museum

ROYAL BELGIAN INSTITUTE OF NATURAL SCIENCES

ANNUAL REPORT

FOREWORD

As it does each year, this report takes you behind the scenes of the Royal Belgian Institute of Natural Sciences (the Institute or RBINS) and its Museum, casually sharing with you its stories, facts and figures. Be aware however: peaceful appearances can be deceiving, given that 2013 was a particularly tumultuous year.

The first change has been long overdue: the Institute's internal reorganisation, which has been ongoing for several years, was finally completed. We partially anticipated this, thanks to involvement of several colleagues who, often on a voluntary basis, took on important responsibilities. I hereby wish to thank them for their commitment and for their contribution to our institution's operations and for helping to preserve its efficiency.

The Belgian Science Policy (BELSPO), being the Public Planning Service to which the RBINS reports, is currently being reformed itself. To this end, BELSPO launched several initiatives under its Administration Agreement. One of these initiatives, the merger of the ten Federal Scientific Institutions (FSIs) reporting to BELSPO, into four poles, hit several bumps in the road - some of which were also picked up by the media - and ultimately did not make it. Whether this is good or bad news, the preparatory work was not in vain: it should facilitate the FSIs to co-operate in view of more targeted and operational projects, which are indeed of strategic importance for the Belgian Science Policy.

Finally, the RBINS, like the rest of Belgium's federal administration, has seen its funding drastically cut during the past year. Preserving our activities and the quality of our services has been a huge challenge in light of this development. We have been forced to be very creative in keeping our promises. Fortunately, we were able to rely on the trust of our public, on the usefulness of our institution in supporting federal capacities, and on our reputation with our colleagues abroad.

This is the reward for years of tireless work and our strong quality focus. It is even one of our major assets. But this asset is also under threat if we are no longer able to fulfil the expectations of our many partners and users. We will no longer be able to keep this positive result if the austerity and the budget cuts continue. Although collaborations, partnerships and synergies allow us to make the most of public funding, they do not replace it.

This composed overview of the past year's activities is therefore well worth it. The stories, facts and figures show how our institution, as well as all the people working here, is always able to innovate.

A nice conclusion to a rather turbulent year.

Camille Pisani,
General Director

TABLE OF **CONTENTS**

RESEARCH

Urbanisation in Belgium and its impact on biodiversity

It is clear that the growing level of urbanisation in our country has had repercussions on our region's flora and fauna, and that it is significantly contributing to the biodiversity crisis. To better understand the effects of urbanisation, we need to identify the processes that cause this phenomenon and understand to what extent they occur at territorial level. This will allow us to better anticipate the long-term consequences.

Researchers of the University of Leuven, the University of Ghent, the University of Antwerp, the University of Louvain-la-Neuve and the RBINS have decided to join forces. Together they are studying the effects of urbanisation on the same series of experimental plots of land all over Belgium.

The project, which is called SPEEDY, is studying a wide variety of species: birds, plants, ostracods, spiders, bacteria, dragonflies, snails and many more. The approach is unique. The project focuses on the ecological impact, such as changes in the composition of the species and their diversity, and on identifying the consequences of urbanisation on the evolution of species and their interactions. The researchers of the RBINS are studying the snails, ostracods and beetles, and are largely responsible for mapping the genetic impact.

To fly or not to fly, that is selection

Among several insect species, but also in other organisms, we have identified individuals, who, thanks to their well-developed wings, can easily disperse while others, within the same population, are unable to do so. The cohabitation of these two types of species and the underlying mechanism are one of the great mysteries of evolution.

For quite some time the assumption was that individuals with long wings mainly colonise new territories. Once the new habitat is colonised, the individuals that do not invest as much energy in the ability to fly are in a better position as they can use the available energy for reproduction.

An empirical and theoretical study of beetles, however, helped highlight an alternative explanation. In the same natural environment, habitat quality varies greatly.

If, in a given environment, all the individuals were to disperse and occupy a random area, then there would be a significant chance of overcrowding in spaces where the habitat is of poorer quality. This process, however, does not occur when only a small portion of this population randomly disperses and the majority of the individuals stay put in their usual habitat. Computer simulations showed that, in these environments, the situation in terms of habitat is stable, with species with strong dispersion and species that are sedentary living together in harmony – proof that evolution can provide a simple solution to combat local overpopulation.

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02.01

The RBINS offers a regional recipe which demonstrates the relationship between food and geology in "Geology at the table - Cooking without borders".

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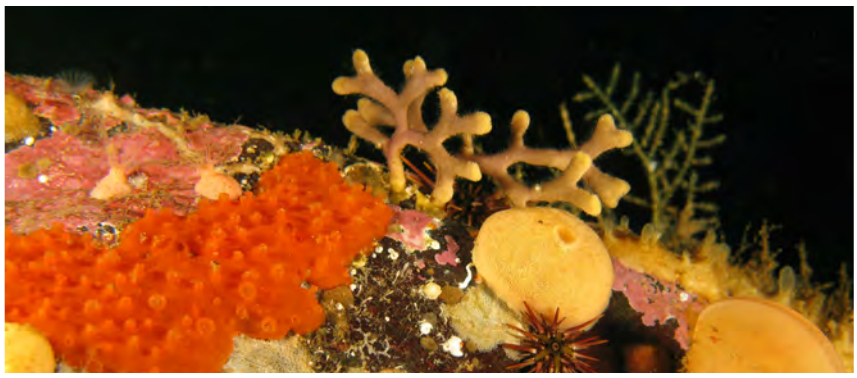
17.01

The Marine Chemistry (MARCHEM) laboratory in Ostend retains its ISO 17025 certification and is accredited to perform a group of supplementary analyses of plant pigments in sediments.

Bees and other Hymenoptera from Ethiopia

Insect fauna, more specifically bees and other Hymenoptera, are not that well known. This is especially true in African countries, particularly in Ethiopia. While it has long been difficult to organise entomological studies in this country, it has proven to be a real hotspot of biodiversity.
Thanks to a three-year GTI (*Global Taxonomy Initiative*) project and support from the Leopold III fund, a researcher and an external collaborator of the RBINS were able to set up a project in Ethiopia that was both educational and scientific in purpose. While a group of Ethiopians were trained to collect, identify and preserve the insects, research was carried out in close collaboration with the *Zoological Natural History Museum* in Addis Ababa and with the *Holeta Bee Research Centre*. The highlands and the Great Rift Valley were surveyed to collect two groups of insects: bees, whose role in pollination no longer needs to be explained, and another group of Hymenoptera, some of which may cause considerable damage to crops. A number of specimens were thus collected and identified, including several new Ethiopian species and species that had not yet been discovered.
While we now know more about the bees and other Hymenoptera of Ethiopia than we did at the start of this project, the researchers also concluded that, given the size of the country and the diversity of its biotopes, subsequent research may still give rise to a large number of scientific discoveries. The RBINS's team also observed that deforestation and overgrazing are two worrying developments which strongly disrupt the entire ecosystem.

Twelve new sponges from Chilean Patagonia



Among marine invertebrates, sponges are the most important source of secondary metabolites, with antiviral, antibiotic and even antineoplastic properties. Many of these metabolites have already been patented and are used in pharmaceutical research. The growing interest in these new substances for therapeutic use has led to a boom in the taxonomy of sponges.
Since 2004, under an international partnership, the RBINS has participated in exploratory missions in Brazil, Argentina, Chile and Peru to draw up an inventory of the coastal fauna.
The benthic fauna of the fjords in Chilean Patagonia present a particularly high level of biodiversity. After the publication of an initial series of six new species of calcareous sponges in 2009, twelve new demosponges of this region were described in 2013 in the journal *Zootaxa*. The biogeographical relations of each of these new species with other species of the same type in the Pacific and the Atlantic are also used in the description of the marine eco-regions.
The RBINS is working closely with the *Museu Nacional* and the *Universidade Federal do Rio de Janeiro* (Brazil), *Fundación Huinay* (Chile) and *Muséum d'Histoire naturelle de Genève* (Switzerland) for this project. Part of the field work was paid for with Brazilian and Chilean funding, supplemented with funding from the Belgian Development Cooperation (GTI project), the Leopold III Fund for the Exploration and Conservation of Nature and the FNRS (Scientific Research Fund for Wallonia and Brussels).

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20.01

The members of the international expedition aboard the Polarstern icebreaker share their daily life and research adventures online on a blog entitled "Two months in Antarctic Seas".

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01.02

Our teams uncover a whale skeleton that is 3.5 million years old and was found during the digging of the new giant lock in Doel near Antwerp.

A multifaceted snail

The land snail *Rumina decollate* is named as such because it loses the top of its shell as it ages. This hermaphroditic species presents a huge intraspecific variation of shells and body colours. In the seventies, two types of colour were distinguished: dark and light. Until recently, scientists thought that these were one and the same species.

The RBINS's researchers were able to show, using genetic bar coding, that these two types of colour belong to different species. But they were even more surprised to discover that other species could be defined using statistical models for interpreting DNA information! While one of the methods only distinguished five types within the group, the other method identified no fewer than 17 different species – a real taxonomic nightmare as it demonstrates that DNA-based techniques do not always provide a simple and objective answer in terms of taxonomy. The techniques used today, therefore, are still inconclusive, and the classification of species remains a difficult undertaking.

By combining DNA data with other information, however, the researchers were able to provisionally conclude that *Rumina paivae* does not belong to a specific species, that *Rumina saharica* and *Rumina decollata* is indeed two different species and that *Rumina decollata* is actually a set of at least six cryptic species, with variants in terms of light or dark colour.

Biodiversity: a new national strategy for 2020

Pollinating insects, raw materials, the production of oxygen... Today, at least 40% of the world's economy relies on services provided by healthy ecosystems.
In light of the loss of biodiversity, Belgium, in 2013, updated its National Strategy with specific figures and objectives for 2020 (www.biodiv.be).

This strategy applies to the federal, regional and community level and is Belgium's contribution to the global and European objective to halt the loss of biodiversity by 2020 (MDG 2020).

The RBINS is the National Focal Point for the Convention on Biological Diversity and coordinated this update. For example, in 2013, the Institute organised a public consultation and a meeting with all the stakeholders, wrote out and translated the strategy, and started developing tools to inform the public and raise public awareness. The National Biodiversity Strategy aims to tackle various new challenges including:

- the development of ecological networks (preserve at least 17% of terrestrial areas and 10% of marine areas);
- to restore ecosystems and stop the loss of biodiversity (restore at least 15% of damaged ecosystems);
- and the integration of the economic value of biodiversity and of services by ecosystems in national planning and accounts.

In Belgium, 10% of living species have already become extinct and, today, more than one third are under threat.

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05.02

The State Secretary for Science Policy, Philippe Courard, enjoys a flight on board the RBINS's newly renovated observation plane during the press presentation.

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13.02

Nine hundred children visit the "BiodiverCity" exhibition/travelling workshop at Aqualaine in Verviers.

The stranding of marine animals

It was a very difficult year for the RBINS's "North Sea" unit, which coordinates the data processing and scientific research relating to marine animals stranded on Belgium's beaches. In 2013, the unit posted the highest number of stranded porpoises ever recorded, namely 146 with peaks in the months of April, May, June and July. A lot of these animals were accidentally trapped in fishing nets, but the number of porpoises reported in inland waters has also recently increased. This phenomenon, which is also occurring in Germany and the Netherlands, could be related to the presence of fish upstream in rivers.

Stranded cetaceans: victims of plastic waste...
Besides porpoises, a minke whale was also found on 10 March 2013 on the beach at Nieuwpoort. This specimen, a very young male, measured 3.40 m in length and was abnormally thin. The cadaver was transported to the University of Liège for an autopsy. The 25 people who attended the autopsy concluded that 400 g of plastic bags were found in the animal's stomach. This caused total obstruction of the digestive tract, meaning that the animal could no longer feed and starved to death. This event, once again, proves how mortally dangerous plastic packaging can be for marine animals. The global problem of marine litter has reached alarming proportions and is a source of growing problems for many marine species.

... and also blood poisoning
The reason for the stranding of a young live sperm whale in the spring of 2012 in Knokke-Heist was quite different. The autopsy coordinated by the University of Liège, in collaboration with scientists from the University of Ghent and the RBINS, provided valuable information about the reasons for the animal's stranding.

The researchers discovered that the animal was suffering from septicaemia, or blood poisoning, caused by the *Edwardsiella tarda* bacteria, which in man and (mainly marine) animals can cause symptoms that are similar to those of *salmonella* infection. The concentration of the bacteria in the blood revealed that the infection had weakened the animal to such an extent that its navigation system had been disrupted causing it to strand, which is usually fatal for such an animal. This was the first time that a link between beaching and a bacteriological infection had been established. The results of this research were published in *Veterinary Microbiology*. They indicate that bacteriological infection may have played a major role in the beaching. The stomach of the young sperm whale contained remains of fish (possibly the source of the bacteria) and a piece of a plastic container which created a small perforation in the stomach, allowing the bacteria to infect the blood.

Information brochure: "What to do in the event of stranded marine animals"
It is a reality: seals, porpoises, dolphins and birds covered in oil regularly get stranded on our beaches. That is why, in the framework of the Coast Guard service, the Governor of the Province of West Flanders asked the RBINS to gather all the relevant information in a brochure, about what actions to take in the event of a stranded animal. This brochure entitled "Wat te doen bij waarnemingen, strandingen en incidentele vangsten van beschermde zeedieren? Gids voor informatie en actie" (What to do in the event of sightings, stranded animals and incidental catches of protected marine animals? Information and action guide) was published in 2013. To date, it is the most comprehensive information and action guide for the various stakeholders, such as the mayor, the police, the fire service, the emergency services and the port services.

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15.03

The RBINS co-organises the congress entitled "Challenges in Aquatic Sciences" in Taiwan. The proceedings of the congress are published in the journal Hydrobiologia.

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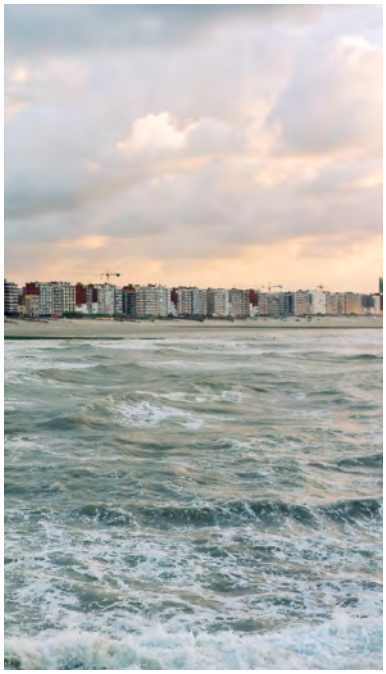
16.03

The RBINS canvasses the Belgian population about waste management as part of the VOICES (Views, Opinions, and Ideas of Citizens in Europe on Science) project.

International collaboration in the North Sea

In early December, the Rotterdam *Hit and Run Cargo Team* undertook an operation with the agreement of the Belgian public prosecutor, to fight drug trafficking by boat in the North Sea. The team requested the support of the RBINS's Operational Directorate Natural Environment.
Sources indicated that cocaine was going to be thrown from a container ship, which would then be picked up by smaller, accomplice boats. While the boat was sailing to the Netherlands, a large quantity of cocaine was indeed thrown overboard. A small, fast motorboat was immediately boarded and searched, and the suspect passengers were arrested in the Netherlands.
After the drop-off, some of the parcels were at risk of drifting into Belgian waters. Because the Dutch coast guard did not have the necessary permission to operate in the Belgian waters of the North Sea, several agencies of the Belgian coast guard were mobilised for the operation.
To locate the cocaine parcels, the coast guard relied on the OSERIT drift model, developed by the RBINS's Operational Directorate Natural Environment. This maritime mathematical model, which was developed in the seventies, can accurately reproduce the ocean current in the English Channel and the southern part of the North Sea. Thanks to OSERIT and the attention of the various partners of the Coast Guard, the cocaine parcels were easily located and picked up by the Dutch authorities. In total, several hundred kilos of cocaine were seized and have since been destroyed.
The use of OSERIT in a drug trafficking case was a first. The Coast Guard's partners constantly use this model and have had online access to it since 2012. It has been used for many purposes, for example in the event of oil pollution or when someone is missing at sea.

The Saint Nicholas storm: reliable forecasts



One of the daily tasks of the RBINS's Operational Directorate Natural Environment is to draw up storm surge forecasts or 3D models of ocean currents. On 6 December 2013, the RBINS forecasts a storm surge on the Belgian coast with waters rising up to 6.3 metres above the reference level in Ostend. These forecasts proved to be accurate and the storm surge was the biggest storm to hit the Belgian coast since 1953.

The forecasts enabled the authorities to take adequate preventive measures to ensure everyone's safety and protection. The Saint Nicholas storm passed without causing any major damage on the Belgian coast. In addition to the quality of the forecasts by the RBINS's team, we would also like to emphasise the excellent collaboration between the forecasters of the MRI (Royal Meteorological Institute), the OMS (Oceanographical Meteorological Station), the representatives of the MDK (Maritime Services and Coast) and the modellers.
A storm surge model is a mathematical model for calculating the evolution of currents and water levels at any time at different points in a grid, which in this case covered the northwest European continental shelf. This is done twice a day to provide accurate and reliable forecasts, especially during heavy storms.

The forecasts are available online at www.mumm.ac.be. They are also sent to various institutional users such as the coast guard, the federal police, the army, the aerial surveillance team, Belgian universities and so on.

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05.04

"The largest dinosaur hall in the world": that is how CNN Travel presents the Museum in its global top ten dinosaur exhibits.

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21.05

An Antarctic meteorite weighing in at 18 kilos is handed over to the RBINS under an agreement with the National Institute for Polar Research of Japan for exhibition in the museum for ten days.

The Cinebulle: an original way of observing ants

The forests of Papua New Guinea, which is located between Australia and Indonesia, are home to an amazingly diverse flora and fauna. After an initial exploration in 2012, an entomologist and an ecologist of the RBINS returned there in April 2013 to continue their research in the canopy, which is generally deemed inaccessible. The objectives of the mission: to study the structure and vertical distribution of ant colonies as well as their behaviour and the way in which they symbiotically exploit certain other insects and plants. At the same time, the team also wanted to involve the local population and to train naturalists-explorers as part of their contribution to protecting the forest.

One of the highlights of the mission was the use of Dany Cleyet-Marrel's Cinebulle, a hot air balloon with a ULM motor which is used for TV documentaries. The Cinebulle was adapted to gain access to the trees that grow out above the canopy and the ends of their branches: the addition of an electric motor facilitated the manoeuvring of the aircraft, allowing it to stop and restart as soon as the balloon was installed at a specific location in the trees for observations and collecting samples.

Bait and traps for flying insects were hoisted into the trees at the desired level using ropes, and samples of ant-friendly plants, which grow on the trees and which the ants use as support, were collected. The specimens that were collected will now be studied to determine whether certain species of plants are specific to ants and how the various ant colonies share this patchwork of territories in the forest canopy.

Supporting biodiversity in developing countries to promote sustainable development

As a centre of excellence for biodiversity and sustainable development, the RBINS makes all its expertise available to the Directorate General for Development Cooperation and other agencies for actions aimed at promoting biodiversity in developing countries.

This programme aims to help local professionals (institutes, universities, national parks and so on) study, manage and use biodiversity in the framework of sustainable development and the eradication of poverty.

As part of the global taxonomy initiative, for example, short training programmes were organised in Belgium for students and professionals from developing countries. Grants were also given to Belgian researchers to implement projects in partner countries.

The team also provided support for the inventory, monitoring and evaluation of biodiversity, in partnership with local institutions. In 2013, habitat dynamics were monitored along ten permanent nature trails in the parks of Burundi. Teaching materials were also prepared, which led to the publication of a lexicon of the dominant plants in Kahuzi-Biega (DRC) national park. Other activities included promoting research on ecosystemic services, and a partnership with the University of Abomey-Calavi (Benin).

The Institute also provided support for the implementation of the Clearing House Mechanism, which aims to ensure the exchange of information and to strengthen technical and scientific collaborations.

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22.05

A biodiversity festival: our scientists, our neighbours and the local authorities work together to organise an event in Leopold Park as part of the European PLACES project.

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26.05

The "Prehistory – Do It Yourself!" exhibition closes. 73,733 visitors now know how to carve flint, make fire, chase a mammoth, tan skin and much more.

The origins of modern dog

An international team of geneticists and palaeontologists of the RBINS and the University of California conducted a large-scale research project to gather more evidence on the origin of modern dog. It started in 2009 with a study of canid skulls.

The research team used molecular techniques to extract and analyse the mitochondrial DNA, which is only inherited from the mother, of fossil remains such as bone and tooth roots. By comparing the genetic material of 18 wolves and prehistoric dogs with that of modern-day wolves and dogs, the team was able to deduce that all modern dogs are most closely related to the prehistoric dogs and wolves of Europe. Thanks to the large quantity of genetic data, the researchers were able to situate the beginning of the domestication of wolves in a period dating between 32,100 and 18,800 years ago. This means that the European hunter-gatherers started to domesticate these animals during the last glacial period.

This led to a surprising conclusion. Contrary to the assertions of previous studies, domestication did not start in the Middle East or in China: the first dogs were European.

The world-famous Goyet's dog of the RBINS's collection, the oldest fossil of a primitive canid found to date, was also included in the study. This skull was found in 1860 in the Belgian Ardennes by Edouard Dupont, a researcher and former director of the RBINS. His meticulous excavations benefited research because he preserved every single bone, even the tiniest. After a renewed examination of the skull, the RBINS's palaeontologists were able to demonstrate that this was not a wolf, as previously stated, but a dog. The skull also appears to be much older than other skulls found to date.

The skull is actually 32,000 years old, while a 14,000-year-old skull had been declared the oldest known skull. The new study allowed the researchers to conclude that the maternal line to which Goyet's dog belongs is not actually a direct ancestor of modern dog, but rather a related group that disappeared over time.

The results of this study were published in the journal *Science* and prove that even 140 years after something has been dug up, researchers can still make new discoveries thanks to technological developments. After studying the mitochondrial DNA of the maternal line, the team will now examine nuclear DNA, which is inherited from the mother and father. To be continued in other words!

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28.06

State Secretary Hendrik Bogaert visits the Belgica oceanographic research vessel in Zeebrugge and the laboratories in Ostend.

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01.07

Nobody's perfect! Visitors can now fill in an online form to record a complaint. The RBINS commits to answering within 15 days!

Learning more about our ancestors by observing pollen

The study of fossilised plant remains (such as leaves, fruit, seeds and charcoal) found on archaeological sites provides a wealth of information. For example, what plants our ancestors ate, gathered and grew and what they used to keep warm, to build their house and to make tools. Even the smallest fossils, such as pollen grains and spores, reveal valuable clues about the plant environment and lifestyles of our ancestors.

To answer the questions of archaeologists, one of the RBINS's palynologists collaborated with the Public Service of Wallonia to analyse the pollen grain and spore content of sediment samples from archaeological sites. Ponds, wells, latrines, pits or trenches are all places where these grains are usually well preserved. They provide information about the changes that our ancestors made to their local or regional natural environment. These microfossils also provide information about agricultural practices (crops, livestock) and, to a lesser extent, about funeral rites and pharmacopoeia.

All periods (from the Palaeolithic to the present day) and all types of site (villages, mines, burials and caves) were included. At Clairefontaine Abbey, a recent study of the sediment in eighteenth-century latrines revealed what the nuns ate and whether these products were locally grown or imported.

These palynological studies are part of a broader project that includes archeo-botanical and archeo-zoological disciplines which provide varied and complementary information and help researchers piece together a site's history: local environment, vegetation, habitat, economic activity and the lifestyles of the site's occupants.

Aurornis xui: the most primitive bird

Together with Chinese, Italian and British colleagues, a palaeontologist of the RBINS described a new fossil bird, dating from the Jurassic, and about 160 million years old. Baptised *Aurornis xui* (from the word aurora and the ancient Greek word *ornis*, meaning bird), this is the most primitive bird known to date.
The new fossil was discovered in the Tiaojishan formation, in Liaoping Province in China, which is a particularly rich source of fossils. Several fossils of feathered dinosaurs dating from the Middle and Upper Jurassic have already been found here.
The study prompted a review of all the relationships between birds and carnivorous dinosaurs. "The bird of dawn" was categorised in the Paraves group, which includes the avialians (i.e. all birds, both current as well as extinct species) and their closest relatives, the theropod dinosaurs of the dromaeosaurid family (like the *Velociraptor*) and of the troondontid family (such as the *Troodon*).
Thanks to a detailed analysis of almost 1,000 characteristics, the palaeontologists came to the conclusion that *Aurornis* is the most primitive bird known to date, dethroning *Anchiornis* and *Archaeopteryx*. Following this study, *Archaeopteryx* was also reinstated to the Aves class. The study also confirmed that flapping flight (by repeated beating of the wings) had only appeared once in the group of feathered dinosaurs and birds.
The results of this study were published in May 2013 in the scientific journal *Nature* in an article entitled *"A Jurassic avialan dinosaur from China resolves the early phylogenetic history of birds"*.

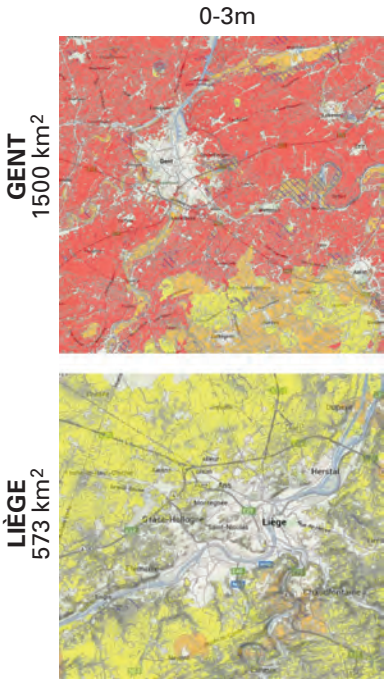
> 02.07

One of our palaeontologists describes the fossils of feathered dinosaurs found in Siberia: an important step forward in the process of explaining the origin of feathers and birds.

> 03.07

A dig in the Pisco Basin in Peru enables our researchers to illustrate certain crucial stages in the evolutionary history of fossil cetaceans.

ThermoMap: the potential for shallow geothermal resources



On 7 May, the RBINS hosted the final Belgian ThermoMap conference. Various researchers presented the results of three years of work to end users (installers of geothermal systems, manufacturers and installers of heat pumps, heating technicians and so on).

ThermoMap (www.thermomap.eu) was launched in September 2010 with the objective of developing a map of potential shallow geothermal resources (less than 10 metres) in Europe and of promoting the use of this data to develop superficial geothermal systems. The project, which was funded by the European Commission, brought together 12 partners, including the RBINS, from nine countries.

The researchers' work led to the development of a small-scale map of the geothermal potential of the European subsoil up to a depth of 3 metres, combining soil, climate and hydrogeological information.
Each country also identified test areas (Liège and Ghent for Belgium) in order to establish a large-scale map for these areas, up to a depth of 10 metres this time. The existing data – such as soil, geological, hydrogeological and drilling information – was collected and analysed. This then led to the creation of a high-resolution map of the geothermal potential for three different soil levels.

The results of these studies were incorporated in an online GIS (*Geographic Information System*) and the maps are now available for free, to professionals and private individuals, so they can check the feasibility of a heating system that uses green energy.

More broadly, ThermoMap is part of a global sustainable development policy and an initiative to promote the use of non-fossil energy sources in Europe.

Geological research in Iran

In February 2013, the RBINS's "Quaternary Man and Environments" Unit launched a research project on "Greater Mesopotamia: its history and environment" in the southwest of Iran. Starting with the study of a plot of land to the north of the Persian Gulf, the researchers are seeking to collect geological information dating back 10,000 years and to study how the landscapes have evolved over time. This paleogeographic research is being conducted in close collaboration with the Geological Commission of Iran and Tehran University.

The objective is to reconstitute the rising sea levels of the Persian Gulf. To this end, the RBINS is being assisted by the Royal Institute for Cultural Heritage, which is in charge of radiocarbon dating. The geologists, who specialise in the Quaternary, will be mapping the different types of landscapes, such as river and coastal landscapes, salt marshes and wetlands. This is the only way that they can understand how people used to live then and conduct archaeological research. They are also trying to understand to what extent the landscapes were transformed by nature and man.

These geologists of the Quaternary have already scored an initial good and interesting result by analysing the algal layers that developed in the various natural environments. During drilling operations, they found layers of algae in coastal deposits which they were able to date. This made it possible to obtain an indication of the sea level. The outcome of this analysis is different from what has been hitherto published in literature. A first, thrilling avenue that the geologists will seek to clarify by continuing with their field research!

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15.07

Our geologists search for samples of bivalves and measure speleothems in the Belgian caves of Rochefort, Remouchamps and Han-sur-Lesse.

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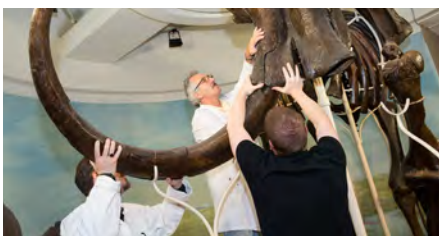
18.07

Closed for renovation! The mammoth joins the elephant in the room "250 years of Natural Sciences".



2 COLLECTIONS

A tiny collection belonging to Emperor Hirohito returned to Japan after 78 years

Some specimens of Hydrozoa collected by Emperor Hirohito of Japan in Sagami Bay in the thirties were found at the RBINS and returned to the reference collection of the Showa Memorial Institute in Japan. We unveiled a very original story after the unexpected discovery, by a member of the Institute's team of conservators, of a jar containing 20 tubes that were labelled "Japan" along with several boxes containing slides. Correspondence between the former Belgian conservator Eugène Leloup, an eminent specialist in research on Hydrozoa, and the scientific advisor to the Emperor of Japan, Dr Hattori, was also found. The analysis of their letters, which were written between 1930 and 1952, revealed that, in 1936, Dr Hattori appointed Dr Leloup to identify the samples of Hydrozoa found by the Emperor of Japan, who was an avid collector of these marine species. Leloup acquitted himself scrupulously in his mission, because, among other things, he discovered a variety and three new species for science. One was named *Serturalia hattorii* as a tribute to his correspondent.

In January 1940, when the scientific work had been completed, the samples were ready to be returned to Japan. But World War II broke out, interrupting all exchanges. In 1941, contact between the protagonists was re-established. The samples were only mentioned once. Nonetheless, for unknown reasons, they were never returned even though relations between Leloup and Hattori were excellent. In 2013, after this unusual discovery, the Emperor Hirohito's collection of Hydrozoa was handed over to Japan by the embassies of both countries.

The Leopold III Fund celebrated its 40th anniversary

In the early seventies, King Leopold III decided to create a foundation to promote the achievement of his ideals. In 1972, the "Leopold III Fund for the Exploration and Conservation of Nature" was established with the objective of promoting nature studies and conservation. The first general meeting of the fund was organised in 1973. In 1983, after King Leopold III's death, his youngest daughter, Princess Esmeralda of Belgium took over at the helm. Since its inception, the Leopold III Fund's headquarters have been at the RBINS.

Even today, the fund is an important promoter of scientific research in the field. It co-funds expeditions outside of Europe aimed at studying biodiversity as well as populations that are particularly close to nature. Each year, fifteen projects are selected to receive financial support. In return, the fund may use the results and the discoveries of the research conducted.

In addition to grants to researchers, the fund also manages King Leopold's extensive photo archives. These comprise about 40,000 colour slides and just as many black and white photos taken by the king during his many trips to Southeast Asia, Africa, and Central and Latin America.

On the occasion of the fortieth anniversary of the Leopold III Fund, the Museum of Natural Sciences exhibited a series of photographs and objects – such as cameras, lenses, notebooks – from the archives. A special exhibition, which attracted many visitors.

>
27.09

The sexual proclivities of North Sea rock snails and the virtual autopsy of a dolphin are just a few of the topics presented by the RBINS during Researchers' Night.

>
30.09

The RBINS publishes and distributes the monograph "Diversity of Fish Otoliths, Past and Present".

Digitisation: an essential tool to safeguard the collections' future

With 37 million specimens, the RBINS has the third largest natural science collection in Europe. Preserving these specimens and ensuring access for future generations is a challenge. Hence the importance of the 3D digitisation of the collections as well as the comparative study of the various digitisation techniques.
Digitisation is an essential tool for registering collections, especially when handling rare or fragile objects, and for preserving them from destruction. It is an excellent exchange tool because digitised collections can be shared between scientists from different institutions all over the world. The RBINS's 3D digitisation programme started in 2005. To date, about 2.5 million of the 37 million specimens have been encoded, but without multimedia digitisation.
At the same time, the Agora 3D project, a consortium consisting of four Belgian federal scientific institutions, namely the RBINS, the Royal Museum of Central Africa, the Royal Museums of Art and History, and the Royal Institute for Cultural Heritage, was launched in November 2012. The aim of this project is to establish more efficient protocols for the digitisation of cultural heritage collections, using a large number of case studies. To this end, the Agora 3D project is testing 3D digitisation techniques from a wide range of technologies. Fossils, insects, termites, elephants, ammonites, and more: the digitised objects have considerable value and the digital techniques have enabled very accurate reconstructions, which are often spectacular!

A travelling collection of insects and spiders

The conservators of the RBINS's collections have the important task of preserving the specimens that have been collected over the years. Certain collections travel around the world so foreign researchers can study them. This is particularly true for the entomological collection. Why? Because insects and spiders make up the largest animal group on earth. To date, about one million species have been identified but, according to entomologists, there are ten times as many. As a consequence, there is still an enormous amount of research to be conducted in this group, which prompts us to loan our collections.

The entomological collection, which was started 160 years ago at the RBINS, now includes more than 15 million specimens. They are stored in 77,000 boxes at 5,000 conservation sites in eight galleries.

Each year, at least 60,000 new specimens are added. Thanks to the loans of insects and spiders, we significantly increase the scientific value of our entomological collection. The more studies are conducted on our material, the more new species can be described. The discovery of new types of equipment is especially important as it allows the description of new species. In addition, we can also provide useful information to nature conservationists.

Managing all these loans, which involves the dispatch and recovery of specimens, requires a lot of work. Seven employees are responsible for the daily operations. In 2013, the Institute loaned 37,127 specimens, for 219 loans. That same year, 50,793 specimens were returned to us after examination. A daunting task, but a great contribution to science!

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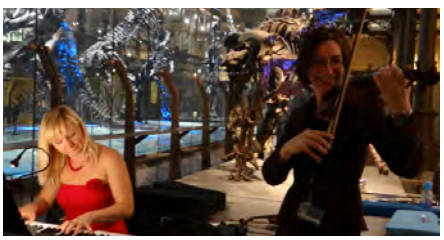
03.10

During the Brussels Museum Night, hundreds of visitors discover the hidden talents of our technicians, artists and conservators in an informal and festive atmosphere.



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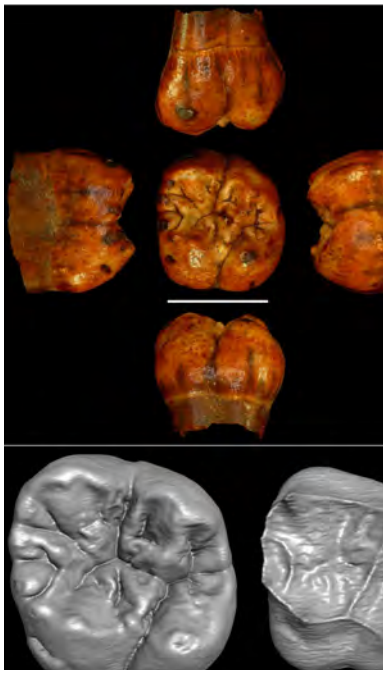
15.10

A RBINS team organises the inventory of the species and natural habitats of a protected area in the Democratic Republic of Congo as part of the BIOSERF project.

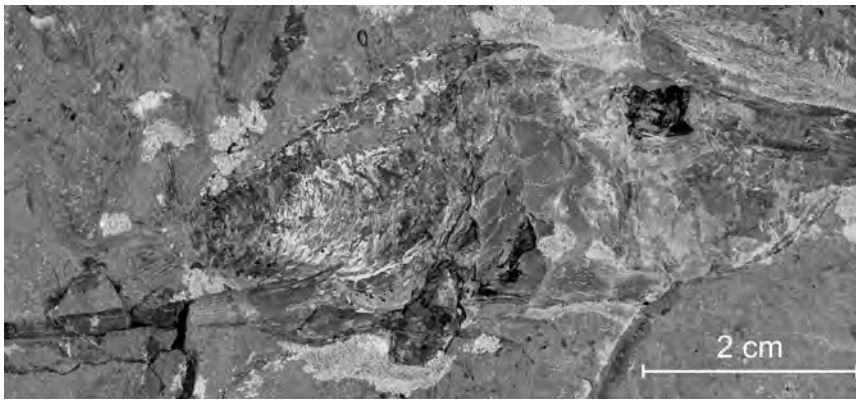
A two million year old human molar from Central Africa



During an archaeological dig on the Ishango site – in the northeast of the Democratic Republic of Congo – which was conducted in the fifties by Jean de Heinzelin, a RBINS geologist, the researchers found a large number of human fossil remains (tibias, humeri, teeth, mandibles and more) as well as old tools such as harpoons and the "famous" notched stick. These various discoveries, which were found in layers that were 20,000 to 25,000 years old, are carefully preserved at the Institute.

A team of scientists is re-examining the Ishango remains. During her post-doc at the RBINS, under a project funded by the Brussels-Capital Region, a paleo-anthropologist of the French National Centre for Scientific Research re-examined the fossils using current techniques. Among the bones, for example, she found a human tooth which did not have the same profile as the other human remains that were found. A thorough study of this atypical molar and a meticulous examination of the reports that were drawn up during the dig about the findings indicated that this tooth was not correctly referenced when it was found. The researcher then collaborated with specialists to study the tooth's morphology. The results were clear: the 3D analysis and the comparison with more than 60 teeth of ancient hominids confirmed that the molar was from an individual who probably walked our earth about two million years ago. The team was not able to pinpoint a known species of hominids however. This is a major discovery given that it is the first time that a hominid this old has been found in Central Africa and to the west of the African rift.

A new family of fossil fish



The study of the collections preserved by the RBINS allowed researchers to identify a new family of fossil fish. This includes several types of fossil bony fish of the marine Late Cretaceous of Lebanon which are indigenous to the region and which lived about 90 million years ago.
After an in-depth anatomical study, it became clear that these specimens belonged to three new types of pycnodontiform fish (bony fish with a flat body and a round shape, who lived from the Triassic to the Eocene). They are different from other pycnodontiform fish in many ways – elongated mouth in the form of a proboscis, sharp spines that replace the pectoral fins and so on. This in turn justified the creation of a new family, the Gladiopycnodontidae (from the Latin *gladius* for sword and the ancient Greek *puknos,* close, and *odous,* tooth).
This discovery was first published by the palaeontologists of the RBINS and the University of Chieti (Italy) in the *European Journal of Taxonomy.* Besides the three genera discussed in the article, another six genera and the phylogenetic study will be discussed in three subsequent publications.
Aside from its scientific value, this discovery also highlights the essential role that volunteers play within the RBINS. In 2013, there were 80 volunteers working on a daily basis at the Institute. Among them, 15 pensioners continue to pursue their research with the same passion as they did during their careers. This is particularly the case in the palaeontology department, and leads to important scientific discoveries, such as that of this new fossil fish family.

>
23.10

One of our researchers names a frog *Pristimantis jamescameroni* as a tribute to the famous explorer and filmmaker and his work to raise awareness about environmental issues.

>
27.10

On the occasion of the tenth anniversary of DNA barcoding, the Joint Experimental Molecular Unit presents its work during a meeting in China with 350 participants from over 40 countries.

PUBLIC

Baby animals: an exhibition tried and tested by 3 to 8 year olds

With 114,975 visitors in 2013, the *Baby Animals* exhibition has been a huge success, even though it targets an audience that museums tend to overlook: young children between the ages of 3 and 8 years old.

The exhibition concept is very innovative. Everything has been conceived and designed with this young target audience in mind, from the small size of the exhibition displays, to the choice of colours and materials, and even the communication methods – lots of visuals, films, illustrated stories and games, and not much text. To create and develop this exhibition project, the Museum canvassed some 600 children in their classrooms. This gave the Museum a better understanding of their knowledge, the questions they ask and the topics that interest them. The stories and games were also tested to correct anything where necessary.

The result was surprising and delighted everyone: the exhibition immersed visitors in the fascinating world of baby animals, from their birth to the moment they can fend for themselves, retracing the various stages of their growth, their lives and their survival. 75 animal species were shown in 29 illustrated stories, multimedia displays and fun activities. It also provided the perfect opportunity to bond with your child!

"Falcons for everyone": nature's beauty in the city centre

In 2013, for the tenth consecutive year, a pair of peregrine falcons, a species that was under threat in Europe and North America, nested in the spire of St. Michael and St. Gudula Cathedral in the centre of Brussels. At the end of May 2004, an ornithologist of the RBINS came up with the idea of the "Falcons for everyone" project while he was observing their nesting acrobatics. It offered the perfect opportunity to share the fragility and beauty of nature with the public, as well as highlighting its ability to adapt in an exceptional setting.

In March 2013, a rare event occurred as the female laid five eggs in snowy conditions. In order to follow the spectacle of the hatching, the growth and the first flight of the baby falcons, a set of mini cameras were installed near the nest, which continuously transmit images live to a website. An observation post was also set up for the public in April and May in the cathedral's forecourt. There is also a blog to inform visitors about the ecology of the peregrine falcon. A project that is both a scientific research programme and highly informative for the public. In 2013, the site www.falconsforeveryone.be recorded 534,000 visits from 105 countries, while 20,000 people visited the observation post. In 2013, the project received the first annual Award for Science Communication of the Royal Flemish Academy for Sciences and Arts (KVAB).

>
31.10

On Halloween, 54 young monsters, skeletons, zombies and other witches spend an unforgettable evening and night surrounded by dinosaurs.

>
23.11

The Royal Entomological Society of Belgium celebrates the 200th anniversary of the birth of its founder, Baron de Selys Longchamp. The RBINS preserves his collection of dragonflies, which is the largest in the world.

The Museum receives an award for its excellent accessibility

In 2013, the Museum of Natural Sciences received the 2012 VISITBRUSSELS Accessibility Award for the external walkway it had built and the fact that it had adapted its visitor services and facilities for people with reduced mobility.
For several years, the Museum has worked tirelessly to ensure that it is accessible for as many people as possible: people of all ages, those with reduced mobility, the visually impaired, children and adults with mental disabilities and so on. This approach was incorporated in the renovation plan that started in 2004, in spite of the building's historical and architectural complexity. The works that led to the opening of the Dinosaur Gallery (2007) and the Evolution Gallery (2009) mean that, today, 90% of all visitors with reduced mobility have access to the Museum's public spaces. Only the entrance remained to be tackled, as this limited accessibility, and prevented the Museum from receiving groups of people with reduced mobility. In 2012, the Buildings Commission thus launched the construction of an external walkway at the Museum's request. This provides direct access to the Museum's cloakrooms and avoids the steps at the entrance. The architects opted for a steel structure and a wooden floor that is suited to wheelchairs and prams, combined with floor lights, orientation tiles and an electric gate.
The Brussels Tourism Award focuses on the global approach to accessibility for all, and not merely on the architectural achievement, a reflection that has also inspired the Museum's educational programmes in recent years.

A day at the centre of the earth, this living and tumultuous planetl

Each year the RBINS organises a theme day focusing on geological discoveries for the public. This formula, which appeals to all generations, is becoming increasingly successful and is aimed at experienced amateurs and novice scientists. There are various activities throughout the day: films, events including debates, meetings with professionals, opportunities to explore the Museum's collections and unpublished documents, and more. On Sunday 24 March 2013, the RBINS's educational service welcomed the public to the "Volcano and Seismic News Day", which focused on the latest news about volcanoes, earthquakes and tsunamis. Eighty visitors, of all ages and from various backgrounds, attended the presentations by Jacques-Marie Bardintzeff, a volcanologist at the University of Orsay (France) and Michel Van Camp, a seismologist at the Royal Observatory of Belgium. Sylvie and Daniel Chéreau, the presidents of L.A.V.E. (L'Association Volcanologique Européenne) also gave an update on volcanoes around the world, with some amazing footage which they had filmed during their most recent expedition to Iceland. In addition to these conferences/debates, the day's programme also included some interactive displays about earth and the treasures of volcanoes – such as lava, sulphur, obsidian - a guided tour of the Institute's geological depositories and a workshop during which the participants could learn how a seismograph works. From Italy to Vanuatu, from Iceland to Haiti and Sumatra, the day attracted an enthusiastic audience that wanted to learn more about the shocks that perturb our earth's fragile crust – a strong reminder that Earth is a living planet and of how small man is compared to this immense force!

>
04.12

The RBINS is a member of the delegation of five experts representing Europe in the second Expert Group Meeting of the Convention on Biological Diversity in India.

>
09.12

Visually impaired children and disabled adults visit the museum for the presentation of the accessibility guide to the museums of the Brussels Museum Council.

Culture and nature go hand in hand

In order to attract the widest possible audience, every year the Museum of Natural Sciences enters into a cultural partnership with Belgian partners. And it would seem that culture and nature go really well together! On the one hand, we want to offer artists a platform to disseminate their message and draw inspiration from nature. On the other hand we can use art to advance science.

For example, the Museum provides support for the well-known ARGUS photo contest, which focuses on nature and the protection of biodiversity. This year, the Museum also organised a photo exhibition showing the work of the laureates in the various categories.

Since 2011, the Museum has also been proud to participate in the Museum Night Fever event. This year, animals, plants and minerals inspired students from various departments of the Applied Arts faculty of the Brussels-based university college, Haute Ecole Francisco Ferrer. They drew inspiration from the treasures in our collections to concoct a stunning tour through the most beautiful galleries in the Museum. The public was even able to attend a fashion show in the Dinosaur Gallery.

For the second year running, we also worked with Kunstenfestivaldesarts. The Belgian scenographer Jozef Wauters thought the Museum was the perfect setting for his project, the "ZOOLOGICAL INSTITUTE FOR RECENTLY EXTINCT SPECIES", which is dedicated to these species. In a temporary wing in the Museum, Wauters shared his point of view on people and the choices they make in relation to their habitat. He used an unusual collection of imagery, stories and key moments.

The Museum is renovating!

Times are changing, visitor numbers are increasing, their wishes are changing and in turn so are the technological requirements. The Museum wants to move with the times, meet the expectations of the public and its external partners and offer an integrated experience. A change that means that the buildings and the layout have to be adapted with the main objective of letting in more daylight and adding more space for workshops and events.

After the first phase of works – with the creation of the "Dinosaur Gallery", the "Evolution Gallery" and the other galleries, including "250 years of Natural Sciences" and "BiodiverCITY" – in 2013, the Museum entered the second phase of its renovation. This meant closing the "Men and Mammoths" and "Animal Pals, animals in the city" rooms. The temporary exhibition space has also been renovated and the reading room will be converted into a knowledge centre.

The temporary exhibition "Brain Twisters" has opened in June 2014. The "Gallery of Mankind" will kick off in early 2015. In 2017, a Gallery on the "Living Planet" is scheduled with two floors about biodiversity and ecology in the world. There is lots for the public to discover in other words!

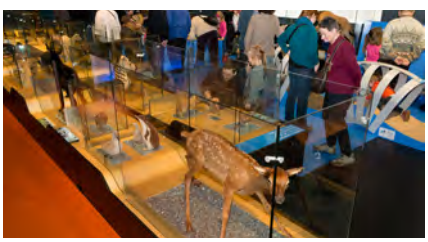
When a gallery is closed for renovation, the specimens in it are moved to other galleries or returned to the Museum's depositories. The mounted specimens and most of the skeletons were easy to move. The larger skeletons, such as the Lier Mammoth, had to be taken apart and moved piece by piece, which was quite a feat.

> 10.12

At a workshop in Singapore, the RBINS presents the great diversity of the insects of the mangroves in Southeast Asia to the employees of the region's national parks.

> 31.12

334,190 thanks to the people who visited our galleries and exhibitions and who were even more numerous than in 2012!



4

FIGURES

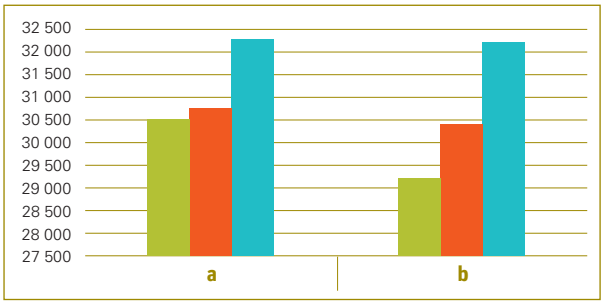
> FINANCES

In 2013, the Institute's earnings and expenditure strongly increased, which demonstrates the Institute's dynamic approach to finding external funding and also its desire to invest in research resources and in the Museum.
Earnings increased by 5% in total compared with 2012. This is all the more remarkable given that the Institute's endowment was cut by 6% during the period (freezing of expenditure at federal level). It is the first time that funding has been cut to such an extent. The Institute's own earnings (ordinary income and grants) increased by more than 15%. This spectacular increase needs to be quantified, however, as it is due to the advance payments made to the Institute under research projects at the end of the financial year (see below). These amounts, however, are provisions for expenses.
Expenditure (not including personnel costs) increased by 8.25%.

- The personnel costs to be covered by the Institute's own earnings remained stable.
- The increase in operational expenses (€2,065 k) was due to:
  - the increase in operational expenses relating to external contracts, more specifically the transfer of our European contracts (€869 k) to partners;
  - €592 k of the Museum's own funds were invested in the Museum (renovation of the temporary exhibition area);
  - €2,985 k were expensed as part of the contract with the Ministry of Defence for the management of the Belgica, compared with €2,064 k in 2012.

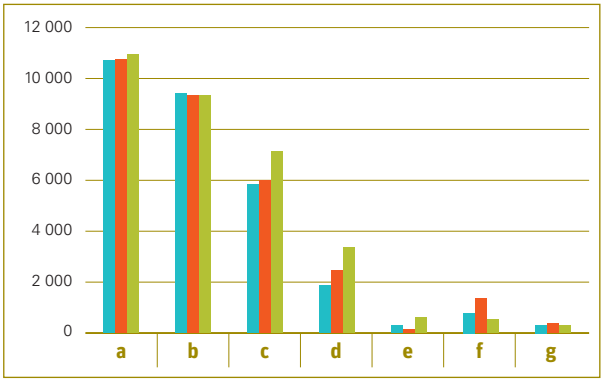
INCOME AND EXPENSES (IN €k)

	2011	2012	**2013**
a Income	30 508	30 754	32 288
b Expenses	29 218	30 406	32 217
Balance	1 290	348	**71**



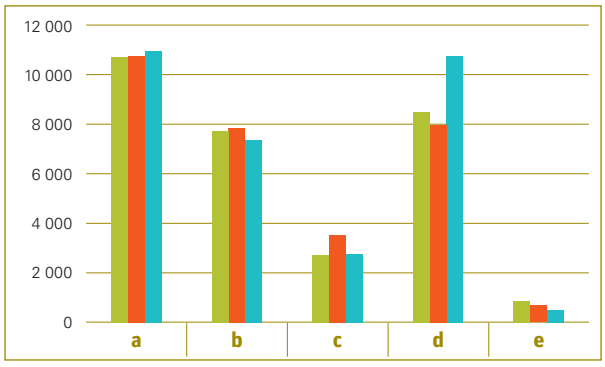
SOURCES OF EXPENSES (IN €k)

	2011	2012	**2013**
a Staff budget*	10 694	10 748	10 938
b Staff expenses financed from own resources	9 424	9 345	9 347
c Ordinary operational expenses	5 830	5 978	7 134
d Operation flight equipment/vessels	1 876	2 467	3 376
e Investment in the Museum	292	153	592
f Equipment	787	1 358	546
g Library and collections	315	357	284
Total	29 218	30 406	**32 217**



SOURCES OF INCOME (IN €k)

	2011	2012	**2013**
a Staff budget*	10 694	10 748	10 938
b General grant	7 726	7 849	7 358
c Museum's own income	2 719	3 515	2 752
d Research's own income	8 496	7 956	10 746
e Various own income	873	686	494
Total	30 508	30 754	**32 288**



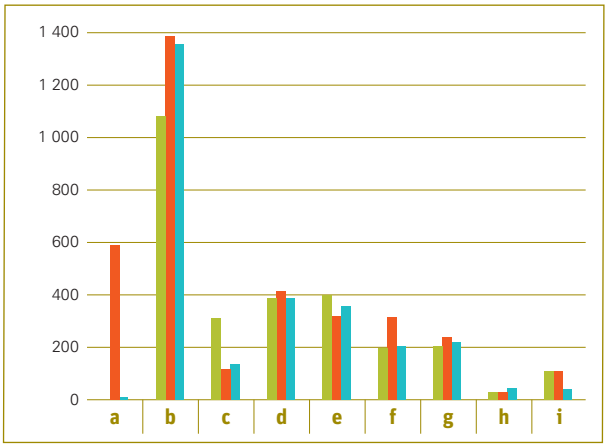
* Statutory and contractual staff at the expense of the Belgian Science Policy

BREAKDOWN OF MUSEUM INCOME (IN €k)

The Museum welcomed 334,190 visitors in 2013 (+3.25% compared with 2012). Of these visitors, 114,975 people visited the "Baby animals" temporary exhibition (over a period of 9.5 months) while 24,798 people visited the "Prehistory – Do It Yourself" exhibition (over a five-month period).

This slight increase in the number of visitors did not in any way have an impact on the earnings from ticket sales. The tickets to the "Baby animals" exhibition were offered at a reduced rate for marketing purposes. The number of visitors to the Museum shop significantly dropped (-7.24%), a development which we attribute to the physical distance between the shop and the "Baby animals" temporary exhibition.

	2011	2012	**2013**
a Museum renovation grant	0	591	8
b Ticket sales	1 080	1 385	1 356
c Exhibition hire and sales	312	115	137
d Shop	387	415	386
e Donations - sponsorship - grants	398	317	358
f Educational Service	198	313	203
g Events	204	240	219
h Cafeteria concession	30	30	45
i User Observatory (all federal Museums)	110	109	40
Total	2 719	3 515	**2 752**

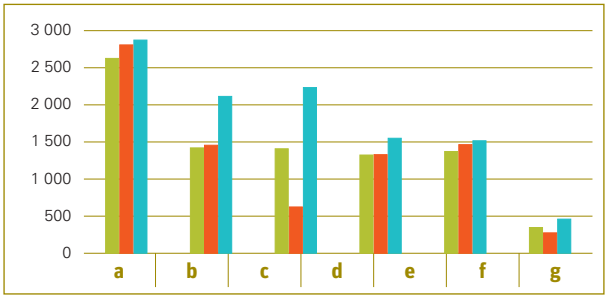


BREAKDOWN OF RESEARCH INCOME (IN €k)

In 2013, earnings associated with the scientific departments increased by more than 30%. This surprising fact can be explained by the transfer of €900 k by the National Lottery for the purchase of a tele-detection radar for the Institute's surveillance plane, and by the pre-funding of a major European contract (€1,200 k). These two exceptional entries explain the increase in earnings from the federal government on the one hand and from the European Union on the other.

In contrast to 2012, federal government grants did not make up the majority of the volume of earnings from contract-based research. The Belgian Science Policy, however, continues to be the Institute's largest donor and, in 2013, accounted for 26% of the credits used for research purposes (32% in 2011 and 34% in 2012). Earnings from the federated entities and the private sector remained stable.

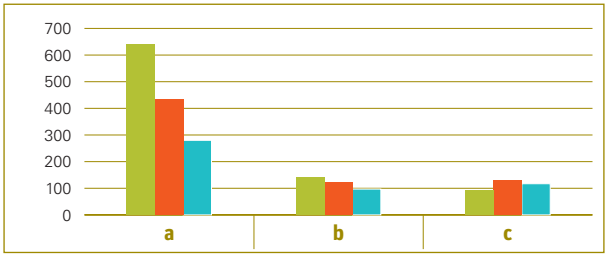
Projects financed by	2011	2012	**2013**
a Belspo	2 626	2 808	2 873
b Federal administrations (excl. Belspo)	1 420	1 456	2 114
c European Commission	1 408	624	2 233
d Belgian federal bodies	1 324	1 329	1 550
e Private sector	1 371	1 464	1 516
f Foreign institutions (non-EU)	347	275	460
Total	8 496	7 956	**10 746**



BREAKDOWN OF MISCELLANEOUS INCOME (IN €k)

Besides major subsidised research projects, the scientific units also earn income from their daily activities (laboratory analyses, organisation of conferences, sale of geological maps and so on). The Institute also provides a canteen and a child-care facility for its personnel that generate an income (social activities). These activities however, by their nature, are loss-making. The board's income consists of bank interest, copyright and so on.

	2011	2012	**2013**
a Scientific activities	641	435	280
b Social activities (mess, crèche)	141	123	97
c Management	91	128	117
Total	873	686	**494**



> STAFF

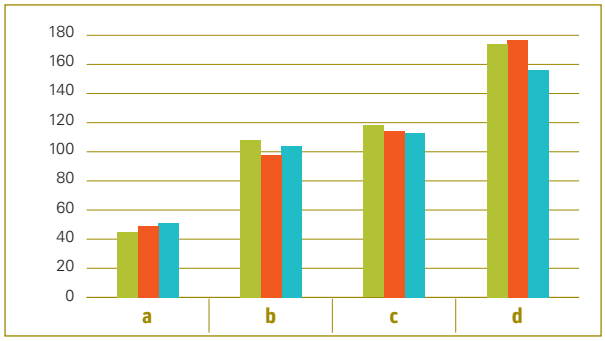
The number of employees continued to slowly but steadily decline, both among members who are paid out of budgetary resources and those paid out of the Institute's own earnings.

In a closed budget system – and even without taking into account the linear decline of personnel credits within the public sector (2% of this budget) the natural increase in wages automatically results in a reduction in the number of employees. The significant reduction in the number of contractual employees (15 employees) was partly offset by the fact that the number of permanent employees increased by eight.

As for the employees paid out of the Institute's own earnings, the decline affected employees whose wages are paid out of ordinary income and employees paid through external grants.

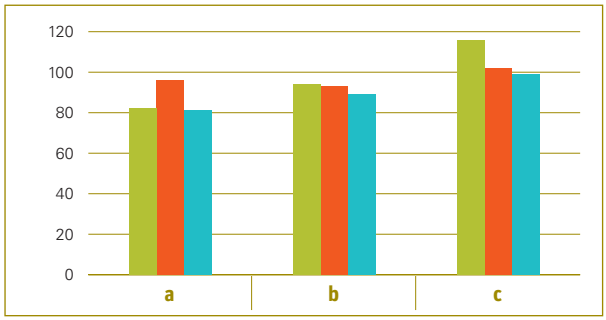
STAFF BREAKDOWN

	2011	2012	**2013**
a Statutory scientists	45	49	51
b Statutory non-scientists	108	98	104
c Contractual scientists	118	114	113
d Contractual non-scientists	174	177	156
Total	445	438	**424**



SOURCES OF FINANCING FOR CONTRACTUAL STAFF

	2011	2012	**2013**
a Staff budget*	82	96	81
b Grant and ordinary income	94	93	89
c External projects	116	102	99
Total	292	291	**269**



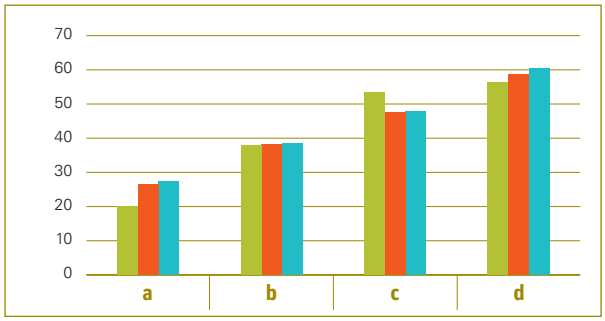
* Extraordinary and temporary contractual staff at the expense of the Belgian Science Policy Office.

PERCENTAGE OF FEMALE STAFF

Generally speaking, the ratio of male to female employees is fairly balanced. However, there are still differences in the individual categories, with more male permanent employees for example. The number of female permanent employees, meanwhile, has constantly increased in recent years (27.5% compared with 20% in 2011). The ratio of male to female contractual scientists is about the same (47.8%).

More than 60% of the non-scientific contractual employees, however, are female.

	2011	2012	**2013**
a Statutory scientists	20	26,5	27,5
b Statutory non-scientists	38	38,1	38,5
c Contractual scientists	53,4	47,4	47,8
d Contractual non-scientists	56,3	58,8	60,3
Total	47,4	47,5	**47,6**

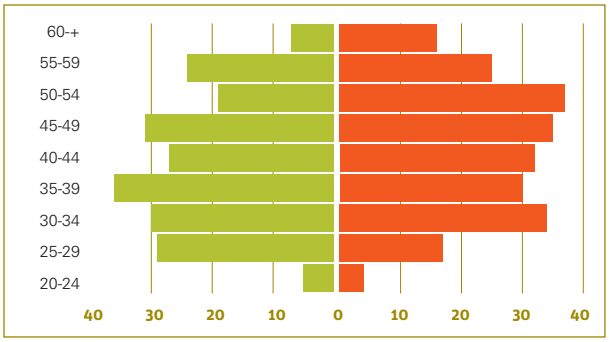


AGE PYRAMID

The average age of the Institute's employees dropped slightly (42 years compared with 42.6 years in 2012).
This situation can be explained by the number of employees who retired.

More than 18% of the workforce consists of employees over 55 (16.5% in 2012). These figures highlight the fact that the Institute needs to develop a proper knowledge transfer strategy soon.
As has been the case in recent years, women make up the majority of the 20-40 year age group.

	Woman	Men
60-+	11	18
55-59	22	27
50-54	17	29
45-49	29	41
40-44	32	30
35-39	37	36
30-34	29	28
25-29	20	10
20-24	5	3
Average age: 42 years		

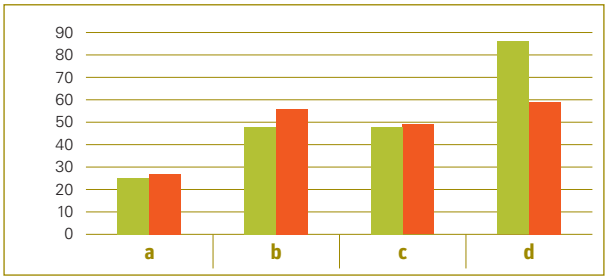


STAFF BREAKDOWN BY LINGUISTIC ROLE

Although the linguistic parity of the workforce was perfect in 2012, the situation was very different in 2013. The number of Dutch-speaking contractual non-scientific employees dropped from 77 to 59 employees, while the number of French-speaking employees remained unchanged.

Linguistic parity was almost maintained among permanent employees (49% French-speaking vs. 51% Dutch-speaking), while the contractual scientists were largely Dutch-speaking (54%).

	FR	NL	Étr.	Ost.	Bil.
a Statutory scientists	25	27	-	0	1
b Contractual scientists	48	56	2	5	0
c Statutory non-scientists	48	49	-	7	0
d Contractual non-scientists	86	59	6	6	0
Total	**207**	**191**	**8**	**18**	**1**



ABSENTEEISM AND WORK ACCIDENTS

	2011	2012	2013
Absenteeism RBINS (%)	4,58	6,79	5,68
Absenteeism federal level (%)	6,84	6,93	nd
Work accidents RBINS (frequency)	12,02	14,69	14,69
Work accidents R&D (frequency)	2,61	3,21	nd
Work accidents Museums (frequency)	11,98	12,51	nd
Work accidents RBINS (number)	9	11	11
Accidents RBINS on the way to work (number)	10	5	8

Absenteeism dropped compared with the 2012 financial year (5.68% against 6.79%), but was still higher than 2011. In spite of prevention efforts (staff training and information), the number of work-related accidents remained the same.
After a strong decline in 2011 and 2012, the number of accidents during the commute to and from work increased again. The Institute only has a limited influence on this variable.

> RESEARCH

The number of publications decreased significantly in 2013 compared with the 2012 financial year (-15%). This quantitative decline varies by category of publication. The number of publications with an Impact Factor (+17%) and Peer Reviewed publications (+8%) saw a strong increase, which points to the international recognition of the Institute's work. The dramatic decline in the number of publications without IF or Peer Review can be attributed to two phenomena: the less pronounced interest of researchers in publications which do not have any impact on their scientific career, and a new methodological approach which prevents the same publication from being classified in different categories (risk of overlap).

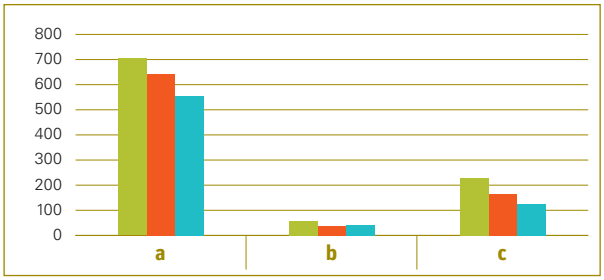
The number of expert reports and general audience publications remained unchanged.
The Directorate Earth and History of Life was responsible for 46% of the scientific publications and 77% of the general audience publications.
In spite of its small size, the Directorate Taxonomy and Phylogeny accounted for 28% of the scientific publications.
The Directorate Natural Environment logically held a monopoly on the number of expert publications and reports (78%).

BREAKDOWN OF PUBLICATIONS

	Scientific publications				Popular works	Expert reports	Total
Operational Directorates	Total	*of which journals with IF*	*of which journals with international editorial board*	*of which others*			
Taxonomy and Phylogeny	153	*78*	*40*	*35*	3	0	**156**
Natural Environment	100	*28*	*12*	*60*	6	98	**204**
Earth and History of Life	257	*72*	*16*	*169*	31	17	**305**
Scientific Service Heritage	52	*19*	*28*	*5*	2	2	**56**
Total RBINS*	**555**	***187***	***75***	***293***	**40**	**126**	**721**

CHANGE IN PUBLICATIONS

	2011	2012	**2013**
a Scientific publications	704	642	555
b Popularisation	59	39	40
c Reports	229	166	126
Total	992	847	**721**



SCIENTIFIC PROJECTS WITH EXTERNAL FUNDING

In 2013, the number of contracts managed by the Institute, whether alone or in partnership, amounted to 159. This was a rather sharp decline compared with 2012 (-10%). We should not, however, be overly concerned about this decline. The number of contracts is purely a quantitative figure, i.e. all the contracts, regardless of the amount involved, are recorded in the same way.
The Directorate Natural Environment, which deals with pressing contemporary environmental issues, obviously accounted for the lion's share of the research and expert contracts (52%).

	Projects with external funding
General Direction	3
OD Public Services	3
OD Taxonomy and Phylogeny	26
OD Natural Environment	83
OD Earth and History of Life	34
Scientific Service Heritage	10
TOTAL	**159**

BREAKDOWN OF CURRENT PROJECTS ACCORDING TO SOURCE OF FINANCING

An analysis of the sources of funding reveals the diversity of the bodies granting subsidies and the importance of international funding. However, the Belgian Science Policy is still the Institute's largest sponsor, both in terms of the number of projects and the number of credits granted.

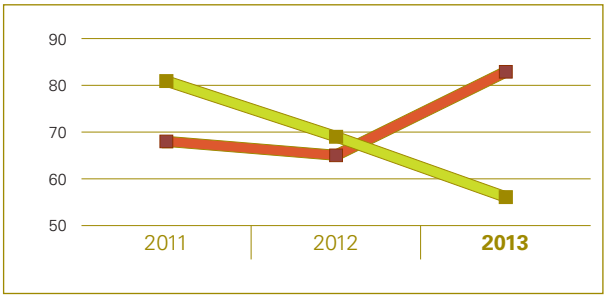
	2011	2012	**2013**	**2013**
	Number	**Number**	**Number**	**Amount (in €)**
Belgian Science Policy Office	66	81	60	2 873
Federal funding from other sources	12	12	13	1 214
National Lottery	5	2	2	900
Flemish Region + FWO	13	12	12	586
Walloon Region + FNRS	6	5	4	646
Brussels-Capital Region	4	6	2	318
Universities	3	2	6	0
European Commission	28	36	40	2 233
International	12	15	15	460
Private sector	7	7	5	1 516
Total	156	178	**159**	**10 746**

SUPERVISION OF STUDENTS

There was a slight increase in the supervision of students, Master's students and doctoral students. Compared with 2012, however, there was a reverse shift in the ratio of Master's students to doctoral students (60% and 40% respectively). As was the case for the scientific publications, the Directorate Earth and History of Life supervised the highest number of students (55%) followed by the Directorate Taxonomy and Phylogeny (27%), the Directorate Natural Environment (14%) and the Scientific Service for Heritage (4%). It should be noted that only those dissertations supervised by an employee of the Institute have been included.

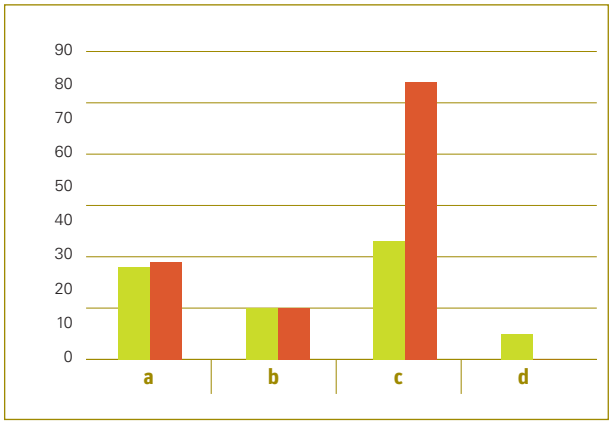
CHANGE IN SUPERVISION OF STUDENTS

	2011	2012	**2013**
PhD	81	69	56
Master	68	65	83
Total	149	134	**139**



BREAKDOWN OF THE SUPERVISION OF STUDENTS

		PhD	Master	**Total**
a	OD Taxonomy and Phylogeny	18	19	37
b	OD Natural Environment	10	10	20
c	OD Earth and History of Life	23	54	77
d	Scientific Service Heritage	5	0	5
	Total 2013	**56**	**83**	**139**



> LIBRARY

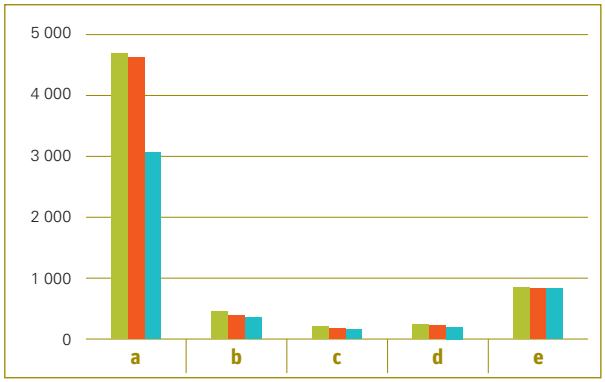
The purchase of books and journals stabilised at around 8,000, which points to the continuity of the collections and the expansion of the library. At the same time, the number of e-journal subscribers grew steadily (increase of almost 10% in 2013).
One striking development was the inverse trend concerning traditional loans and the electronic consultation of documents. Loans are continuing to decline year after year, while electronic consultations are steadily increasing (+5% annually).

ACQUISITIONS

	2011	2012	**2013**
Books and journals	+8 068	+8 174	+8 145
Electronic journals	+59	+83	+137

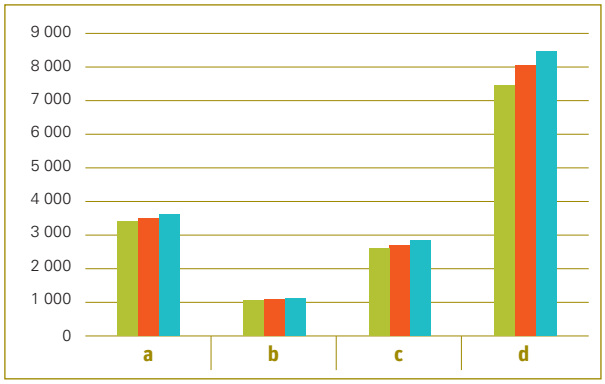
LOANS

	2011	2012	**2013**
a Internal loan of documents	4 690	4 619	3 071
b Inter-library loans	447	390	352
c Borrowings	211	167	154
d Loans	236	223	198
e International exchanges	851	831	828



TYPES OF CONSULTED ELECTRONIC DOCUMENTS

	2011	2012	**2013**
a Periodicals	3 419	3 487	3 623
b Abstracts	1 047	1 075	1 123
c Complete text	2 611	2 689	2 851
d Total consultation sessions	7 455	8 051	8 455



> COLLECTIONS

SCIENTIFIC VALORIZATION

Compared with previous years, the figures for loans remained unchanged, except in the department of Entomology and Invertebrates where an onsite visit is preferred to a loan.
At the same time, the number of scientific visitors to these collections increased.
The expansion of the collections dramatically decreased with just over 80,000 donations in 2013 compared with more than 190,000 in 2012, a direct consequence of the reduction in the endowments to the scientific departments.
A new technology was used to count the number of scientific visitors. The number of visitors and the number of daily visits to the collections are now counted separately.

	Number of visiting scientists	Additions to the collections	Number of loans
Vertebrates	26 / 46	1 783	21
Invertebrates	36 / 101	12 354	22
Entomology	77 / 522	64 432	219
Palaeontology	45 / 159	1 680	14
Anthropology and Prehistory	31 / 198	0	7
Geology	33 / 49	599	21
Total	**248 / 1 075**	**80 848**	**304**

DIGITISATION OF THE COLLECTIONS

The registration of the number of "specimens" dropped by almost half. This sharp decrease is due to the number of coders, which dropped from ten to five between 2012 and 2013. The coders are paid out of external resources. The registration of specimens thus depends on grants which are used to pay their wages.

Three former coders were also reappointed as collection technicians. Consequently, coding is no longer part of their main tasks.
By the end of 2013, however, the number of registrations in DaRWIN amounted to nearly 500,000 items, including 30,000 registrations of "type specimens".

ENCODING PER DEPARTMENT	
Vertebrates	12 954
Invertebrates	10 587
Entomology	4 067
Palaeontology	4
Geology	7
Total	**27 619**

BREAKDOWN OF ENCODING TASKS (%)	
Addition of data	76,86 %
Updating of data	23,14 %

ENCODING IN THE DaRWIN DATABASE				
	Recording of types	New species	Recording of non-types	Total items recorded in DaRWIN
First term	178	9 586	1 100	9 764
Second term	304	7 483	821	7 787
Third term	267	4 752	727	5 019
Fourth term	190	2 566	391	2 756
Increase	**939**	**24 387**	**3 039**	**25 326**
Total	**29 514**	**451 190**	**NC**	**480 704**

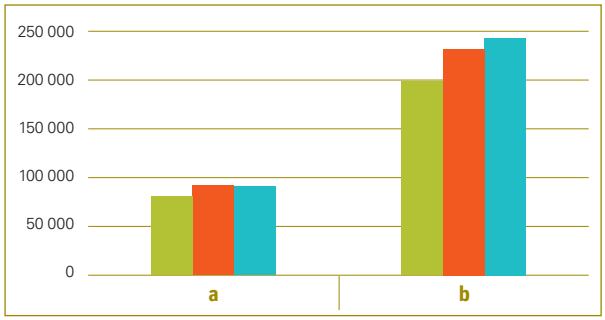
> MUSEUM

As in 2012, which was an excellent year, the number of museum visitors increased, this time to more than 330,000 (+3%). This success was most certainly due to the temporary exhibitions in the museum. Nearly half of all visitors visited one of our temporary exhibitions (Baby animals or Prehistory - Do It Yourself!). In a little less than ten months, the exhibition targeted at young children attracted almost 115,000 visitors. The success of the "Baby animals" exhibition also contributed to the increase in the number of individual and family visits (+5%).

In 2013, none of the temporary exhibitions, which were (co-) organised by the Institute, were rented out to other museums. Consequently, outdoor presentations were limited to the XperiLAB.be activities (a science lab that visits Belgian municipalities) and the BNEC (travelling exhibitions in the Brussels municipalities), which explains the decrease in the number of participants in these types of activity.

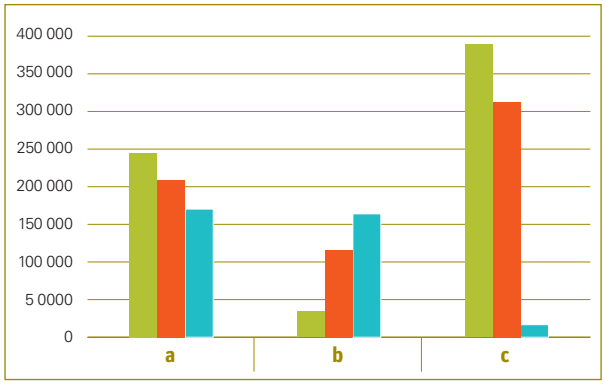
CHANGES IN MUSEUM ATTENDANCE

	2011	2012	**2013**
a Visitors in groups	80 544	92 172	90 924
b Individuals and families	198 500	231 768	243 266
Total	279 044	323 940	**334 190**



BREAKDOWN OF MUSEUM ATTENDANCE

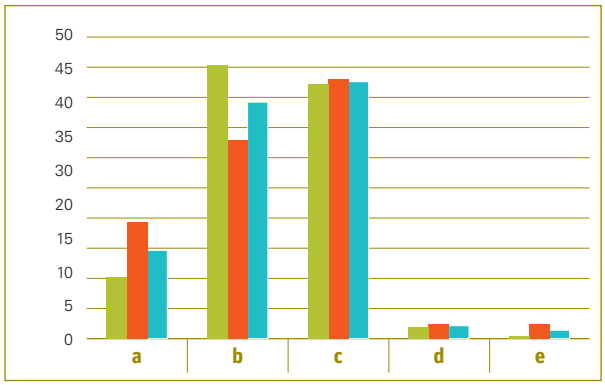
	2011	2012	**2013**
a Permanent galleries	244 648	208 404	170 270
b Temporary exhibitions (on-site)	34 396	115 536	163 920
Total Museum	279 044	323 940	**334 190**
c Temporary exhibitions (off-site)	389 000	312 500	16 617



BREAKDOWN OF VISITORS BY AGE GROUP (%)

Children between the ages of 0 and 5 years make up an increasingly larger part of our audience (15%). In financial year 2013 the "Baby animals" exhibition clearly had an impact on the museum's appeal to the parents of young children. Although the 6-17 year old age group usually represents the majority of our visitors, for the first time adults now hold first place in the ranking of our visitor categories (43% of all visitors, compared with 37% in 2012).

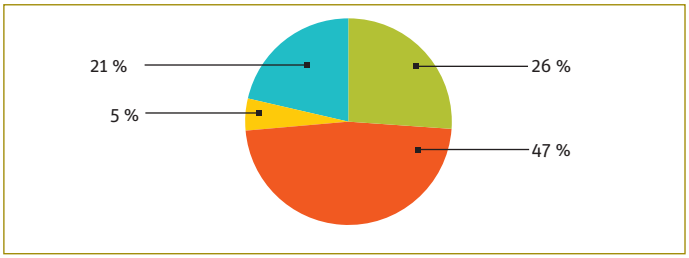
	Permanent	Temporary	**Total**
a Small children (0-5 years)	10,14	19,31	14,64
b Young people (6-17 years)	45,35	32,85	39,22
c Adults (18-59 ans)	42,23	42,99	42,60
d Senior citizens (60+)	1,88	2,41	2,14
e Not known	0,40	2,44	1,40



REDUCED AND FREE ADMISSION

The number of visitors taking advantage of free admission remained stable and was about 25%. The majority of these free visits can be explained by the age of those visitors (children under six years of age). If we were to include the free visits on the first Wednesday of each month, then more than 30% of the museum's visitors did not pay admission. Ultimately, only 26% of the visitors paid the full price – as was the case in 2012. Reduced-price admissions logically account for the majority of the visits because it combines the group visits and the initiatives taken by the Institute, alone or in partnership (NMBS/SNCB, Brussels card and so on) to attract the greatest possible number of visitors to the museum.

	Nombre
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**



VISITS TO WEBSITE

On the one hand there is a sharp decrease in the number of web pages consulted (-8%). On the other hand we have seen a dramatic increase in the number of website visitors (+18%). With more than 3.5 million visitors the website today is one of the Institute's most important communication channels.

	2011	2012	**2013**
Pages	11 509 570	11 590 095	10 672 129
Visitors	2 924 777	3 051 811	3 601 459

CHANGE IN SHOP CUSTOMERS

The number of visitors to the museum shop is not in line with the upward trend in the number of museum visitors. This among others is due to the physical distance between the "Baby animals" temporary exhibition and the shop. While the average amount that a customer spends in the shop has remained stable the average expenditure in relation to the number of visitors is very low (€1.13 per visitor).

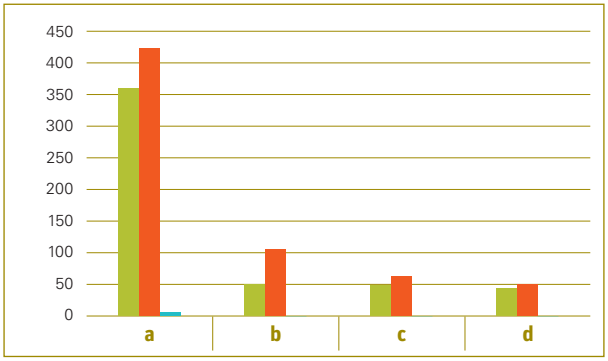
	2011	2012	**2013**
Museum visitors	279 044	329 940	33 4190
Shop customers	25 688	27 693	25 689
Rapport customer/visitor	9,21%	8,39%	7,69%
Expenditure/customer	14,76	14,79	14,72
Expenditure/visitor	1,36	1,27	1,13

THE MUSEUM IN THE MEDIA

The number of articles about the Institute in the press increased compared with 2012 (+7%). This increase was mainly due to articles published in the Dutch-speaking Belgian press. The number of articles in the foreign press was very low however.

The number of mentions concerning the Institute and the number of radio and TV interviews remained stable compared with the previous financial year. Most topics involved an interview with an employee (about 100).

	FR	NL	Others
Printed press			
Articles Museum and Institute	319	376	6
Expo Baby animals	31	41	0
Expo Do It Yourself	10	5	0
a Total printed press	**360**	**422**	**6**
b *of which interviews RBINS employees*	50	105	0
Radio and TV			
c Total Radio and TV	**48**	**63**	**0**
d *of which interviews RBINS employees*	44	50	0
Total general	408	485	6



ACTIVITIES ORGANISED BY THE EDUCATIONAL SERVICE

This year again was a record year for the number of participants in educational activities, with over 62,000 participants in and outside the Museum. The increase in the number of participants was remarkably higher than the increase in the number of Museum visitors (10% versus 3%). This shows that the Museum's programme meets the public's expectations in general and that of schools in particular. The average number of participants per activity was about 20, which is a perfect number for guaranteeing the quality of the educational message being conveyed.

	2011	2012	**2013**
Number of participants	55 387	56 912	62 594
of which groups (indoor + outdoor)	*50 911*	*51 308*	*56 163*
of which individuals	*4 476*	*5 604*	*6 431*
Number of organised activities	2 828	2 886	3 083
Average number of participants per activity	19,6	19,7	20,3

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

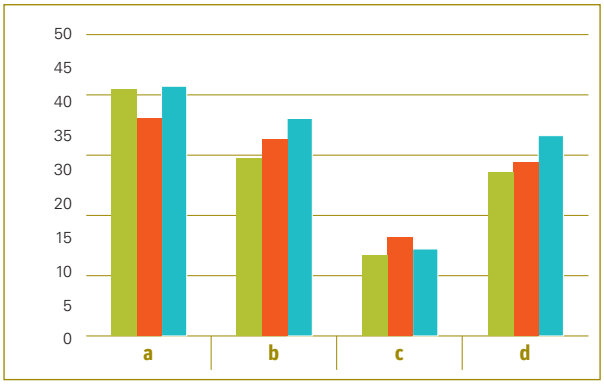
The most important figure in this table is the percentage of guided group visits, which is higher than 50%. The number of guided tours (19%) needs to be looked at from the educational department's objectives, i.e. guides for school groups to provide additional scientific value during the Museum visit.

	2011	2012	**2013**
In relation to the total number of museum visitors	15,0	13,1	13,8
In relation to group visitors	47,4	41,1	50,6

BREAKDOWN OF VISITORS PER ACTIVITY

Although the guided tours make up an important part of the educational programme, the workshops are also becoming increasingly popular. Unlike the guided tours, their success does not depend on the theme of the temporary exhibitions. In two years, the number of workshop participants increased by more than 20%.
As far as activities outside of the Institute are concerned, the success of the science truck that visits municipalities (XperiLAB.be) and of the small temporary themed exhibitions for Brussels schools is worth mentioning.

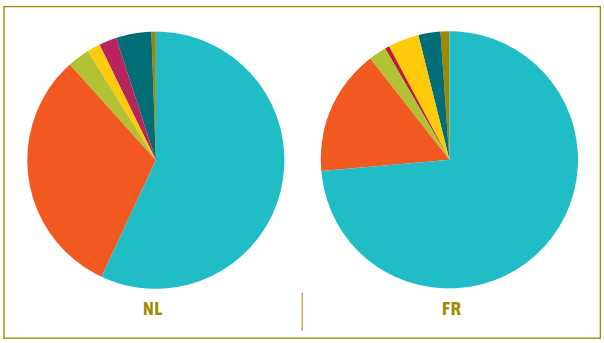
	2011	2012	**2013**
a Guided tours	20 448	18 054	20 718
b Workshops	14 764	16 314	18 043
c Other activities	6 639	8 132	7 216
d Off-site activities	13 536	14 412	16 617
Total	55 387	56 912	**62 594**



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

Dutch and French-speaking kindergartens and primary schools mainly use our Education Service. The "Baby animals" exhibition had a clear impact on this result. It is worth noting the continued, strong absence of French-speaking secondary schools in our visitor figures. They only made up 15% of French-speaking visitors (18% in 2012) compared with 30% of Dutch-speaking visitors. The opening of the Gallery of Mankind in 2014 should be an incentive for this target group to visit the Museum.

	NL	FR
Nursery & primary school	56,95	73,86
Secondary school	31,53	15,7
Higher education	2,85	2,11
General education	1,61	0,72
Youth groups	2,33	3,73
Groups of adults	4,3	3,02
Individuals and families	0,43	0,86
Total	**100**	**100**



5

INSTITUTE

A new organisation

In 2013, the Institute made the transition to a new organisation, which was planned and decided on already several years ago. In 2008, the Scientific Council approved the reorganisation of the Institute. It was the start of a long journey marked by Ministerial and Royal decrees, job descriptions and evaluations, publications in the Belgian State Gazette, long periods of waiting and sudden accelerations, successful and unsuccessful selections, appointments and more. But finally, five years later, the new organisation has been implemented and a new Management Board appointed since May. By coincidence, this process was completed at the same time as the approval of the Scientific Council and the Management Commission. The RBINS ended 2013 therefore with a fully renewed governance and control bodies.

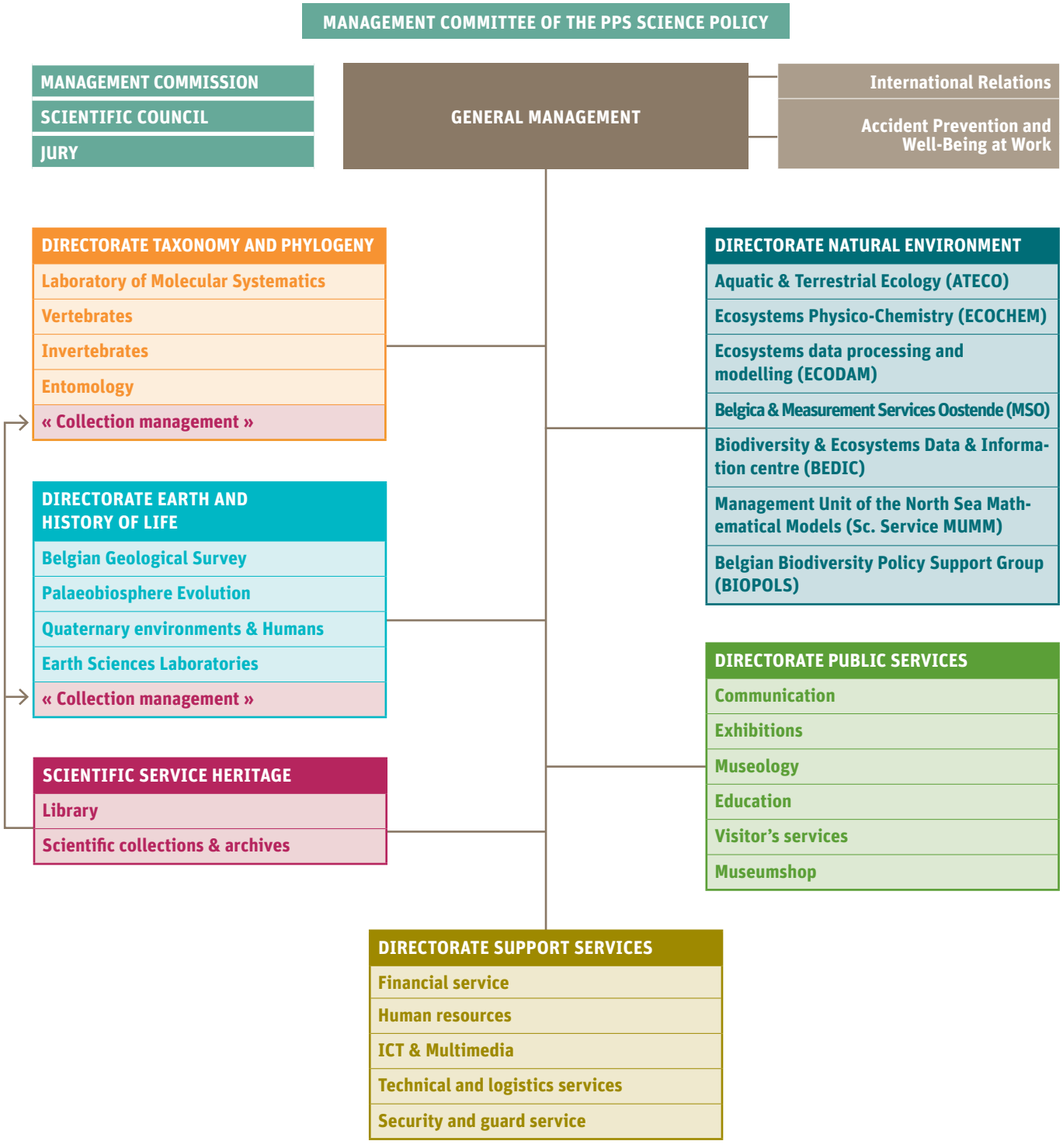
Why a new organisation?

Until recently, the RBINS consisted of seven scientific departments and a dozen services which operated the Museum and provided administrative and technical services. But only the departments had official representation on the Management Board, the decision-making body for many aspects of the Institute's operations. Consequently, governance was by no means representative. In addition, the scientists were in charge of managing the collections as well as conducting their own research and responding to various requests. The federal collections which are preserved by the Institute, however, are a common good, and our role is to guarantee their conservation and accessibility. This service to the community should not have to compete with other tasks of the Institute. Finally, all support services were the responsibility of the General Director, but without an overall structural coordination.
The new organisation sought therefore to improve exactly these aspects – more representation of all various units on the Management Board, better guarantees for the conservation and accessibility of the collections, and improved coordination of the services to the public and of support services.
At the same time, the research teams were grouped together into larger units in order to create more interdisciplinary domains and to offer more flexibility and more opportunities for development.

The Institute organised itself around six pillars:

- three pillars focussing on research and expertise: the Directorates *Taxonomy* and *Phylogenics, Natural Environment,* and *Earth and the History of life;*
- a pillar dedicated to the dissemination of knowledge: the Directorate *Public Services;*
- a pillar dedicated to the management and accessibility of the collections and the libraries: the *Scientific Service Heritage;*
- a pillar for all the administrative and technical services: the Directorate *Support Services.*

The internal organisation of each of these pillars was the subject of numerous discussions and exchanges of points of view. Some of the existing teams were maintained, while others were merged or reorganised. The organisational chart alongside provides an overview of the current situation.



The Royal Belgian Institute of Natural Sciences is one of the ten federal scientific institutions which report to the Belgian Science Policy (Belspo).

The RBINS is a state service. It is separately managed by three independent bodies:

- 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 monitoring the careers of and recruiting the permanent scientific employees. In additions, the Institute's General Director is also a full member of the Management Committee of the Federal Public Planning Service Belgian Science Policy.

The BRAIN.be programme: a review of the first cycle

BRAIN.be (Belgian Research Action through Interdisciplinary Networks) is the new multiannual framework programme for scientific research, which is coordinated and funded by BELSPO. It targets the entire Belgian scientific community, including universities, federal scientific institutions and research centres. It replaces various previous thematic programmes (SSD, AGORA, TA, DR, etc.) as well as mass research, which hitherto was the responsibility of the ESFs. Henceforth all research projects submitted by the RBINS will thus be evaluated and funded in the same way as projects that were submitted by the universities and the research centres.
The RBINS has an advantage in this new context given that it is long used to collaborating with the world of academia, both in Belgium and abroad, and to submitting its projects to be evaluated by experts and funding bodies. After the first two calls for projects (2012 and 2013) the situation is quite encouraging. The number and the budget of the Institute's research projects which are funded by BELSPO has remained the same. The RBINS is a coordinator of or a partner in more than one out of four projects.

Better internal communication

The RBINS is a highly diversified institution with several professions and specialisations, which, moreover, are split between various sites. Does it come as a surprise then that the employees do not know each other that well, even if there is an overall strong sense of belonging to the Institute itself?

In 2012, many employees participated in a survey about the internal communications practices and expectations of the Institute. This survey highlighted the need to improve the existing tools and develop collective activities. In 2013, the first internal communication plan was developed with two guiding principles: the involvement of all employees by creating working groups of volunteers, and greater transparency through regular reporting to the management and personnel. The working groups identified several areas that required action: the intranet, e-mail traffic, new employee introduction, the coffee areas, sports and cultural activities, and the creation of an internal network of communicators.

The outcome of this joined effort: the welcome package for new employees is being adapted, the Intranet is being revamped, the mailing lists have been reviewed, by theme and by geographical location, and an original initiative has been launched, called 'hello week'. The idea is to encourage everyone to engage in a conversation with a colleague from another department or service. The best participants received some extraordinary prizes – like a flight on board the RBINS's surveillance plane, with the lucky winners and the pilots taking away some great memories!

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All of RBINS activities are described in the
2013 detailed report (approximately 500 pages FR/NL).
This report is available on CD ROM
and can be obtained on request from
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