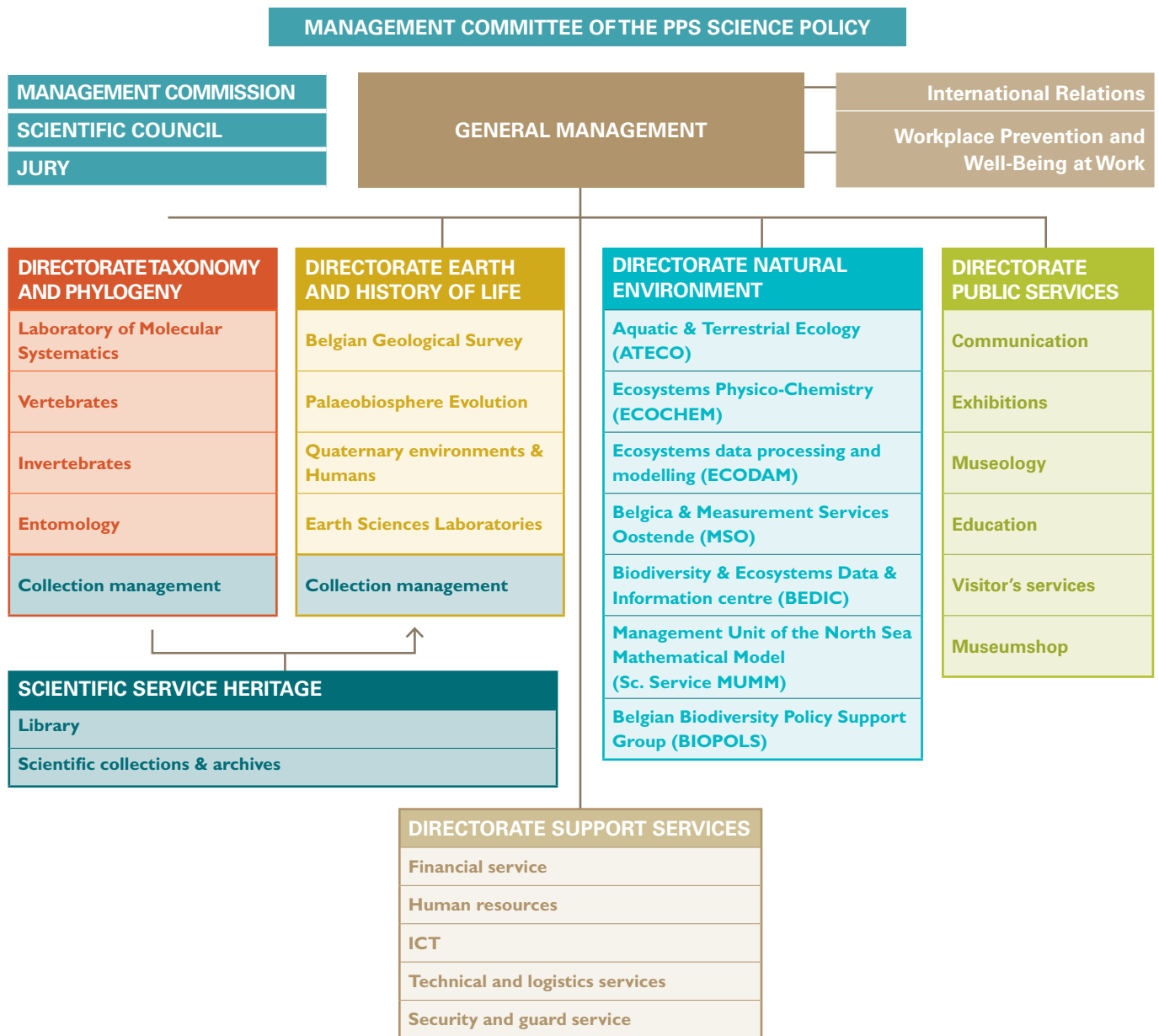
With their 38 million specimens conserved as Belgian heritage of universal significance, the RBINS's collections come just after London and Paris in the European classification, and belong to the top 10 largest collection in the world. They serve above all as reference and research tools and as such belong to the European 'major research infrastructure'. In this respect they are constantly being visited and studied by researchers from around the world. For several years now, the RBINS has been committed to an ambitious programme to digitise its collections and to do so has developed an open-source software, DaRWIN, which has made it possible to encode all the data on any collection of specimens, whatever their taxonomic group.

## Museum

For the general public, the Natural Science Museum is the visible part of the RBINS. It has 16,000 m<sup>2</sup> of permanent galleries, temporary exhibition rooms and educational workshops, public spaces of all kind, enabling it to welcome more or less 300,000 visitors each year, approximately 25 % of whom are school groups. Its Dinosaur Gallery is world famous and the largest in Europe.

It plays a leading role in the promotion and dissemination of scientific culture, both within and beyond its walls, notably through travelling exhibitions and events. The RBINS is pursuing ambitious efforts to gradually renovate the premises, to make the Museum more convivial and better adapted to people's expectations. The Museum also takes a resolute position promoting a more respectful approach to nature.

# ORGANISATION



The Royal Belgian Institute of Natural Sciences is one of the ten federal scientific institutions that are governed by the Belgian Science Policy Office (Belspo).

The RBINS is a State service.

It is managed by **three independent entities**:

- ▲ **The Scientific Council** offers advice on issues of a scientific nature that have an impact on the accomplishment of the tasks of the Institute.
- ▲ **The Management Commission** is responsible for the financial and practical management of the RBINS. It is the same body for the RBINS and the Royal Museum for Central Africa.
- ▲ The General Director is responsible for the day-to-day Institute's management. She is assisted by **the Management Board**.

Moreover **the Jury** for recruitment and promotion is responsible for recruiting the permanent scientific employees and monitoring their careers.

The Institute's General Director is also a full member of the Management Committee of the Belgian Science Policy Office.

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p. 13 photo 1 (C. Lancelot)

p. 15 Photo 3 (Africa Museum)

*All of RBINS activities are described in the 2018 detailed report (FR/NL).*

*This report is available and can be obtained on request*

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