



ROYAL BELGIAN INSTITUTE OF NATURAL SCIENCES

ANNUAL REPORT

FOREWORD

In Europe, the RBINS is one of the five leading natural history museums, very active in the European and international context and a driving force in many European projects.

This praise is taken from the Institute's peer review, which dominated this year's activities. In fact, the conclusions of this evaluation will play a significant role in years to come, providing a solid base for the dialogue that has yet to be established with the Deputy Minister for Scientific Policy about the Institute's mission and priorities.

It also provides an element of reassurance in light of the concerns arising from announcements made on the 16th of October 2014, regarding budget cuts, regulatory restrictions in terms of new employees or access to investment funds and the abolition of the Public Programming Service for Science Policy. To date, we do not know which structure will replace the PPS. Regardless of its nature, it must be able to continue to play its full role, at a federal level, as an orientation agency that funds research, in support of Belgium's federal competences and international obligations.

This new organisation needs sufficient resources in order to succeed. Transparent and clear selection rules, the development of national and international collaboration and ex-ante and ex-post evaluation are all considered international quality standards that must be maintained.

The Institute fully complies with these ambitious policy requirements. It is firmly anchored in Brussels and Belgium, is internationally recognised and

regularly works with over 300 partners in more than 60 countries worldwide.

This past year is a good example of the institute's quest for quality, reliability and relevance. In 2014, our achievements include publishing articles in prestigious scientific journals; providing accurate and instantly available forecasts to warn the population in case of dangerous storms; playing a discreet but valued role in the implementation of international conventions; organising a blockbuster exhibition and developing high-performance tools for the digitisation of our collections. You can read more about this in this report.

Finally, I cannot resist the urge to quote the expert panel again:

“There is a significant amount of which RBINS can be proud – a strong history, a unique collection, a significant public focus through the museum, and enthusiastic and dedicated staff with an excellent collection infrastructure”.

I would like to dedicate this annual report to our devoted and enthusiastic staff.

*Camille Pisani,
Algemeen directeur*

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 mechanisms involved in the evolution of life;
- > Land, freshwater and marine ecosystems;
- > History of life, the climate and human installations;
- > Geology of Belgium and modelling the North Sea.

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.

With their 37 million specimens conserved as Belgian heritage of universal significance, the RBINS's collections serve above all as reference and research tools.

Just behind London and Paris in the European classification, the collections in Brussels have been awarded the European label of 'major research infrastructure' and in this respect 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 taxonomical group.

Museum

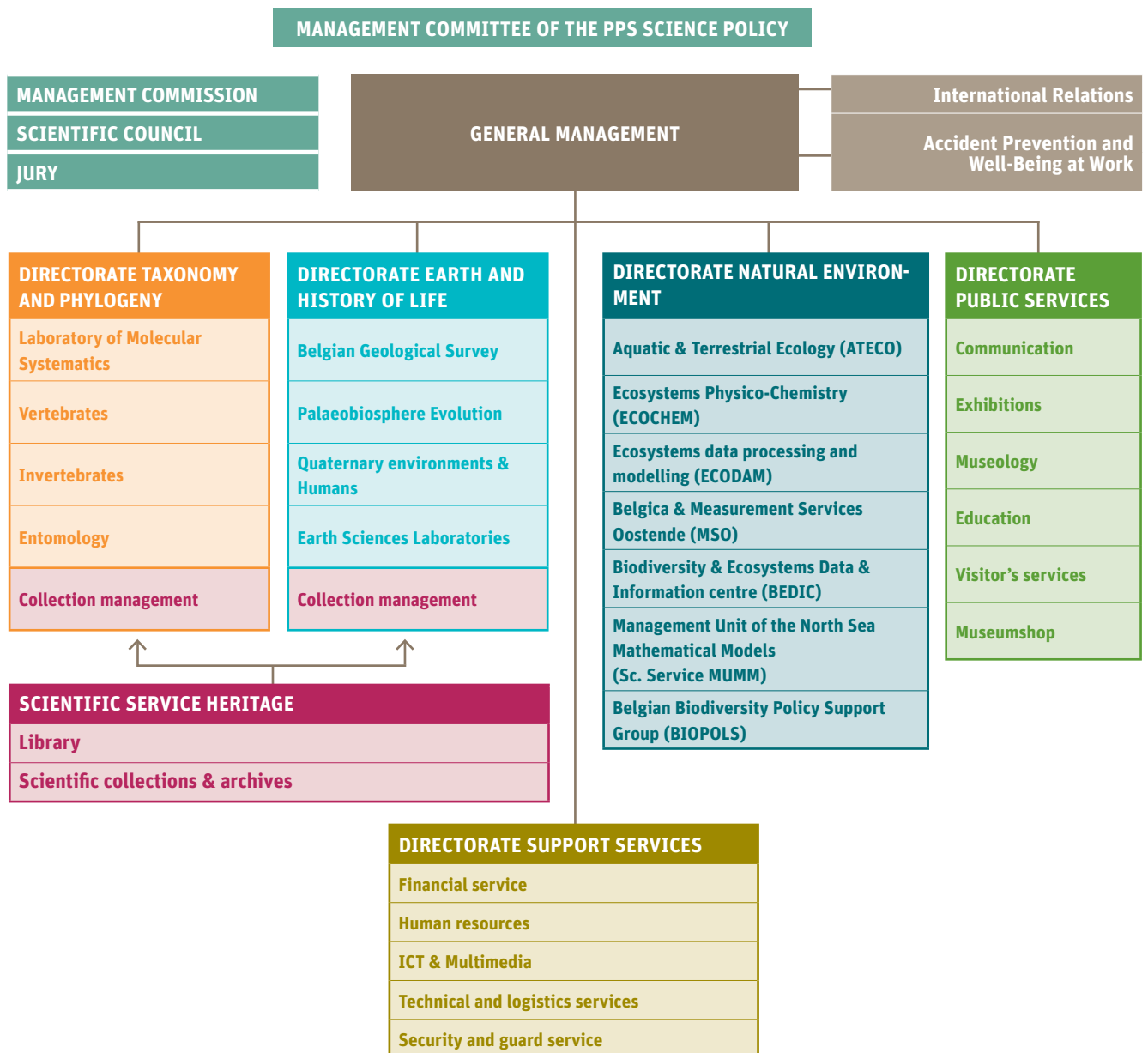
For the general public, the Natural Science Museum is the visible part of the RBINS. It has 16 000 m² of permanent galleries, temporary exhibition rooms and educational workshops, enabling it to welcome more or less 300 000 visitors each year, approximately 30 % of whom are school groups. Its Dinosaur Gallery is world famous, it being 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. It is pursuing its ambitious efforts to gradually renovate the premises, to make the Museum more convivial and increasingly better adapted to the expectations of society; it is also resolutely oriented towards the promotion of a more respectful approach to nature.

Collections



3| " Clearly, the reorganisation promoted strategic discussions and the management is congratulated for its efforts in this regard. "

ORGANISATION



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

The RBINS is a State service. It is separately 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 Nature Focus Management Commission, which comprises the RBINS and the Royal Museum for Central Africa, is responsible for the financial and practical management of the RBINS;

- › The Management Board is responsible for the day-to-day Institute's management.

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

In addition, the Institute's General Director is also a full member of the Management Committee of the Federal Public Planning Service (PPS) Belgian Science Policy.

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RESEARCH

6 | *"The RBINS has a strong national and international position and is recognised as such by relevant entities."*

The Institute as rated by its peers



In 2013, the Science Policy PPS (Belspo) launched a **major assessment of the scientific activities of the establishments** it supervises. The RBINS was the first to be audited. The process focused on the institute's research, expertise and collections. The museum and public activities were not included in the study.

Our employees put a lot of time and effort in gathering the relevant data and preparing a self-evaluation. The Technopolis Group took care of a large part of the inventory and the benchmarking. A committee of **seven international experts** then spent two days in the institute to give their opinion about our results and our strategy.

We were pleased with their praise. They felt that the research was of good quality and constantly improving. The number of scientific articles is on the rise and they are being published in more prestigious journals, as well as being cited more frequently. The stakeholders – partners, patrons, and customers – are satisfied with the advice and services they receive. The recent reorganisation was seen as a positive development, especially the creation of a service for collection management. We are obviously very satisfied with this, which is why you will find quotes from the experts throughout this annual report as a sign of our pride.

There were however also a few points of constructive criticism. The experts recommended that we strengthen the synergies and cooperation between the departments and the teams, as well as better organising the research strategy. At the same time, however, the experts also noted the **complete absence of any financial margin** for implementing such a policy, including funding for the institute's own budget for internal interdisciplinary projects or projects that are a priority. The institute has no other option than to resort to financial opportunism and is highly dependent on external funding for its research.

The panel also concluded that the RBINS, making a virtue of necessity, has developed a **wide portfolio of competences and roles**. While this is both a strength, because of the flexibility it creates, this is also a weakness in terms of identity, image, and continuity – too many activities managed by one single permanently employed researcher – and selection criteria.

The expert panel also touched upon the **rigidity of the administrative rules** and their inadequacy in the margin of qualitative research. It urged the relevant authorities to set out the objectives and define the resources more clearly and coherently.

In 2015, the report's findings will be used to **define and implement the most essential improvements**. This document will play a prominent role in the anticipated dialogue with the Secretary of State for Science Policy.

> 07.01

Several of our scientists were featured on the cover of the Journal of Vertebrate Palaeontology, accompanying an article on one of the oldest and most primitive carnivore ancestors.



> 22.02

3,250 visitors, 30% more than in 2013, admired the work of 40 graphic artists, celebrating Museum Night Fever in the Museum while dancing to the beats of DJs.

Influential bacteria in spiders

Researchers from our institute have demonstrated that **spiders have a very special micro biome**, namely **not the type of bacteria that help them digest but a parasitic species that feminises the population**. These bacteria can cause quite an upheaval in a population and locally may even contribute to its extinction.

For several years now, researchers have been conducting intensive research, using new DNA sequencing technology, into the bacterial communities in humans. Bacteriologists were able to establish connections between the bacterial composition in our gut – the micro biome – and certain diseases. However, it seems that insects and other invertebrates also have a very diverse micro biome. Bacteria help them break down plant material and other substances that are difficult to digest.

However, the spider's micro biome seems to be quite special. Firstly, it is remarkably "clean", containing only four dominant bacterial species. The bacteria live in the cells of their hosts, not in between them, as is usually the case. As a result, they are only transmitted to the next generation through eggs. Our scientists noticed that a number of bacteria developed **a manipulative strategy**, allowing them to **alter the sex of the spider's**



offspring to have as many females as possible, increasing their share in the next generation.

This strategy leads to a sharp increase in the number of infected individuals in the population and a strong drop in the number of male offspring. The monitoring of an infected population showed a **steady deterioration of the species**, which, over time, was replaced with a closely related counterpart. This suggests that environmental changes as well as bacteria in organisms can strongly alter the composition of a species. Another interesting fact: while our skin is positively teeming with bacteria, **no bacteria were found on the spider's skin**.

Two hundred biodiversity experts gathered at a conference in Kisangani

Kisangani is situated in the north of the Democratic Republic of Congo (DRC) where the Lualaba River is named Congo River. The city developed in an area of **high biodiversity**, in the heart of the second largest rainforest in the world after the Amazon. While it occupies a strategic position, Kisangani is still very difficult to reach and suffered for several years during the civil war in the country.

In 2014, RBINS employees were able to **gather 200 researchers from 20 countries here**, to **take stock of the biodiversity** in the

Congo Basin and to exchange knowledge. This unique international conference presented an overview of the biodiversity in the DRC, which was established following the creation of eleven provincial branches, which were **responsible** for gathering the available information in their province.

The conference is part of a larger programme, which also includes the creation of a **biodiversity-monitoring centre** at the University of Kisangani. This hub, which was pre-inaugurated by speakers, will rely on the information from the eleven branches across the country.



BELSPo and the VLIR-UOS INCO programme funded the Kisangani conference. The coordinator was the Consortium Congo 2010, which consists of the Royal Museum for Central Africa, the University of Kisangani, the Botanical Garden of Meise and the RBINS. The monitoring centre was established with the financial support of the Directorate General for Development Cooperation and BELSPo (2011-2014) as well as with the European Action Plan for Forest Law Enforcement, Governance and Trade (FLEGT, 2014-2015).

>

03.03

The CITES Convention marked its 30th anniversary with a conference in the RBINS, reviewing 30 years of application in Belgium and the EU while looking to the future.

>

10.03

Aviation Day: Kris Peeters, the Flemish Minister-President and Hilde Crevits, Minister for Mobility, took a tour of our observation plane and met with the crew.



Discovery of the second largest insect in the world



Since 2010, the RBINS has been visiting **Vietnam** to conduct an **inventory of the insects**. This project, which also includes training in taxonomy, is part of the **Global Taxonomic Initiative** (GTI), a collaboration with the Vietnam Academy of Science and Technology through the Vietnam National Museum of Nature and the Institute of Ecology and Biological Resources of Hanoi. Every expedition gives the RBINS team the opportunity to train Vietnamese biologists in the field and during seminars, helping them to **establish reference collections**. These will be used as a working basis to identify species and reliable comparative

material for describing species that are still unknown. Hundreds of insect species have yet to be described and many habitats are at risk of disappearing, without revealing their secrets.

In 2014, the team, consisting of an entomologist and a volunteer from the RBINS, describes two species and a new subspecies of stick insects. The latter, *Phryganistria heusii yentuensis*, is 32 cm long (54 cm when its front legs are stretched forward), making it the **second largest living insect known**

to date, only a 36-cm phasmid, which was described in 2008, is longer.

These expeditions have already identified more than 150 new species of stick insects. Their description will **more than double the number of known species** in Vietnam in this group.

The three new stick insects were described in the *European Journal of Taxonomy*, a free online journal, which is co-published by the RBINS. Specimens of these two species are now kept by the RBINS and can be observed in the **museum's vivarium**.

Land snails carry dog parasite



The tiny roundworm with the scientific name *Angiostrongylus vasorum* can cause serious health problems in dogs, and can even be fatal. This parasite is carried by land snails, especially slugs.

Recent research suggests that the range of this parasite is expanding in Western Europe. Biologists are now trying to map its progress, but for this, they need to be able to properly and **unambiguously identify the intermediate host** (such as land snails). Until recently, this was very difficult for slugs because the identification based on external characteristics was often unreliable. Determining them on the base of their reproductive organs involves a time-consuming dissection, which, moreover, is only possible in adult specimens.

Identifying slugs **with DNA barcoding** can be a relatively simple way to solve these problems. Species can be identified using

genetic markers from the mitochondrial DNA (mtDNA). Researchers of the RBINS, who were invited because of their expertise in DNA identification, worked with an international research team consisting of scientists from the United Kingdom, the Netherlands, Germany and Australia.

The aim of the undertaking was to identify the intermediate hosts of the parasite in the area around London. The researchers were thus able to demonstrate that the parasite has **a wider spectrum of intermediate hosts** than expected, and therefore has **a greater potential to rapidly spread**. The intention is now to conduct the same research in Belgium to see whether the dog parasite is also spreading here as the snails that serve as intermediate hosts are also found in Belgium. The possible link with global warming, which causes some species to occur more frequently, may also be the subject of further investigation.

> 12.03

The Belgian Biodiversity Platform presented the tools developed to evaluate the risks related to pest organisms and invasive alien species as well as making them available online.

> 21.03

Philippe Courard, the State Secretary for Science Policy, and 40 students in the last two years of secondary education, spent a day on board the research vessel Belgica, participating in a mission.



9 | "The research activity of the OD Taxonomy and Phylogeny is excellent (...) the OD presents an extraordinary record of publications in terms of quantity (...). This is above the production of peers in other museums (...)"

Female Dalmatian wall lizards dislike bruisers

It is widely assumed that women tend to fall for strong, athletic men. As a result, they have more offspring, and a higher "fitness" gradient. While this is often true, there are exceptions to this tenet. Along with colleagues from the universities of Antwerp and Zagreb and the Muséum National d'Histoire Naturelle in Paris researchers of the RBINS found strong indications that the Dalmatian wall lizard, or *Podarcis melitellensis* in full, does not apply this adage.

Using **microsatellite** (DNA that does not lead to protein synthesis) genotyping the team examined the relation between the athletic ability – individual sprint speed and bite force capacity – of male lizards and the number of offspring, which these males fathered. Rather unexpected this showed that **more athletic males produce fewer offspring** than their less athletic counterparts. The conclusion that **females produce offspring with several different partners** was equally unexpected. Future research will have to determine whether the results can be replicated and whether they apply to other lizard species. In addition, the evolutionary explanation of these results remains unclear.



A possible hypothesis relates to the relative energy investment. The more energy they expend on sprint speed and bite force, the less they have for reproduction. In any event, it seems that **in the world of the wall lizard less athletic males are more successful in transferring their genes to the next generation**. This once again illustrates that the survival of the fittest does not always apply.

In Darwin's footsteps: island radiations in the Galapagos

In March 2014, the RBINS organised a three-week expedition to the Galapagos Islands. One of the objectives was to study caterpillar hunter beetles (*Calosoma*) and unravel the genomic basis of island radiations. This is **the process by which a species splits and occupies various environmental niches**. The Galapagos Islands are perfectly suited for such evolutionary studies. These volcanic islands, which have different animals and vegetation depending on their age, have been an "ideal natural laboratory" since Darwin's time. Following the expedition, 500 extremely valuable specimens were added to the RBINS's already vast entomological collection. Using the most recent genomic technology, **the evolutionary history of these caterpillar hunter beetles is now being unravelled**. However, **a number of questions have also been raised**: has evolution repeated itself on the Galapagos Islands, in

accordance with the hypothesis or did it just occur once and did the various species radiate on all the islands in the archipelago? Or is the answer a combination of the two scenarios?

The initial results seem to point convincingly towards the latter, nuanced option, with crucial "speciation genes", which are transferred between species and islands. These, in turn, can serve as an evolutionary breeding ground. Such results can provide **far-reaching insights into the molecular mechanisms of how species originate** and how species can exchange genes. The results also highlight the necessity of safeguarding genetic diversity in valuable ecosystems like Galapagos.

The research was financed by the "GENESORT" pioneers project (BELSPO), the RBINS and the Leopold III Fund.

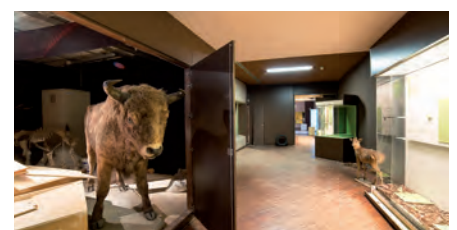


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08.04

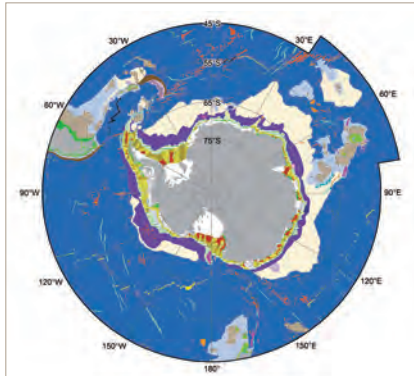
The third peregrine chick hatched in the Cathedral of St Michael and St Gudula! Its arrival created quite a buzz online with 874,700 views from 134 countries.

>
20.04

The Whale Hall, the Mammal Hall and the North and South Poles Hall closed. A new hall highlighting the miracle of biodiversity will open soon.



Biodiversity inventories and atlases



The development of inventories and atlases is **an important mission of the RBINS and a major scientific undertaking**, which makes an essential contribution to the understanding and preservation of our planet.

The information that is gathered, recorded and compared provides a **tangible and descriptive knowledge** of the most diverse species, as well as highlighting the amazing biodiversity of our planet. It also contributes to a healthy planet, by creating references to aid the diagnosis of problems when they arise. It helps detect hot spots of biodiversity and monitor the **impact** of environmental change and human activities on nature. When combined with modelling programmes, these atlases and inventories are an important tool to **evaluate the long-term changes in the distribution of organisms**. Inventories are a source of **information for policy-makers**, making them a vital resource for supporting **conservation strategies** and allowing for the mapping of areas to be protected. They also can be used in the field to **train** local biologists, to interact with NGOs and governments and to **raise the awareness** of the local population about the availability of resources.

Inventories and reference works

The *Biogeographic Atlas of the Southern Ocean* was published in 2014 and is an initiative of the institute, involving 165 researchers worldwide. Based on the data published since the discovery of Antarctica, this atlas lists more than 9,000 species as well as mapping over a million data from 434,000 different sampling stations.

Another example is the *Inventory of the terrestrial gastropods of the Western Ghats in India*. This unique monograph covers over 100 years of inventory, listing 300 species that live in this hot spot of biodiversity.

In 2014, the institute also conducted **two inventory missions in the Democratic Republic of Congo**. The missions focused on mega fauna (mammals and birds) in the Ngiri and Tumba-Lediima reserves, consisting of direct and indirect observations as part of an inter-university partnership, for the modeling of the evolution of ecosystems in the Congo Basin. The results of these missions will be presented in the Bioserf project report, which is funded by Belspo, in June 2015.

Online tools

The *Global Freshwater Biodiversity Atlas* was launched during the “Water Lives” conference, as part of the European BioFresh project. This online tool provides policy-makers with geographic and spatial information on biodiversity in freshwater, which 35% of all vertebrate species call home.

The **Belgian Marine Data Center**, a multidisciplinary instrument, has been collecting data about the marine environment since 1997, taking into account various aspects (sea water, sediment, water column, animals...). In 2014, it made over 500,000 data available. The Belgian Marine Data Center was established in the framework of the European SeaDataNet project.

Knowledge sharing

In 2014, the RBINS published the *Distribution Atlas of the Belgian Miridae*, as part of its series on “Fauna of Belgium”. This publication is aimed at a wider audience of nature enthusiasts and is the outcome of a partnership between amateur biologists and professional researchers. The RBINS employees were instrumental in the editing of this publication, providing editorial and scientific guidance.

> 15.05

Belgian marble and its excavation were the theme of the publication, “Belgisch Marmer”, a new tool for the regional industry, which has to contend with strong international competition.

> 19.05

World Biodiversity Day: Belgium updated its national strategy to better protect biodiversity in Belgium and beyond, during activities abroad.



Did Neanderthals and Modern Humans Live Alongside Each Other for Thousands of Years?

Neanderthals lived in Europe and part of Asia for over 150,000 years before their disappearance and gradual replacement by anatomically modern humans. Palaeogenetic studies have shown that there was some interbreeding between the two populations, probably in the Middle East about 100,000 years ago. Nevertheless, there is no undisputed archaeological or anthropological evidence that proves that the two populations coexisted in Europe. The results of [a new study](#), published in Nature and conducted by Oxford University (in which the RBINS participated), show however that [these two groups of humans did indeed live together on our continent](#). Thanks to a new dating method the era in which Neanderthals lived can be more accurately identified. Their disappearance could be several thousand years earlier than previously thought, but Neanderthals and *Homo sapiens* would have had approximately [2,600-5,400](#) years to exchange their genetics and cultures across Europe. This new study also revealed that [the latest Neanderthal remains](#) are not those found in southern Spain, but [are in fact the Belgian Spy fossils](#), which are between 42,500 to 40,000 years old. In the



future, these fossils might allow us to understand the disappearance of the Neanderthals and the dominance of *Homo sapiens*. Recent excavations, studies and analyses of a variety of evidence (including food, teeth and tools), are increasing our understanding of this pivotal period, both at a regional and continental level. 'The Gallery of Humankind – Our Evolution, Our Body' is a new permanent exhibition at the Museum of Natural Sciences where, from 2015, visitors can learn all about human populations coexisting, human evolution and the modern human body.

The Deinocheirus returns to home

In 1965, a team of Polish and Mongolian researchers found some remarkable [fossils](#) in the [Gobi Desert](#) (Mongolia), which were about 70 million years old. The [two gigantic forelimbs](#) were 2.4 metres long, with impressive claws. The scientists named this dinosaur *Deinocheirus mirificus* (from the Greek for "unusual terrible hand"). However, this discovery remained a stubborn enigma for many years, because apart from these huge forelimbs, to date only a handful of bone fragments had been unearthed. In 2006 and 2009, teams of Mongolian, Korean and Canadian researchers, unearthed [two new specimens](#) of *Deinocheirus*. However, they too found neither the [skull nor the feet](#) of the skeleton. They also noticed that the bones of the forelimbs were quite fragmented. Soon after, a palaeontologist of the RBINS discovered [the skull and the feet](#) in a private collection. It was abundantly clear

that they belonged to the same dinosaur and were stolen in the Gobi Desert and then sold. Fifty years after the initial discovery, palaeontologists are now able to reconstruct the [whole skeleton](#). With a body length of 11 metres, the *Deinocheirus* is [by far the largest ornithomimosaur](#) ("ostrich-like dinosaur") known to man. In spite of their gigantic size, these creatures were relatively mild-tempered. Teeth were absent and its snout – as well as the remains of fish and gastroliths found in its body – point to an animal that foraged for water-based food in rivers. Its long limbs and claws probably helped it pick or dig for plants. In 2014, the RBINS and the Mongolian Minister of Culture were able to finally return the fossils to Mongolia. This official return to the country resolved the question of the skeleton's legal status and led to the publishing of this discovery in the scientific journal *Nature*.



>
22.05

"Collections are crucial for protecting species" according to 60 research institutions, including the RBINS, in a counterargument written in response to an article in *Science*, which was published alongside.

>
11.06

After an extension, the Baby Animals exhibition hit the road. With just under 185,000 visitors in 15 months it was definitely a hit with the younger audience.



12 | "The RBINS is one of the still rather rare institutes conducting high-level interdisciplinary research within this new and rapidly emerging domain of Quaternary Environments and Humans"

The date of cat domestication in ancient Egypt pushed back



In the past, it was always assumed that cats were first domesticated in ancient Egypt at the time of the pharaohs, around 2,000 BC. Recently, however, new discoveries have undermined this hypothesis and pushed back the date of cat domestication to around 7,500 BC in Cyprus and possibly even earlier in the Levant. In the meantime, however, scientists neglected the issue of domestication in Egypt. A team, consisting of researchers of the RBINS among others, studied cat skeletons proving that cats in Egypt were domesticated about two thousand years earlier than initially assumed.

The researchers examined the bones of **six cats**, which had been buried in a pit in Hierakonpolis, near Edfu around 7,500 BC. There were four kittens, a tomcat and a female cat in the grave. And yet they are not related because the differences in age do not match up. The female was eleven months old, far too young to be the mother of the kittens who were about four to five months old. If these were feral cats, they would have had to be caught on four different occasions. It is likely that the animals lived in or around Hierakonpolis, probably because the

domestication process had already begun.

In any event, it seems that people exercised a form of cultural control over the cats in Hierakonpolis, **two thousand years earlier than the presumed domestication of cats** in the era of the pharaohs. Further research will have to determine whether the cats that were venerated in Egypt were domesticated locally or came from elsewhere. DNA analyses may also help clarify this in the future.

The article was published in February 2014 in the scientific journal *Journal of Archaeological Science*.

Did all dinosaurs have feathers?



Since 1996 it was widely assumed that only theropods, a suborder of carnivorous dinosaurs which includes the direct ancestors of birds, were covered with feathers.

The **first ever example of a plant-eating dinosaur with feathers** was unearthed during excavations in 2013 by a team from the Institute of Natural Resources, Ecology and Cryology from Chita (Siberia) together with the RBINS, in a site called **Kulinda** in East Siberia. All the bones belonged to a new primitive, ornithischian dinosaur, which was not related to the bird suborder, and which was called *Kulindadromeus zabaikalicus*.

The shins of its hindlegs were covered with small scales, like those of birds while its tail sported caudal scales (different from the osteoderms of ankylosaurs). There were long filaments across the thorax, the back and around the head.

However, the palaeontologists were surprised to discover **more complex compound elements, resembling feathers, on the fore and hind legs**. To date, these structures were only associated with theropods. This discovery, which was published in *Science* in 2014, suggests that **primitive feathers were probably widespread in dinosaurs, and not just in theropods**.

The scales on the shins are also identical to those found on the legs of modern birds. Embryologists recently demonstrated that these scales correspond with aborted feathers, due to an **inhibiting mechanism** in the epidermis. Would all dinosaurs have had feathers without this mechanism? A subject to debate in the years to come...

> 12.06

"Brain Twisters" is "a fascinating journey to the centre of our brain", according to Vlan as it announced our new exhibition. "Brains are too cool", said the newspaper De Morgen.



> 17.06

His Royal Highness the wasp *Nervellius philippus*: an entomologist of the RBINS named a new wasp species, which was discovered in French Guiana, after King Philip.

The horse's ancestor found in India

An international team of palaeontologists, including researchers from the RBINS and their American and Indian colleagues, recently found the remains of a primitive mammal, resembling a small horse in West India, in a lignite mine in Vastan. Over 200 fossils, including teeth, skulls and bones that are up to 54.5 million years old, **shed new light on the origin of perissodactyla**, the order which modern horses, rhinos and tapirs belong to. These fossils indicate that **perissodactyls originated in India, when this subcontinent was still an island, drifting slowly towards Asia**.

The creature, *Cambaytherium thewissi*, exhibits **characteristics of perissodactyls as well as more primitive characteristics**, especially its teeth, its sacrum and the bones of the fore and hind legs. It probably weighted around 30 to 35 kilos, and was the size of a peccary. This discovery is important because it is the first time that we have a clear idea of what these distant relatives of horses and rhinos may have looked like. It was also the first time that researchers were able to ascertain their origin in the ancient layers of the Earth.



During the Eocene, about 56 to 47 million years ago, India was an island, which had detached itself from Madagascar and was drifting northward towards modern-day Asia. According to scientists, the fact that *Cambaytherium* was only found in India proves that the island had been drifting for quite some time, isolated in the ocean. However, primates and rodents similar to their European cousins, have also been found here, which suggests the existence of a **land bridge**, which would have allowed these animals to migrate, when India floated past the Arabian Peninsula or the Horn of Africa.

Healthy bees thrive in a healthy environment

Bees are responsible for the pollination of various plant species. They play **a crucial role in biodiversity and ultimately also in our food production**. When bees become extinct, we stand to lose a lot of the food that we are used to seeing on our plates.

The Belgian National Focal Point for Biodiversity jointly developed **the website levendebijen.be** together with the FPS Environment. The aim of this website is to **better inform the public about bees as well as encouraging people to take action**. The project was developed in the margin of the Federal Bee Plan (2012-2014) that aims to tackle the increase in bee mortality. According to a European study, called Epi-lobee, 33% of all Belgian honeybees died in the winter of 2012-2013. The website www.levendebijen.be lists **more than 200 information tools**, which were developed by various partners. People also can find tips on how to protect bees here. A few examples of things you can do to help: sowing indigenous flowers that produce a lot of nectar, having a mound of earth or an insect hotel in your garden, and drinking organic coffee.

The educative BZZZZZ trail was launched in the Museum with the

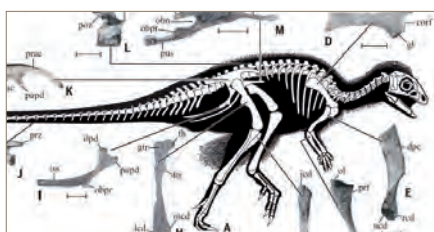


same objective, namely to illustrate the importance of bees. Young visitors, families and schools are given the opportunity to take an educational tour of the museum, with a lot of bee facts.

In June 2014, **a scientific seminar** was organised on the health of the honeybee and the surrounding environment. The aim was to better monitor the bees in our hives and to find out more about how healthy the environment is. New or enhanced measures can then be proposed for the protection of the bees and their (and our) environment.

> 21.06

A publication in *Science*: palaeontologists of the RBINS discovered fossils in Siberia that suggest that all dinosaurs had feathers.



> 22.07

Our ecologists concluded that the altitude for maximum species diversity varies depending on the organism (plant, vertebrate or insect) at a conference about biodiversity in New Guinea.

RV Belgica celebrates its thirtieth anniversary



In 2014, the Belgian research vessel Belgica, or RV A962 Belgica in full, celebrated its thirtieth anniversary. The RBINS organised a major event to mark this occasion, which kicked off on the weekend of the 17th and 18th May 2014, with an animated video, a conference and **open door days** during the Brussels Port Festival.

The thirtieth anniversary was an excellent opportunity to **raise the public's awareness** of the RV Belgica. Hundreds of people visited the ship and asked the crew and scientists questions. The **popular animated video**, which had been created by our multimedia team (in

three languages) showed what the RV Belgica is capable of in the most astonishing manner: **the ship's most crucial role is the constant monitoring of events in the North Sea.**

A lot of science goes into keeping the North Sea viable and profitable. As a result, every Belgian stands to benefit from maintaining it. The RV Belgica is even relevant for all Belgians, not just coastdwellers, as it conducts missions relating to sustainable fishery, wind energy, sand extraction for building materials and tourism.

The **conference**, which was mainly attended by scientists, included a discussion on the future of the RV Belgica. After thirty years the ship is ready to be replaced. The new ship needs to be **larger and more technologically advanced and to offer more space for scientists, accurate equipment and unmanned measurement robots.**

You can view the animated video that was created for the ship's thirtieth anniversary online at www.howbigisbelgica.be as well as keeping informed about news from and about the RV Belgica.

Innovative tools for researchers



The technological progress in terms of digital electronics and the proliferation of new design tools, whether 3D printing or the prototyping of circuits, now allows scientists to **build their own original and efficient measurement equipment**. These instruments are custom-made to withstand the natural environments they study, whether in the extreme cold of the stratosphere or the watery depths of our oceans.

The **Stratochip** is just one example of this approach. It was developed at the RBINS by the Geological survey of Belgium for missions at **high altitude missions**. This system for observing earth and the atmosphere operates at between 1,000 and 32,000 metres of altitude, and works in a simple and innovative manner. The use of two balloons filled with helium to control their ascent stabilises the device at a pre-determined attitude, plateauing above the study area. Its low cost, its reach and productivity (several

hundred square kilometres covered by day in case of a mapping) make this a unique tool for geoscientists.

The RBINS also developed **Niphargus**. This **temperature logger**, which has several years of autonomy, is based on a new generation silicon diode sensor. This type of technology, which is still very rare and exclusive in commercial instruments, combines the measurement stability of a lab thermometer with the sensitivity of a miniature probe. This **small, autonomous and highly stable tool** allows researchers to monitor the change in temperatures, especially in very humid environments, environments that are difficult to reach or in confined spaces. In 2014, this technology was used in several caves and quarries in Belgium and abroad. This year it will be used to **check temperature and humidity variations in the RBINS's conservatories.**

>

18.08

The start of the installation of 240 photovoltaic panels in the RBINS. The aim is to generate enough solar power to meet 2.5% of the institute's annual energy needs.



>

22.08

A project of the Educational Service, "Man, his origin, his function", won the competition "One day I'll be Marie Curie or Einstein" (Wallonia-Brussels).

15| "RBINS has implemented an efficient strategy, based on important questions and its expertise on both aquatic and terrestrial ecology and ecosystem modelling"

Rare bat crosses the North Sea

Some bats cover incredibly long distances during migration from their hibernation areas to their breeding grounds and back. Sometimes they even fly over the sea. In recent years, there have been several reports of **bats landing on offshore oil platforms and wind farms**.

Until recently, the presence of bats in the Belgian sector of the North Sea had not been studied. In autumn 2014, the research ship "Belgica" was fitted with an automatic bat detector to conduct **a preliminary study** into the distribution of bats at sea. A number of **different bat species** were identified based on differences in terms of echolocation calls, namely Nathusius' pipistrelle *Pipistrellus nathusii*, the Common noctule *Nyctalus noctula*, Daubenton's bat *Myotis daubentonii* and **the rare Parti-coloured bat** *Vespertilio murinus*. Most bats were recorded **at a distance of about five kilometres** from the shore but there was even evidence of individuals about 20 kilometres from the coastline.

The observation of a Parti-coloured bat five kilometres off the coast of Zeebruges is especially surprising as this is the first recorded pres-



ence of this rare bat species in the Belgian sector of the North Sea. To date there are only forty records of the Parti-coloured bat in the whole of Belgium.

The (scheduled) construction of several wind farms and reports of bats on Dutch offshore wind farms recently gave cause for concern about the potential impact of wind turbines on this vulnerable animal species. Future research is needed to confirm this.

First continuous measurement of underwater construction noise on the Blighbank

The **wind farms** off the Belgian coast produce **noise emissions** in the air and under water. These sounds may have an impact on marine life. During the operational phase of power generation, this impact is not lethal. The level of these noise emissions however may occasionally cause **changes in the behaviour of wildlife** as well as becoming a potential nuisance in the marine environment.

The Natural Environment Directorate of the RBINS has been coordinating the **monitoring programme of the wind farms in the Belgian part of the North Sea** since 2005. It measures and analyses underwater noise emissions during the construction phase, during operations, and finally when these wind farms are dismantled. These underwater noise measurements are usually carried out in good weather with small quiet boats, which are propelled by the wind and the currents at these wind farms. For the first time in the summer of 2014, **a stand-alone meter** was able to **continuously** record underwater noise, regardless of the weather conditions, on the fringe of the Belwind offshore wind farm, which is located on the Blighbank sandbar. This device, which was fixed to the seabed by a tripod, measured the underwater noise



emanating from the wind farm for **nearly two months**. This data will be used to supplement the report which the RBINS published at the end of 2013, which was made available to the authorities and the concessionaires of these wind farms. It distinguished between three types of foundations in the North Sea when looking at operational noise. The foundations consisting of **steel single pillars seem to be the noisiest**. Their operating noise levels can exceed up to 12dB, which is louder than the ambient noise when the wind is gentle.

>
01.09

Publication in *Nature*: Neanderthals and modern humans used to live in close proximity, for 2,600 to 5,400 years ago. The Belgian Spy fossils are the youngest remnants of Neanderthals to be re-dated.

>
01.10

XperiLAB.be in Vienna: an example of a rather special educational approach. Our truck was invited to the annual conference of the European Petrochemical Association and welcomed 700 Austrian pupils.



16 | *"The RBINS has shown an international track record in bringing together biodiversity policies with scientific evidence and knowledge (including training). (...) This can be an example for other countries and it is recommended to communicate these practices internationally."*

Training and disseminating knowledge



One of the institute's missions is to make its expertise **available for developing knowledge**. Along with research, reporting and the museum, training programmes are the RBINS's fourth way of sharing this knowledge.

In 2014, researchers and employees organised several training programmes, in the classrooms of the institute or in the field, for professional and amateur audiences. These structured training programmes cover a range of disciplines, relating to biodiversity and natural environments.

Since 2011, the RBINS also manages and organises the **Distributed European School of Taxonomy (DEST)**. This consists of a network of 100 taxonomy trainers, from 60 different scientific institutions. During the academic year 2013-2014, it trained 73 students from various countries.

In its capacity as the National Focal Point for the Convention on Biological Diversity, the institute is also widely involved in the development of **biodiversity skills**. As a result, students and researchers from various Southern countries (Benin, Burundi, Ecuador, and the Democratic Republic of Congo among others) – who do not have sufficient access to data and technology to study the amazing biodiversity in their countries – can conduct a **taxonomic study** of their own samples. Belgian researchers are also given the opportunity to work in the South, in the field, during **workshops, training students and local technicians**.

In the framework of the **CEBIOS (Capacities for Biodiversity and Sustainable Development) programme** which provides support to the partner countries of Belgian development cooperation, the RBINS trains the **administrators of websites** in various African countries for the development of the **Clearing House Mechanism** network (a global mechanism for information exchange set up under the Convention on Biological Diversity).

In the Democratic Republic of Congo (Lushwishi and Itombwe reserves and Bombo-Lumene game park in 2014) the institute is training protected area curators to **collect standardised data** on the dynamics of habitats. These training programmes were developed with universities and university colleges and are designed to **work with as many stakeholders as possible**, whether specialised or not.

In Belgium, the RBINS trains civil servants who work for the FPS Public Health, Food Chain Safety and Environment so they incorporate the issue of **ecosystemic services** in their projects. It also organises a participatory and theoretical training programme for **high school science teachers** about biodiversity challenges.

Licensed professions

The RBINS organises training programmes for professional certification for certain licensed professions. In the framework of BELSPO, the RBINS participates in the training programme for scientific divers. **This state-recognised professional qualification for divers** has been run since 2013, and is specifically aimed at biologists, ethnologists and other researchers who are required to dive as part of their research.

The Belgian Bird Ringing Centre is one of the institute's oldest programmes, relying on a network of 380 banders in the country. Bander certification is obtained after following a training programme and taking an examination that is organised by the RBINS. In 2014, 28 candidates completed the training.

> 02.10

The artists of the Art&Marges Museum exhibited their work in the "Brain Twisters" exhibition to celebrate the evening opening of the Brussels Museums.

> 06.10

The National Focal Point for Biodiversity participated in the twelfth meeting of the Conference of the Parties in Korea. This is the governing body of the Convention on Biological Diversity.





COLLECTIONS

Taxidermy: a rare yet essential profession



A museum of natural history would get nowhere **without a good taxidermist**. He or she prepares new collection specimens, restores old specimens, and stuffs animals for new exhibitions. This **rare and rather remarkable profession** combines the skills of butchers, naturalists and artists.

For quite some time, taxidermy had a negative connotation. A taxidermist stuffs dead animals, or cadavers as they are sometimes called. In **Belgium** only **twenty people** still practice this profession, often working for private collectors.

Taxidermists **play an instrumental role in every natural history museum**. Our own taxidermist works for the scientific collections as well as for the exhibitions. The lion's share of the work is for the collections, often in large quantities by preparing as many animals of as many species as possible. The finished specimens are then sent to the vaults, where they **can be studied by scientists up to several decades later**, for morphological analyses or DNA research.

The specimens in the exhibitions have to be **"lifelike"**. This means that they have to be stuffed with great care, with a lot of attention to the position and finish. The body of a dead animal is therefore sometimes prepared from scratch. A number of birds were stuffed for the 2014 *Baby animals* exhibition for example. However, the taxidermist will usually restore stuffed animals from our vaults. For the restoration of old specimens – some of which date from the nineteenth century – the taxidermist has to be familiar with the techniques they used in this era. These are handed down from taxidermist to taxidermist.

Sometimes taxidermists **will also develop new methods**. One of the problems taxidermists often encounter in stuffed animals is that artificial light will turn the dark pigment paler over time, while light pigment is darkened. For quite some time, taxidermists assumed that nothing could be done to stop this process but our own taxidermist seems to have found a solution to this quandary, using a mixture made with leather paint.

New life

Every week the institute receives new cadavers. These animals may have died on the road as a result of traffic, in zoos, or in rehabilitation centres. Not every cadaver is suitable for use. Sometimes a bird may have flown into a window with such a strong impact that it is impossible to use the cadaver. Animals that are not eligible for taxidermy are sent to the Institute's **osteologist**, who prepares the skeletons for conservation. Useful animals are immediately frozen.

To **"give the animal a new lease of life"**, the taxidermist has to flay the animal with a scalpel and scissors, turning the animal inside out in the process. He cuts away as much flesh as possible to prevent rotting. Even the thin, long pterygoid muscles (in the jaw) have to be removed. Then the specimens are placed in a tanning bath and are washed, after which they soak in diluted alcohol. They are then transferred to a dryer, with wood chips which accelerate the drying process. The bird skulls are preserved because their beak is attached to it. Mammal skulls are removed, the flesh is then cut away and then they are restored or replaced with an artificial skull.

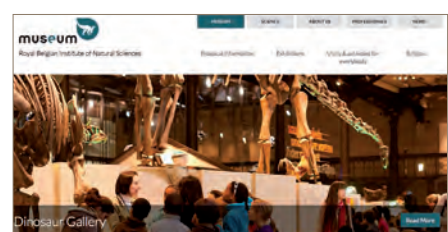
Finally **the biologist and artist in the taxidermist** comes to the fore: he creates a body – often made of polystyrene – based on the dimensions of the skin and the desired position, which is then attached in the animal with an iron wire construction. These days taxidermists still make these bodies themselves, but currently tests are being done with 3D printers. This centuries-old profession is continuously evolving with time.

> 17.10

Insects in the context of criminal investigations and the expeditions of two of our entomologists in New Guinea were discussed during the Belspo Night on M.A.R.S..

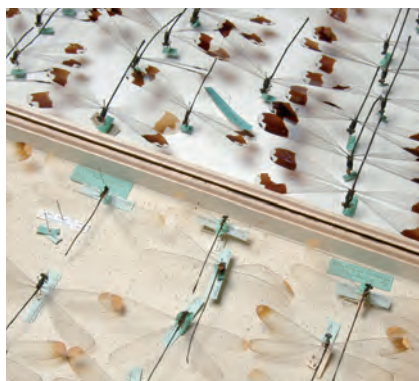
> 20.10

After two years of work by a multidisciplinary team (communication, programming, translation, design), the new RBINS website was finally online.



19| *"Its scientific collections are among the largest in the world and considered a major asset of the institute with considerable international value."*

The relevance of biological collections



At the end of May, ecologists postulated that the practice of collecting plant and animal specimens accelerates species extinction in the renowned journal *Science*. Over one hundred scientists, including biologists from our own institute, immediately defended the practice and responded to the argument.

Currently our institute has about 37 million specimens in its vaults. These include historic (some are over 150 years old) and recently acquired collections. Our researchers also return from expeditions with new specimens. However, the collection of new biological material is [strictly regulated under international agreements](#). Biologists also search in a very targeted manner, [leaving animals under threat of extinction alone](#).

Biologists collect specimens during expeditions because scientifically they are [very valuable](#). They may belong to a new species or provide information about demographic changes in populations, environmental changes, historic pollution, temperature changes or the impact of parasites.

Natural historical collections contribute to a better understanding of biodiversity in Belgium and abroad. [It is this knowledge that protects species from extinction](#). Thanks to these collections biological material, from habitats that no longer exist, is also preserved allowing researchers to continue studying them.

Rather than collecting new material, [scientists browse existing collections worldwide, using new technology](#) to study old material, for example CT scanning, isotopic analysis or DNA sequencing. These new data lead to new insights based on old specimens.

Scientists all over the world are now more aware of what is available in all of these collections thanks to databases. [Our DaRWIn database](#), for example, contains data on more than 35,000 speci-

mens. Every year, a several hundred researchers, from all over the world visit our institute and often borrow items. In 2014, the entomology collection loaned 30,325 specimens. This requires sound management, including a consistent policy for inventory, preservation and access for visitors. [The collections' ongoing digitisation \(with high-resolution images\), will make loans of specimens and researcher's visits increasingly redundant](#).

Curators and biologists do not collect for the sake of collecting but to better understand the world around us. Collections are a vital tool for science and the preservation of species. The article in *Science* was a good opportunity to emphasise this again.

> 20.10

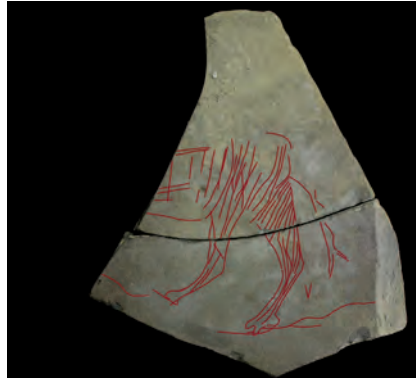
The seminar on sand extraction in the North Sea argued in favour of an integrated knowledge basis of the raw materials and an active dialogue between the authorities and the industry.

> 21.10

Dangerous storm: after forecasts by the scientists of DO Nature (Marine Forecasting Centre) the Flemish Agency for Maritime Services and Coast launches the warning procedure.



Digitisation or new techniques for highlighting the collections



New digitising techniques, such as the scanning of old archives or the creation of virtual 3D collections help protect and preserve science and culture as well as making it more accessible for the public and for scientists.

High-resolution 3D scans help [reveal certain characteristics of ancient objects that cannot be seen with the naked eye](#). A number of specimens – tools and jewellery – from the RBINS's collections were loaned for the [Lascaux exhibition](#), in the Cinquantenaire Museum in Brussels. For the first time ever, the public was able to admire all the prehistoric furniture art in the Belgian federal collections, including the magnificent [Stone of Chaleux](#) and its [representation of animals from the last ice age](#). The specimens underwent [high-resolution 3D scanning](#), in the framework of the DIGIT-3 programme. These virtual models then were used to create [videos](#) and reveal motifs that cannot be seen with the naked eye, like engravings, enigmatic drawings, and carved animals. From May 2015 onwards, visitors will be able to see 3D representations of these Palaeolithic objects in a [virtual museum](#) in the RBINS's new *Gallery of Humankind*. This is also an ideal method for [accelerating the process for the description and publication of new species](#).

In the margin of the Agora 3D (funded by BELSPO) and Synthesys 3 (EU-funded) research programmes, an RBINS team was able to develop a user-friendly and very efficient programme for the [digitisation of small specimens in very high resolution](#). The system delivers more precise images than commercial devices and is ten times cheaper.

The [focus stacking system](#) is perfectly suited to specimens from just a few millimetres to a few centimetres. It can take dozens of photos, each focussing on a different aspect (the head, the body, the legs). A computer then combines these photos to build a [new image](#), which is much more accurate and detailed. The RBINS

employees have started to digitise the insect collections, and have already made available 200 type specimens from the ant collection as well as 50 type specimens of butterflies online. These images are then incorporated in a specific database, which is linked to DaRWIn and are made available online to scientists.

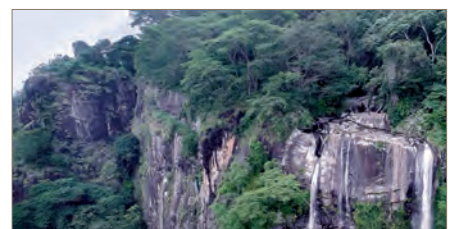
Finally, the RBINS also [facilitates data sharing and exchange](#). The RBINS recently started [scanning and sharing data about exploration](#) and drilling operations in the three Belgian Regions to provide easy access to the archives of the Geological Survey of Belgium. The documents to be digitised include descriptions, letters, maps, sketches, plans, photos, drilling measurements and much more. All these valuable data – 225,000 separate observations – have been collected for over 100 years all over Belgium and will be made available to the Belgian regions and the public by the end of 2015.

> 22.10

Nature reveals the mystery of the *Deinocoelurus*: after finding stolen fossils, a team of palaeontologists (including an RBINS employee) were able to describe this terrifying yet harmless omnivore.

> 24.10

100th publication of the *European Journal of Taxonomy*: this online scientific journal, which is partly financed by the RBINS, is available for free through Diamond Open Access.





PUBLIC

Behind the scenes of the Museum



Opening a new temporary or permanent gallery to the public requires a lot of teamwork. This process can take up to **two years** and involve anything from **80 to 100 people**. Such an undertaking **relies on the skills of many of the institute's services** including Museology, Exhibitions, Technical services, ICT, Communication, Education, the Financial, Legal and administrative services, the Heritage service as well as the scientists on its staff. **The RBINS employs a variety of professionals** including an exhibition designer, a photographer, an architect, a (info) graphic designer, an accountant and even a taxidermist, a carpenter, an electrician, a heating engineer and a blacksmith! The public has no idea that these people work here. Sometimes the RBINS also works with external contractors, depending on the nature of the request or on technical constraints.

After choosing a relevant topic, the Exhibitions and Museology Services develop the concept, the content and design of the gallery. They coordinate every step of the process until the final product, developing all the media (texts, posters, panels, objects, photos, videos and so on), preparing the collections, restoring specimens, developing 3D and multimedia animations, preparing the galleries, refurbishing or setting up the exhibition in the existing galleries, lighting and so on. The communication campaign, the visitor programmes and a number of administrative procedures (call for tenders, insurance, loans of works, transportation, royalties, partnerships and so on) are organised simultaneously.

In 2014, the RBINS's many skills were required for various projects. **Three large mammals from the Quaternary era** on a metal frame were loaned for the Lascaux exhibition. These giant puzzles involved a lot of rigorous and careful work by the curator of the Palaeontology collections and her team (assembly in a particular order, marking of the various items, using outlines on the floor) as well as a good knowledge of their anatomy.

For several months, many human and material resources were involved in the **relocation of the specimens** in the Whale, North and South Pole and Mammal galleries, which closed in April 2014 for renovation (a gallery on biodiversity and ecology will open here in 2018). Moving a 253-kilo skull or a 4.5-metre long mandible are just some of the challenges they dealt with!

The graphic designers and illustrators are currently working on **life-size 3D reconstructions of our ancestors** in preparation for the Humankind Gallery. They use 3D generation software to create a digital model, adapting it based on the latest scientific knowledge. It is then built with fine layers of superimposed wood. By the time the gallery opens in May 2015, they will have built **22 life-sized models!** What an amazing technical feat!

The ICT Service developed two **multimedia applications** (available in four languages) for the Mosasaur Gallery, which opened in April 2014. These two original audiovisual experiences for visitors are a representation of the skull of a mosasaur in all its facets, and the other tells the tale of the exciting first discovery of a mosasaur fossil. On the walls and panels of the gallery they can also see **illustrations of the underwater world**, which were first drawn in pencil, then in ink before being digitised.

> 01.11

The pilot phase of the archaeological sciences expertise centre was launched, which brings together researchers in archaeology and natural sciences of 5 ESF on the theme of "Man and his Environment".

> 05.11

In the Netherlands there was a conviction for a violation of the ban on fishing near wind turbines, based on, among other evidence, observations by our observation plane.



The Belgian mosasaur collection given pride of place again

In early April 2014, the Museum opened a new gallery devoted to the kings of the Cretaceous seas, the **mosasaurs**. These creatures, a type of predatory marine lizard, scoured the oceans for prey a long time ago. The largest specimens are just as formidable in the sea as the *T. rex* is on land. As the public is largely unaware of their existence, the museum chose to create a special gallery for them. Visitors can now discover **one of the most beautiful collections of mosasaur fossils in the world** in a small but bright room. The collection consists of specimens found in Belgium in the nineteenth century. It allows visitors to better understand the life of these giants and their biotope. One of the main attractions in the Mosasaur Gallery is the **almost complete skeleton** of the *Hainosaurus bernardi*, which was unearthed in the village of Ciplu, in the Province of Hainaut. This creature would have been more than twelve metres long, making it **the second largest mosasaur found to date**. **A 3D animation on a large screen**, which was developed exclusively for the museum based on more recent discoveries, explains how mosasaurs swam. Their bodies did not make an undulating movement, instead they



moved their tail from left to right, like sharks. This collection is of the utmost importance from a museological point of view as well as on a paleontological level. It gives us an idea of a moment in time, in which the underwater world was rich and diverse, just before the sudden mass extinction of these large marine reptiles. The **signage and design** of the gallery were developed to take into account **disabled visitors, whether visually or hearing impaired or in a wheelchair**. The height of the tables, the angle of the tablets were adapted, embossed items have been included, multimedia comes with subtitling and so on.

Special collaborations between museums

One of the conditions of Belspo's Administration Contract is to develop **synergies between the federal science establishments**. This relates to the collection as well as to the scientific, educational and communication services. The communication teams of the various institutions have been working together in a working group for quite some time now. In 2014, the institute engaged in **two new collaborations** with the **Royal Museum for Central Africa**, which is currently closed for renovation until 2017 and the **Cinquantenaire Museum**.

The RMCA's "Africa Pop-Up Museum" concept allows the museum to maintain a link with its visitors. Our museum welcomed the temporary exhibition of a strange antelope and a magnificent slit drum that arrived in Tervuren in 1897. It also served as the new location for the **"Green Earth" workshop**, which focuses on village agriculture. Among the many communication activities that were developed, the

pop-up musical was a real hit with the public during the museum's evening opening in October 2014.

The partnership with the **Cinquantenaire Museum**, in the margin of the **Lascaux** exhibition, which opened in November 2014, is equally special. The RBINS developed educational **workshops** about prehistory that were organised in the Cinquantenaire. An **extension of the exhibition**, developed by scientists and technicians of the two institutions, displayed some of the museum's masterpieces in a 250-sq.m. gallery, including the skeletons of large ice age mammals (megaceros, woolly rhinoceros and many others) as well as Palaeolithic art. The museums also developed a **joint communication and promotion campaign**, linking the exhibition to the opening in 2015 of our new *Humankind Gallery*, with press conferences, educational videos and animated videos online and on Facebook, discounts for visitors and so on.



>
14.11

Thanks to a successful Belgian-Japanese collaboration the 18-kilo Antarctic meteorite, which was temporarily on display in 2013, is now a permanent exhibit in the Museum.

>
19.11

Kim Wilde awakens the dinosaurs during the prestigious ".eu Awards Ceremony", one of the 79 events, which the museum organised in 2014.



A record turnout for Education Service workshops



The **educational workshops** that the RBINS organised in 2014 attracted just under **19,000 visitors**, a record figure. Participants more than doubled in the past ten years. Currently these activities make up one third of all the activities in the margin of exhibitions. This dynamic formula, which reaffirms the institute's educational role, mainly targets school groups (more than 95%).

For several years now, the RBINS has implemented a **voluntary policy** of investing in the design and development of possible workshops as well as in high-performance equipment of scientific

quality. The workshops are coordinated by guides/supervisors, who have scientific or educational training (biologists, teachers, prehistorians...). These workshops have a well thought out structure and are aimed at **hands-on participation** – allowing participants to observe, experiment, test, discuss things... and always include a visit to the museum galleries.

This year, the most successful workshops were the workshops on **baby animals**,

prehistory and **evolution of humankind** as well as the **paleoLAB**. The latter was designed from the outset as a modular space, where participants can explore the profession of palaeontologist. It was renovated in 2014, following a survey and a team-based brainstorming. Today the paleoLAB has forty “workstations” – demos, games, working with real specimens (fossils, minerals)... with five new items, including the timeline and the ice age landscape which now features animals.

2014: dedicated to archaeology



In the last ten years, the Walloon Region has relied on the expertise and skills of the RBINS's Archaeological Sciences unit, in the framework of an agreement between the RBINS and the Walloon Public Service. Our institute contributed to **25 ans d'Archéologie en Wallonie** (25 years of archaeology in Wallonia) in 2014 in the margin of this partnership.

A series of **eight conferences dedicated to natural science in archaeology** entitled “Les Midis de l'Archéologie” **was organised at the institute**. The objective was to present the results of interdisciplinary research with various examples of Walloon archaeo-

logical sites of different periods to the public, from the Palaeolithic era to the Modern Age. RBINS specialists, SPW archaeologists and other specialists discussed the daily life, rituals, food and environment of our ancestors. The project had **an original twist: every conference ended with a tasting of historical dishes** of the period (honey-roasted boar, sow's teats, moustacholle pastries and so on), developed together with the Centre of Historical Gastronomy and a caterer. 40 to 60 participants attended each conference-meal.

As part of the **Year of Archaeology**, the RBINS also hosted a photo exhibition of the SPW, entitled “**Archaeological professions**”. It focused on different aspects of archaeology from excavations to the presentation of restored objects and the work of specialised laboratories. Magnificent photos by Guy Focant, alongside testimonials, in the form of handwritten letters, expressed the passion, time, and effort that the institute's researchers, among others, invest in their profession.

> 04.12

The first “Labo_ID” in Leopold Park on the theme of water: the authorities, scientists and citizens tackled environmental problems in the neighbourhood together.



> 06.12

Our followers on Twitter doubled, we have more than 4,000 Facebook fans and our first Tumblr blog posts are a hit. The RBINS is clearly working on its social media presence.

When exhibitions leave the museum...



A travelling exhibition, which goes from city to city, from a museum to an exhibition hall, is an example of what we call 'the roaming principle'. The furniture, the panels, the specimens, films, and educational and playing materials, the boxes, trucks... **nothing is ever lost, everything is recycled and recouped**, from the intellectual work for the development of the content, the exhibition's design, the logistical organisation and the promotion...

A travelling exhibition helps expand **knowledge sharing**, as exhibitions are no longer limited to a moment in time in a specific place. Their encounter with the public continues, because they are rented, shared or even sold in some cases. By offering exhibitions a second life, travelling exhibitions also allow us to maximise the return on our investment and creative work.

Since 2003, the **museum has embarked on the adventure of travelling exhibitions**, starting with *Fatal Attraction*. Some exhibitions were designed and developed in the museum by the museology, exhibitions, ICT, multimedia and technical services such as the *Olympic Games for Animals* (2004), *Simply Mussels* (2005-2006) or even *Murder in the Museum* (2006-2007), which travelled for five amazing years. Most of these exhibitions however are **co-productions** with various international partners. Examples include *Fatal Attraction* (2003-2004) with the National Museum of Natural History in Paris (France) and Naturalis (the Netherlands), *X-TREMES* (2008-2009) and *Sensations!* (2011-2012) with Naturalis again and the Experimentarium science centre (Denmark), *Prehistory - Do it yourself!* (2012-2013) with the Ramioul prehistoric site (Belgium) and *Baby Animals* (2013-2014) with the Museum of Natural History of Toulouse (France). **All these exhibitions enjoyed great visibility and were very successful in several countries**. Two of these exhibitions were even sold, becoming permanent exhibitions. *Simply Mussels* was sold to Waterland Neeltje Jans (the Netherlands) and *Prehistory - Do it Yourself*, which will soon be on display at the Ramioul Museum of Prehistory.

X-TREMES, eight years of travelling around!

The *X-TREMES* exhibition, a co-production with the Naturalis science centre (the Netherlands) and the Experimentarium science centre (Denmark), takes visitors on a journey to the most extreme places on our planet (deserts, high altitudes, the North or South Pole). Like every travelling exhibition, *X-TREMES* benefited from the expertise of our museum designers, who made it both attractive and easy to transport. In its eight years of existence, the exhibition was displayed in **eight museums or science centres in eight European countries**. It ended its long and brilliant career in London, in the Horniman Museum and Gardens, in November, after having been visited by **1.2 million visitors**.

> 10.12

An employee of the RBINS, Richard Smith, was awarded the Morris F. Skinner Prize of the Society of Vertebrate Palaeontology for his contribution to the discipline of vertebrate palaeontology.



> 13.12

Dr. François Muhashy Habiaremye, a member of the CEBioS team, was awarded the Émile Laurent - Tropical Flore (51e quadriennale 2010-2013) Prize of the Royal Flemish Academy of Belgium.



Science centres and museums, strategic players for achieving the Millennium Development Goals



From 17 until 19 March 2014, Belgium hosted the seventh *Science Centre World Summit*, which was jointly organised by Technopolis (Mechelen) and the RBINS.

For the first time more than 400 specialists from five continents and two space stations discussed the **strategic role** of science centres and museums for **achieving the Millennium Development Goals of the United Nations**.

The summit also welcomed several prominent speakers, including Anne Glover, an adviser of José Manuel Barroso, François Englert Nobel Prize winner for physics and the team from the *Human Brain* Project, one of the flagship projects of the European Union. Rep-

resentatives from Palestine and Kenya were able to attend the summit thanks to the support of the Belgian Science Policy (BELSPO).

The institute hosted the **meeting of directors**, with 100 personalities discussing three major themes: research and communication about research, the transmission of knowledge in all its forms, the place of new technologies in education and raising public awareness. The participants were also given a behind the scenes tour of the museum, including the

collections and, above all, the laboratories and the cutting-edge technology (3D, DNA labs, Raman spectroscopy...).

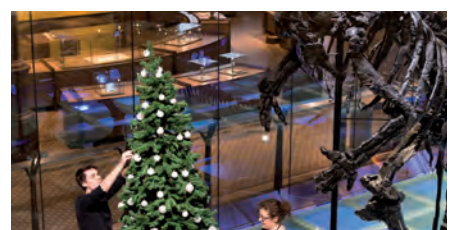
The themes discussed during the summit served to draft the main principles of the **Mechelen Declaration**, which was signed by all the networks of museums and science centres, including **ICOM** (the International Council of Museums). The science centres and museums transposed their ambition into seven points for future actions to **build bridges between the public and decision-makers** in terms of education and research.

>
19.12

Science considered the description of the first feathered herbivorous dinosaur, *Kulindadromeus zabaikalicus*, one of the top 10 scientific breakthroughs in 2014.

>
20.12

The car park and entrance are decorated in seasonal colours, a themed tour and even the iguanodonts were gearing up for it for the first time in 125 million years: winter has arrived in the museum!





FIGURES

> FINANCES

For the first time since 2010, the difference between the institute's income and expenditure for the year is negative. The level of this deficit, which may seem quite large, is explained by two factors. On the one hand, the institute invested € 739k of its savings in the museum's renovation. A newly implemented invoicing method also affected the income for 2014. As a result, the income for 2014 from research contracts funded by BELSPO is only recorded in the first half of 2015.

The institute's income has decreased compared with 2013 to the level of 2012. The sharp increase in the endowment is due to two reasons:

- The granting of an additional credit line of € 525,000 to cover operating expenditure and the payment of the wages of the military personnel on the *Belgica*.
- In contrast with financial year 2013, the "frozen" amount of the endowment, i.e. € 535,000 was paid to the institute.

The reversed downward trend of own revenue from research projects is discussed on the next page.

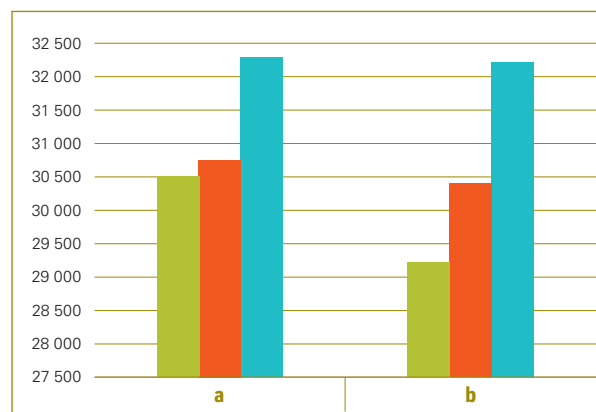
In terms of expenditure, the personnel cost to be covered by the institute's own earnings increased by 3.50%.

The relative stability of expenditure of own earnings for personnel conceals a wide disparity. On the one hand, the amount of wages for research staff follows and reflects the activity level, i.e. an increase of 23% for wages paid with federal grants and -17% for wages in the framework of European contracts. At the same time, the hiring freeze for all employees paid from the endowment and from ordinary income (sections 0 and 1) has led to a staff reduction of about 6%. Obviously this situation affects the level of activity and the services provided.

Operating expenditure has returned to the level of 2012. The additional endowment that the institute received in 2014 for the *Belgica* (€ 525k) allowed it to pay all the invoices relating to its operation (€ 2,875k).

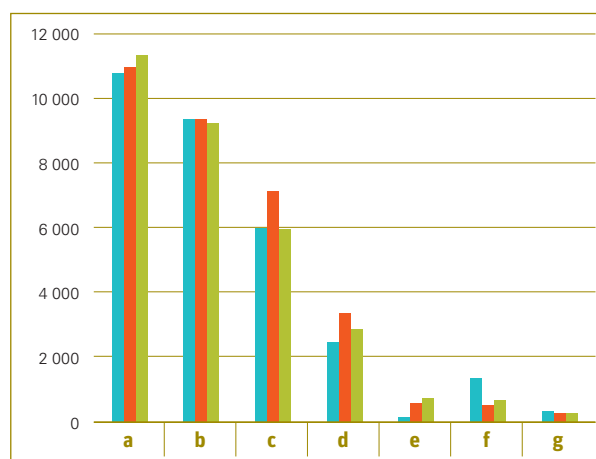
INCOME AND EXPENSES (IN €k)

	2012	2013	2014
a Income	30 754	32 288	30 452
b Expenses	30 406	32 217	31 080
Balance	348	71	-628



SOURCES OF EXPENSES (IN €k)

	2012	2013	2014
a Staff budget*	10 748	10 938	11 321
b Staff expenses financed from own resources	9 345	9 347	9 231
c Ordinary operational expenses	5 978	7 134	5 941
d Operation flight equipment/vessels	2 467	3 376	2 875
e Investment in the Museum	153	592	739
f Equipment	1 358	546	685
g Library and collections	357	284	288
Total	30 406	32 217	31 080



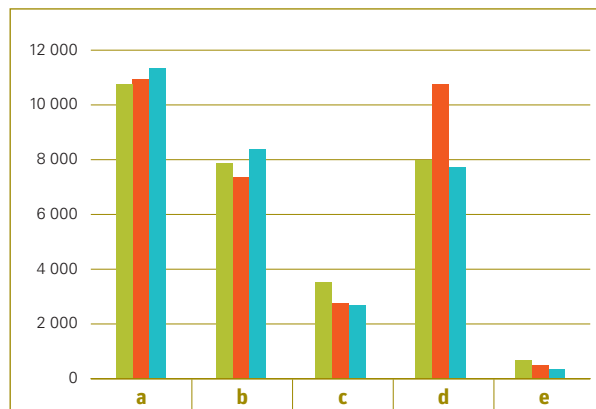
* Statutory and contractual staff at the expense of the Belgian Science Policy

29 | "The breadth of the RBINS across pure and applied science, as well as maintenance of scientific infrastructure, is highly valuable and appropriate. In an era of diminishing structural funds (with a proposed 20% cut on federal research budgets), it presents a great opportunity to ensure the sustainability of the RBINS into the future."

SOURCES OF INCOME (IN €k)

	2012	2013	2014
a Staff budget*	10 748	10 938	11 321
b General grant	7 849	7 358	8 376
c Museum's own income	3 515	2 752	2 691
d Research's own income	7 956	10 746	7 705
e Various own income	686	494	359
Total	30 754	32 288	30 452

* Statutory and contractual staff at the expense of the Belgian Science Policy



BREAKDOWN OF MUSEUM INCOME (IN €k)

The institute welcomed 305,780 visitors in 2014 (-8.5% compared with 2013). Of these visitors, 76,041 visited the "Baby Animals" temporary exhibition (over a period of 6 months) while 35,777 people visited the "Brain Twisters" exhibition (over a 6.5-month period).

The average ticket price per visitor in 2014 was € 4.08 compared with €4.06 in 2013. For the "Baby Animals" exhibition, the temporary exhibition supplement was reduced to € 0.5 instead of € 2 to compensate for the fact that several galleries were closed.

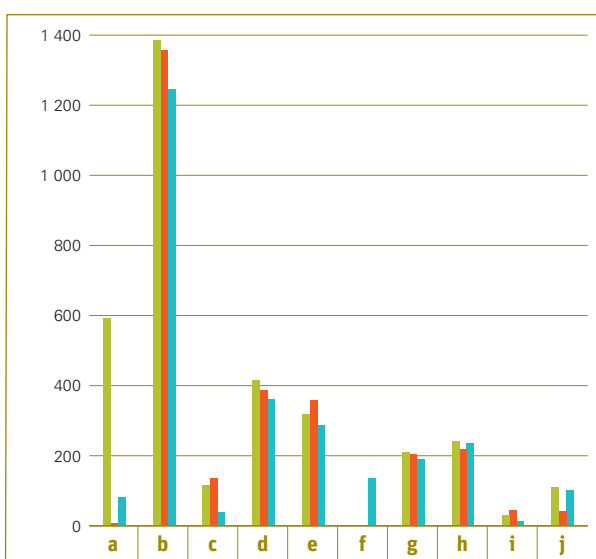
The income of the shop amounted to € 362k (386k in 2013). The average expenditure per customer remained stable (€ 14.86 compared with € 14.72 in 2013). The profit for 2014 amounted to € 82k.

The income from the organisation of events amounted to € 236k (+7%), which is almost equivalent to the record amount of 2012 (€ 240k).

In 2014, there were no major renovations with BELIRIS funding. However, works will resume in 2015-2017 for the renovation of the "Convent" wing.

The travelling exhibitions have toured extensively. As a result, income from these exhibitions is declining. The fact that the "Baby Animals" will travel as of 2015/2016 will increase our income again.

	2012	2013	2014
a Museum renovation grant	591	8	82
b Ticket sales	1 385	1 356	1 247
c Exhibition hire and sales	115	137	39
d Shop	415	386	362
e Donations - sponsorship - grants	317	358	286
f Coproductie			136
g Educational Service	313	203	189
h Events	240	219	236
i Cafeteria concession	30	45	14
j User Observatory (all federal Museums)	109	40	100
Total	3 515	2 752	2 691



BREAKDOWN OF RESEARCH INCOME (IN €k)

The decrease in income from BELSPO can be explained by the new invoicing method (see previous page). Without this change, the income would have remained the same as in previous financial years.

The decrease in income from federal grants (other than BELSPO) from 2013 until 2014 is not structural and can be explained by the payment of an extraordinary grant of € 900k by the National Lottery for the purchase of an ASR. In fact, the funding granted in the margin of the framework agreement with Development Cooperation even increased from € 750k to € 1,200k annually (2014-2018).

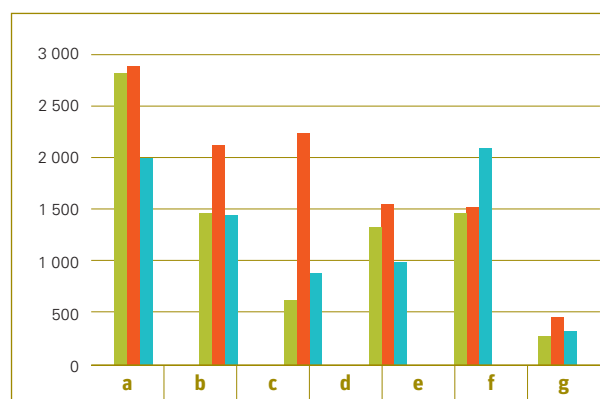
Income from EU contracts remained stable. The 2013 figures were influenced by the advance payment of € 1.2 million in the framework of a European project, which the RBINS coordinates. This explains the significant difference between 2013 and 2014. Nonetheless, there was a decline in the activity levels for these contracts.

The 7th Framework Programme has ended and the H2020 Programme has just started. The institute is going through a period of transition.

The sharp drop in income from federal entities and, by extension, the sharp increase in income from the private sector is due to changes in accountancy methods. The income from royalties is now recorded as private sector income even if they pass through the Flemish Region.

In short, the institute's level of research funding has not decreased, contrary to what the comparison with 2013 suggests.

Projects financed by:	2012	2013	2014
a Belspo	2 808	2 873	1 990
b Federal administrations (excl. Belspo)	1 456	2 114	1 440
c European Commission	624	2 233	884
d Belgian federal bodies	1 329	1 550	983
e Private sector	1 464	1 516	2 083
f Foreign institutions (non-EU)	275	460	325
Total	7 956	10 746	7 705



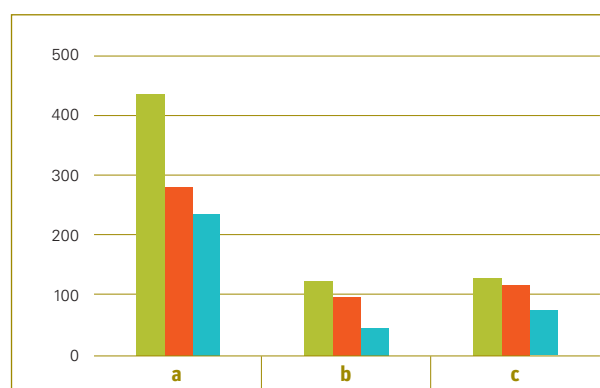
BREAKDOWN OF MISCELLANEOUS INCOME (IN €k)

The scientific departments are working on major funded research projects as well as generating miscellaneous income with their ordinary activities (lab analyses, the organisation of conferences, sales of geological maps and so on).

The institute also makes services available to its personnel that generate income (social activities). Since 1 January 2014, the institute no longer has a day-care facility, which explains the decrease in revenue.

The general direction's income consists of bank interest (which experienced a sharp decline), copyright and so on.

	2012	2013	2014
a Scientific activities	435	280	236
b Social activities (mess, crèche)	123	97	47
c Management	128	117	76
Total	686	494	359



> STAFF

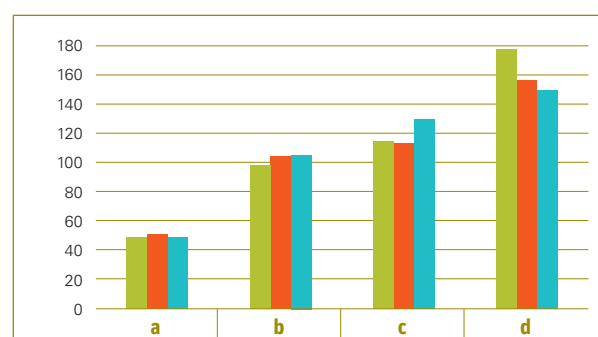
The number of employees slightly increased (432 employees compared with 424 in 2013) but the situation varies hugely depending on the type of employee. The erosion of the number of non-scientific contractual employees continued unabated (+16% in two years) while the number of scientific contractual employees increased (+ 14 % from 2013 until 2014).

Scientific contractual employees typically are employees that are recruited with external resources, for scientific missions or in the framework of research grants. The staff reductions mainly relate to support staff.

The apparent increase in staffing paid through the endowment and out of ordinary income is related to accounting changes. As a result, existing staff is transferred from one category to another. This change explains the strong growth of staff paid out of ordinary income. The scientific activities, which are funded with external grants, explain the increase in staffing levels.

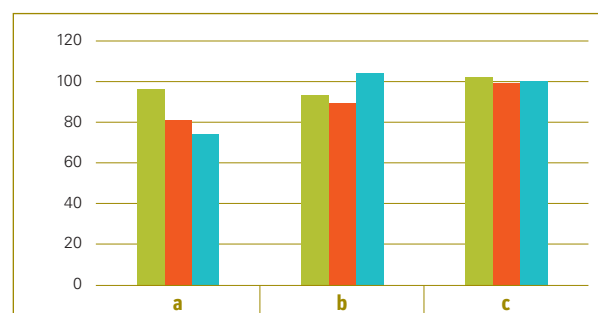
STAFF BREAKDOWN

	2012	2013	2014
a Statutory scientists	49	51	49
b Statutory non-scientists	98	104	105
c Contractual scientists	114	113	129
d Contractual non-scientists	177	156	149
Total	438	424	432



SOURCES OF FINANCING FOR CONTRACTUAL STAFF

	2012	2013	2014
a Staff budget*	96	81	74
b Grant and ordinary income	93	89	104
c External projects	102	99	100
Total	291	269	278



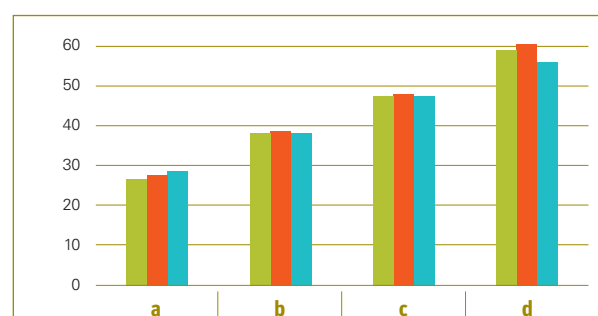
* Extraordinary and temporary contractual staff at the expense of the Belgian Science Policy Office.

PERCENTAGE OF FEMALE STAFF

After a significant increase, the ratio of male to female employees once again is fairly imbalanced. The balance is almost maintained for contractual scientists (47.2% women) and the number of female permanent scientific employees continues to increase (from 20 to 28.6% in four years). However, the differences within the categories continue to be a problem: there are many more male permanent employees

whereas the number of women who are non-scientific contractual employees is much higher (55%, but it must be noted that this was more than 60% in 2013).

	2012	2013	2014
a Statutory scientists	26,5	27,5	28,6
b Statutory non-scientists	38,1	38,5	38,1
c Contractual scientists	47,4	47,8	47,2
d Contractual non-scientists	58,8	60,3	55,7
Total	47,5	47,6	45,4



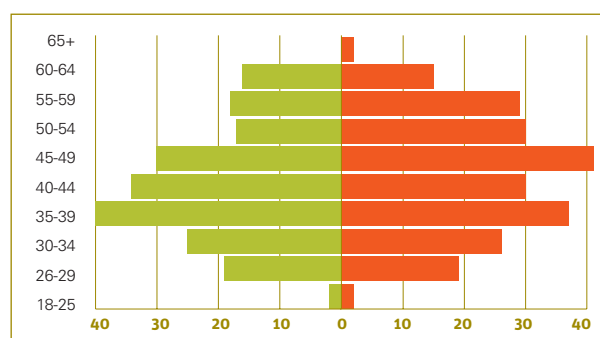
AGE PYRAMID

The average age of employees has increased (43.5 years compared with 42 in 2013).

	Women	Men
65 +	0	2
60-64	16	15
55-59	18	29
50-54	17	30
45-49	30	41
40-44	34	30
35-39	40	37
30-34	25	26
26-29	19	19
18-25	2	2
Average age: 43,5 years		

More than 18.5% of the workforce consists of employees over 55 years (18% in 2013). These figures highlight the fact that the institute must develop a proper knowledge transfer strategy soon.

Women make up the majority of the 18-44 year age group (51%) but this figure drops to 41% in the over 45 age group.



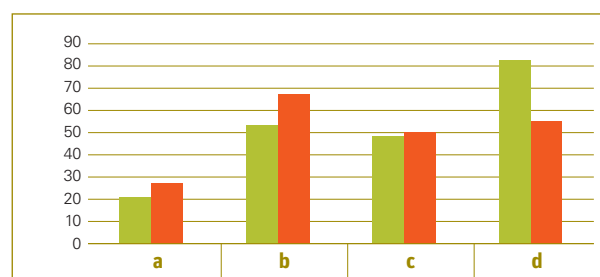
STAFF BREAKDOWN BY LINGUISTIC ROLE

We have nearly achieved linguistic parity (204 French-speaking employees compared with 199 Dutch-speaking employees). The number of Dutch-speaking scientific employees (56% of the workforce) and permanent employees (53%) is significantly higher. French-speaking employees

account for 60% of the non-scientific contractual employees. The staff based in Ostend is not taken into account in the calculation of linguistic parity.

	FR	NL	F.	O.	Bil.
a Statutory scientists	21	27	0	0	1
b Contractual scientists	53	67	3	6	0
c Statutory non-scientists	48	50	0	7	0
d Contractual non-scientists	82	55	5	7	0
Total	204	199	8	20	1

F. = foreigner O. = Oostende Bil. = bilingual



ABSENTEEISM AND WORK ACCIDENTS

	2012	2013	2014
Absenteeism RBINS (%)	6,79	5,68	4,5
Absenteeism federal level (%)	6,93	6,88	nd
Work accidents RBINS (frequency)	14,69	14,69	13,65
Work accidents R&D (frequency)	3,21	2,11	nd
Work accidents Museums (frequency)	12,51	5,82	nd
Work accidents RBINS (number)	11	11	10
Accidents RBINS on the way to work (number)	5	8	9

The figures for absenteeism dropped compared with financial year 2013. The number of accidents at work, however, continues to be quite high in spite of prevention efforts (training and information sessions for personnel).

After a sharp drop in 2011 and 2012, the number of accidents during the commute to or from work once again increased while the majority of our staff travels to work by public transport. The Institute has very little influence on this variable.

33 | "The RBINS can be proud of its global achievements in the advancement of natural sciences, especially in recent years, as reflected in the overall publication record and the worldwide recognition of excellent work among peers and stakeholders."

> RESEARCH

The overall number of publications significantly dropped in 2014 compared with financial year 2013 (- 13 %). The drop mainly affected the publications with impact factor (IF, -16%). However, it is also worth noting that the number of publications with IF increased sharply in 2013 (+13%) and our result (157 publications with IF) continues to be quite respectable. The number of publications with an international reading committee increased by 12%. The number of popularising works meanwhile remained the same, but the number of reports of expertise significantly dropped (+ 35%). These are purely quantitative data. Each work is considered equal, regardless of its importance.

The Directorate Earth and History of Life is responsible for 37% of all the publications and the lion's share of the popularising publications. It employs 34% of the institute's researchers.

While the Directorate Taxonomy and Phylogeny is much smaller (17% of the researchers), it published 32% of all the scientific publications.

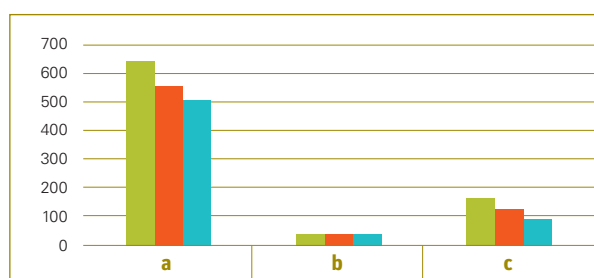
The Directorate Natural Environment (49% of the researchers) logically has the monopoly on all works and reports of expertise.

BREAKDOWN OF PUBLICATIONS

	Scientific publications				Popular works	Expert reports	Total
	Total	of which journals with IF	of which journals with international editorial board	of which others			
Operational Directorates							
Taxonomy and Phylogeny	164	55	45	64	2	4	170
Natural Environment	87	23	7	57	0	48	135
Earth and History of Life	185	74	38	73	46	29	260
Scientific Service Heritage	43	14	15	14	6	2	51
Total RBINS	505	157	84	264	40	83	628

CHANGE IN PUBLICATIONS

	2012	2013	2014
a Scientific publications	642	555	505
b Popularisation	39	40	40
c Reports	166	126	93
Total	847	721	638



SCIENTIFIC PROJECTS WITH EXTERNAL FUNDING

In 2014, the number of contracts which the institute managed, alone or with another organisation, amounted to 158, a slightly lower number than in 2013.

The Directorate Natural Environment, which focuses on topical environmental issues, concluded the lion's share of expertise and research contracts (53 %).

	Projects with external funding
General Direction	1
OD Public Services	3
OD Taxonomy and Phylogeny	25
OD Natural Environment	84
OD Earth and History of Life	36
Scientific Service Heritage	9
TOTAL	158

BREAKDOWN OF CURRENT PROJECTS ACCORDING TO SOURCE OF FINANCING

Research funding is mainly granted by the federal government (45% of resources), then by the federated entities and the European Union (in order of importance). The private sector mainly funds expertise studies, mainly in the framework of marine monitoring.

	2012	2013	2014	2014
	Number	Number	Number	Amount (in €)
Belgian Science Policy Office	81	60	65	1 990
Federal funding from other sources	12	13	10	1 440
National Lottery	2	2	4	0
Federated Entities	23	18	23	983
Universities	2	6	1	0
European Commission	36	40	35	884
International	15	15	12	325
Private sector	7	5	8	2 083
Total	178	159	158	7 705

SUPERVISION OF STUDENTS

The supervision of students, PhDs, and Master's dissertations has dropped significantly (-35 %). The decrease mainly relates to the supervision of Master students (83 in 2013, 40 in 2014).

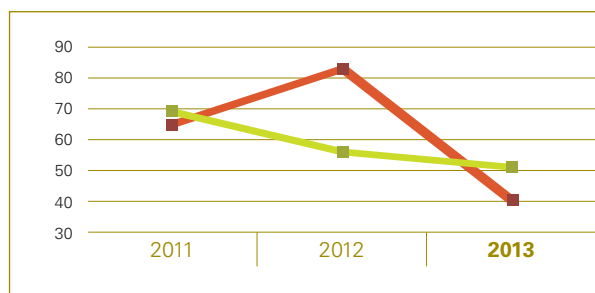
As is the case for the scientific publications, the Directorate Earth and History of Life is responsible for the majority of the supervisory work (48%), followed by the Directorate Taxonomy and Phylog-

eny (25 %), the Directorate Natural Environment (20 %) and the Heritage Service (7 %).

It is worth noting that we have only included those dissertations, which are jointly supervised by one of the institute's employees.

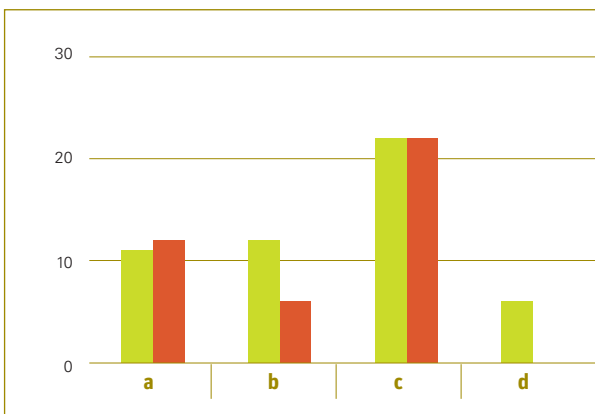
CHANGE IN SUPERVISION OF STUDENTS

	2012	2013	2014
■ PhD	69	56	51
■ Master	65	83	40
Total	134	139	91



BREAKDOWN OF THE SUPERVISION OF STUDENTS

	■ PhD	■ Master	Total
a OD Taxonomy and Phylogeny	11	12	23
b OD Natural Environment	12	6	18
c OD Earth and History of Life	22	22	44
d Scientific Service Heritage	6	0	6
Total 2014	51	40	91



> LIBRARY

In 2014, book purchases were slightly higher (6%). The institute launched a comprehensive project to retroactively update the catalogue of its map library, adding 5,448 new entries to the catalogue.

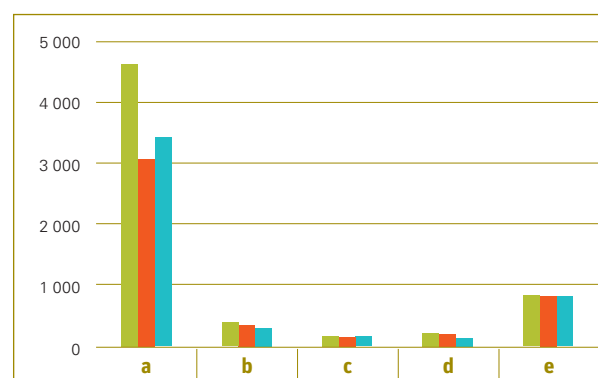
The strong trend of e-journal consultations continues. At the same time, however, the volume of loans of paper journals continues to be significant.

ACQUISITIONS

	2012	2013	2014
Books and journals	+8 174	+81 45	+14 113
Electronic journals	+83	+137	+204

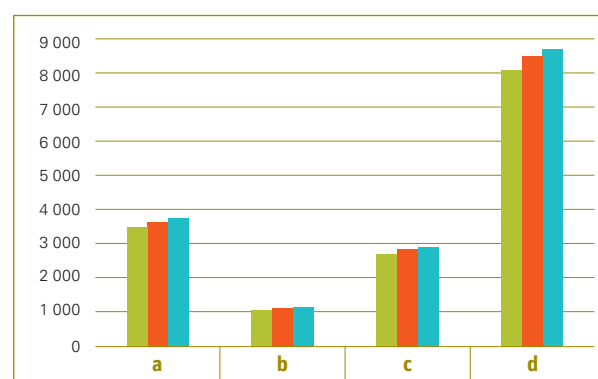
LOANS

	2012	2013	2014
a Internal loan of documents	4 619	3 071	3 419
b Inter-library loans	390	352	299
c Borrowings	167	154	161
d Loans	223	198	138
e International exchanges	831	828	815



TYPES OF CONSULTED ELECTRONIC DOCUMENTS

	2012	2013	2014
a Periodicals	3 487	3 623	3 748
b Abstracts	1 075	1 123	1 152
c Complete text	2 689	2 851	2 891
d Total consultation sessions	8 051	8 455	8 681



> COLLECTIONS

SCIENTIFIC VALORIZATION

The number of scientific visitors to our collection continues to grow, as does the number of loans (+85% and +37% respectively). All the departments are receiving more visitors, except for the Department of Vertebrates. It is worth noting that the collection has not had a curator since May 2013 due to the hiring freeze.

Additions to the collections are on the rise again (+11%) after a sharp drop in 2013. We are however nowhere near the figures for 2012 (190,000 acquisitions). This is a direct consequence of the reduction of our endowment since 2013, which has had an impact on our capacity to acquire collection items.

	Number of visiting scientists	Additions to the collections	Number of loans
Vertebrates	29 / 114	341	23
Invertebrates	74 / 193	8 000	22
Entomology	169 / 734	79 764	219
Palaeontology	44 / 120	389	17
Anthropology and Prehistory	30 / 132	0	15
Geology	112 / 122	1 479	119
Total	458 / 1 415	8 9973	415

DIGITISATION OF THE COLLECTIONS

The number of type specimen registrations was similar to the previous year. The sharp drop, which is apparent from 2013 onwards, can be explained by the reduction in the number of employees. These were essentially paid with external resources. Additions to type specimen registrations are therefore largely reliant on grants to pay their salaries.

Nonetheless, by the end of 2014, the number of registrations in DaRWIN was close to 500,000 items, including 30,000 types.

ENCODING PER DEPARTMENT	
Vertebrates	6 384
Invertebrates	12 384
Entomology	1 795
Palaeontology	7
Geology	373
Total	20 943

BREAKDOWN OF ENCODING TASKS (%)	
Addition of data	77,32
Updating of data	22,68

ENCODING IN THE DaRWIN DATABASE				
	Recording of types	New species	Recording of non-types	Total items recorded in DaRWIN
Growth 2012	1 505	44 725	NC	46 230
Growth 2013	939	14 801	1 939	15 740
Growth 2014	523	15 668	2 537	16 191
Total	30 037	466 858	NC	496 895

> MUSEUM

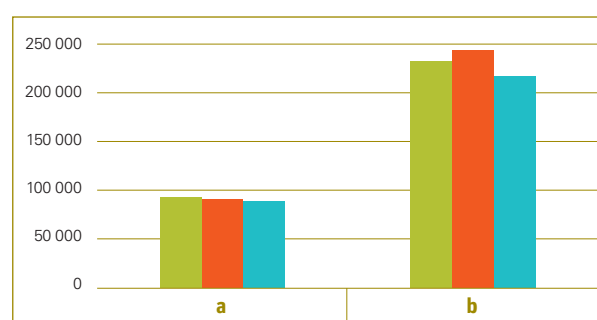
In 2014, the institute welcomed 305,780 visitors, a drop of 8.5% compared with 2013. Among these visitors, 37% visited a temporary exhibition. The “Baby Animals” exhibition continued to be a hit with visitors with 76,000 visitors in six months. “Brain Twisters” is not as successful, with just 36,000 visitors in 6.5 months. The disappointing visitor figures obviously have an impact on the general visitor figures.

In 2014, the three travelling exhibitions, which the institute co-produced (*Senses*, *X-Tremes* and *Baby Animals*) and which were on display in other museums in 2014, drew more than 400,000 visitors there.

Finally, 3,370 pupils visited the *Veilleurs de nuit* and *Water l'Eau* exhibitions, which are funded by the BNEC and travelled to various Brussels schools.

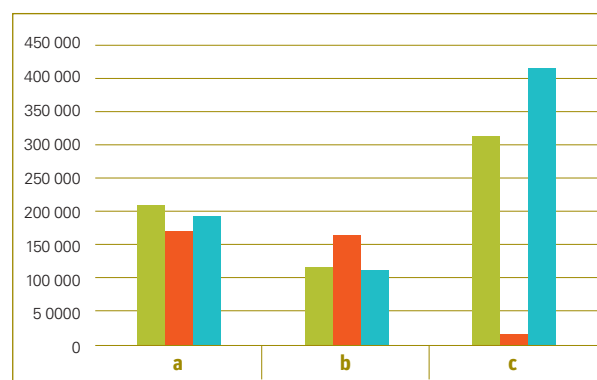
CHANGES IN MUSEUM ATTENDANCE

	2012	2013	2014
a Visitors in groups	92 172	90 924	88 846
b Individuals and families	231 768	243 266	216 932
Total	323 940	334 190	305 778



BREAKDOWN OF MUSEUM ATTENDANCE

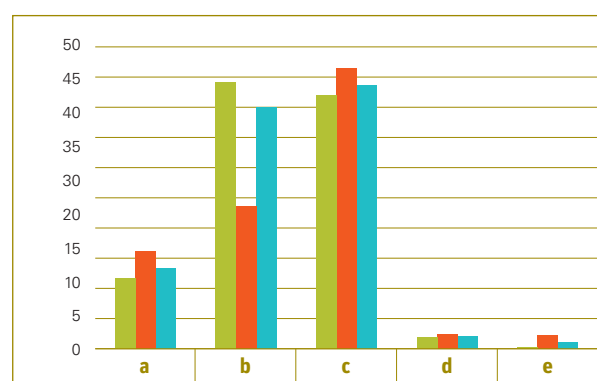
	2012	2013	2014
a Permanent galleries	208 404	170 270	193 602
b Temporary exhibitions (on-site)	115 536	163 920	112 178
Total Museum	323 940	334 190	305 780
c Temporary exhibitions (off-site)	312 500	16 617	414 816



BREAKDOWN OF VISITORS BY AGE GROUP (%)

For the second year running the breakdown of visitors by age group is different from the usual breakdown. Children between the ages of 0 and 5 years represent a growing group (15% in 2013, 13% in 2014) while adults are now the most numerous (43% in 2013, 44% in 2014) whereas the largest age group to date had always been the group of the 6 to 17-year olds. Time will tell whether this is a trend or just a temporary effect related to the “Baby Animals” exhibition, which attracted young children and their parents in droves.

	Vast	Tijdelijk	Totaal
a Small children (0-5 years)	11,71	16,15	13,33
b Young people (6-17 years)	44,18	23,61	39,94
c Adults (18-59 ans)	41,92	46,53	43,61
d Senior citizens (60+)	1,89	2,46	2,10
e Not known	0,30	2,25	1,02

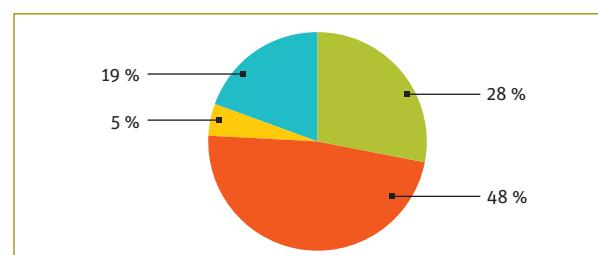


REDUCED AND FREE ADMISSION

The percentage of visitors benefiting from free entry remains stable at around 25%. The lion's share of these free entries is related to the age of the visitors (children under 6, 19%). The rest of these visitors visit the museum on the first Wednesday of the month for free (5%). Ultimately only 28% of the visitors paid the full price. The discounted

tariff makes up the lion's share of tickets, which is logical as this applies to group visits and all initiatives taken by the institute, whether alone or in partnership (SNCB, Brussels Card, and so on) to attract the greatest number of visitors to the museum.

	Aantal
Full admission	87 855
Reduced admission	158 236
Free admission on 1st Weds of month	17 156
Other free admission	70 943
Total	334 190



BEZOEK AAN DE WEBSITE

The data for 2014 only cover the period running from 1 January until 31 October. The new visit registration system on the new website does not allow for comparisons with the figures of the old method. The website, however, continues to be very popular, and was viewed by over 3 million visitors in 10 months. It is a key tool in the institute's communication.

	2011	2012	2013
Pages	11 590 095	10 672 129	13 249 187
Visitors	3 051 811	3 601 459	3 068 557

CHANGE IN SHOP CUSTOMERS

The shop is experiencing a sharp decline in customers (-7%) compared with 2013, which is largely in line with the drop of the number of Museum visitors.

The expenditure per customer has remained stable (€ 14.86) but the number of Museum visitors who are also customers of the museum shop is very low: less than one in 10. The shop's bad location in the Museum is clearly a problem.

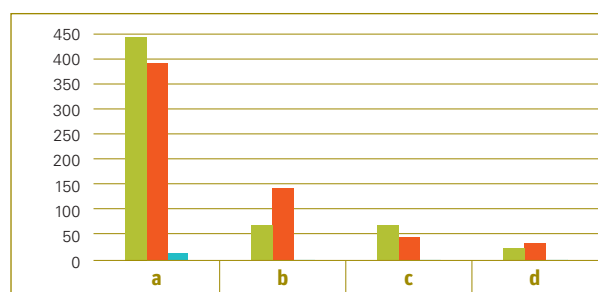
	2011	2012	2013
Museum visitors	27 693	25 689	23 889
Shop customers	329 940	334 190	305 780
Rapport customer/visitor	8,39%	7,69%	7,81%
Expenditure/customer	14,79	14,72	14,86
Expenditure/visitor	1,27	1,13	1,16

THE MUSEUM IN THE MEDIA

The institute's visibility in print media has increased compared to 2012 (+8%) but the situation is very different depending on whether you look at the Dutch-speaking press (-8%) or the French-speaking press (+23%). The

phenomenon can be explained by the grouping of various French-speaking media outlets in large press groups, meaning one article can be published in several local newspapers, which did not occur in the past. These figures do not take into account online or foreign articles as we do not have the necessary tools to measure them. The overall number of mentions of the institute and interviews on the radio and on TV remained constant compared with the previous financial year. Half of the topics they discussed were accompanied by an interview with a member of our staff. Here again, there are more articles in French-speaking media.

	FR	NL	Others
Printed press			
Articles Museum	201	140	
Articles Institute	205	209	
Expo Baby Animals	17	11	
Expo Braintwisters	20	30	
a Total printed press	443	390	13
b of which interviews RBINS employees	68	143	
Radio and TV			
c Total Radio and TV	68	44	
d of which interviews RBINS employees	23	32	
Total general	511	434	13



ACTIVITIES ORGANISED BY THE EDUCATIONAL SERVICE

The number of participants in the Educational Service's activities amounted to more than 60,000 people, indoor and outdoor. Compared with 2013, there was a slight drop (-4%), which is not as significant as the drop in Museum attendance in general (-8.5%). However, the figure is still much higher than in 2012, when the visitor figures were higher. This result demonstrates that the activities proposed meet the expectations of the public in general and of schools in particular.

On average, 21 people participate in the activities. This is a good number given that we wish to preserve the transmission quality of the educational message.

	2012	2013	2014
Number of participants	56 912	62 594	60 060
<i>of which groups (indoor + outdoor)</i>	<i>51 308</i>	<i>56 163</i>	<i>53 529</i>
<i>of which individuals</i>	<i>5 604</i>	<i>6 431</i>	<i>6 531</i>
Number of organised activities	2 886	3 083	2 831
Average number of participants per activity	19,7	20,3	21,2

PROPORTION OF VISITORS IN ACCOMPANIED VISITS ON-SITE (%)

The percentage of accompanied visits amounted to 46%. This is not as good as last year (50%) but at the same time it is a valid result.

The average rate of accompanied visits (15 %) must be judged in the light of the Educational Service's objective to accompany groups to provide added scientific value during their Museum visit.

	2012	2013	2014
In relation to the total number of museum visitors	13,1	13,8	14,9
In relation to group visitors	41,1	50,6	46,0

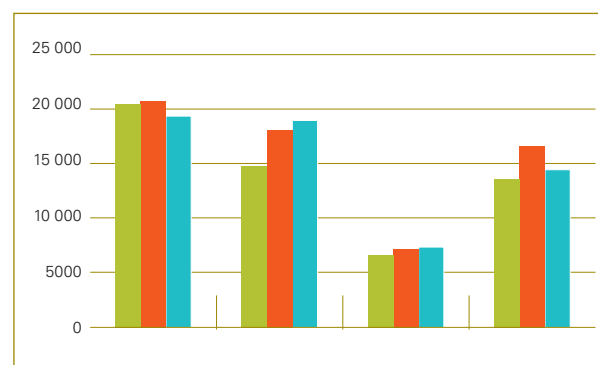
BREAKDOWN OF VISITORS PER ACTIVITY

Visits continue to be a vital aspect of our educational programme. However, the workshops have steadily increased. Unlike guided tours, their themes are not determined by the temporary exhibitions. As a result, attendance in our workshops has increased by more than 20%.

There was a decrease in the number of participants in our outdoor activities, however. Personnel and structural changes meant that the

science truck that is currently travelling around the region (XperiLAB) has achieved similar results to 2013. The truck continues to mainly provide its services to schools.

	2012	2013	2014
a Guided tours	20 448	20 718	19 332
b Workshops	14 764	18 043	18 933
c Other activities	6 639	7 216	7 364
d Off-site activities	13 536	16 617	14 431
Total	55 387	62 594	60 060

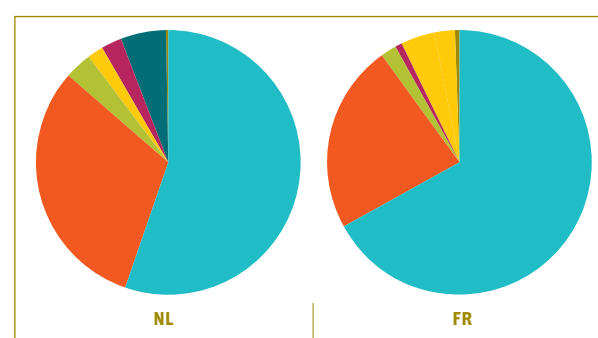


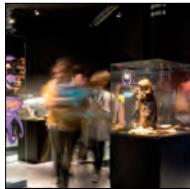
PROFILE OF PARTICIPANTS IN GUIDED TOURS AND IN WORKSHOPS (%)

The audience of the Educational Service is mainly made up of kindergartens and primary schools. Their overwhelming dominance has slightly

decreased on the French-speaking side: the share of secondary schools increased from 15% in 2013 to 23% in 2014. This figure is edging closer to the 30% on the Dutch-speaking side.

	NL	FR
Nursery & primary school	55,32	66,99
Secondary school	31,33	23,05
Higher education	3,27	2,12
General education	2,00	0,87
Youth groups	2,52	3,95
Groups of adults	5,36	2,61
Individuals and families	0,2	0,41
Total	100	100





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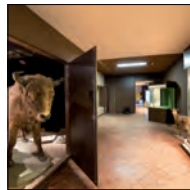
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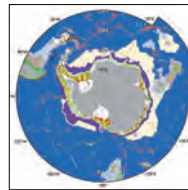
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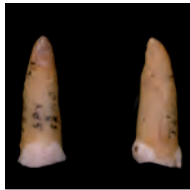
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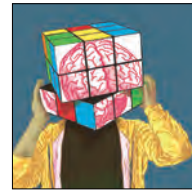
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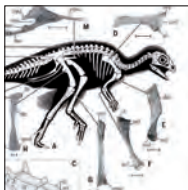
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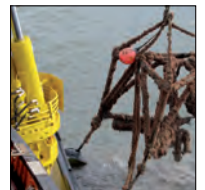
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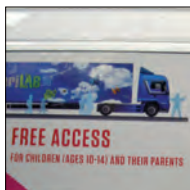
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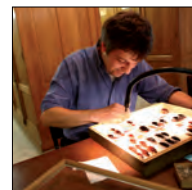
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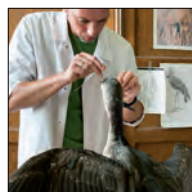
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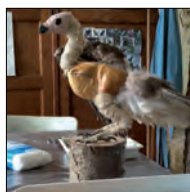
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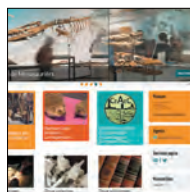
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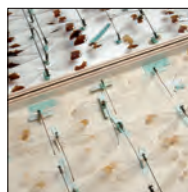
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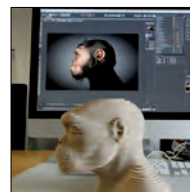
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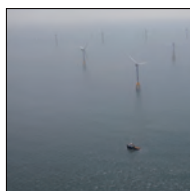
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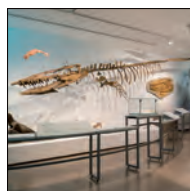
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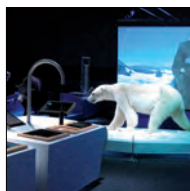
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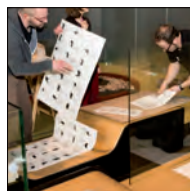
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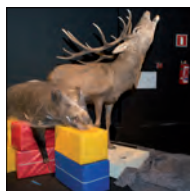
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Kareen Goldfeder, Olivier Ninane, Reinout Verbeke, Camille Pisani (RBINS)

Graphic design:

Freya Vlerick (RBINS)

Coordination:

Kareen Goldfeder (RBINS)

All of RBINS activities are described in the 2014 detailed report (approximately 600 pages FR/NL).

This report is available on CD ROM and can be obtained on request from direction@naturalsciences.be.



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E.R.: Camille Pisani - 29 Rue Vautier - 1000 Bruxelles