ANNUAL REPORT 2011

ROYAL BELGIAN INSTITUTE OF NATURAL SCIENCES

museum

Copywriting:
Michèle Antoine and Eric De Weer (RBINS)
Christian Dubrulle

Graphic design:
Vinciane Lowie and Freya Vlerick (RBINS)
Charlotte Naveau

Coordination:
Sophie Boitsios (RBINS)

Cover picture:
Inclusion of needles of rutile (TiO_2) in crystals of smoky quartz

All of RBINS activities are described in the 2011 detailed report (approximately 500 pages FR/NL). This report is available on CD ROM and can be obtained on request from direction@naturalsciences.be.

Printed on recycled paper with vegetable based inks.

FOREWORD

2011 was a year without any federal government in Belgium. For the Institute and its Museum, that meant that the entire reorganisation, which had long been under preparation, had to be frozen. It was thus a suspended year, in parenthesis.

Did that make it a lost year? Far from it, as you will discover as you read this annual report.

True, in many respects 2011 was an 'ordinary' year compared with previous ones. As a reminder, 2007 to 2009 saw all the major openings of the renovated Museum: the Dinosaur Gallery, the Gallery of Evolution, an extra 5 000 m² and 40 % more visitors. 2010 was the International Year of Biodiversity, for which the Institute and its Museum ran numerous actions throughout the year, from the pledge campaign to the opening of a new permanent gallery, and representing Europe at the COP10 for the International Convention on Biological Diversity.

Now comes the surprise: it seems that an 'ordinary' year is an even more productive year! Because the Institute and its Museum did more than the previous year: produced more publications, concluded more research contracts, welcomed more visitors, supervised more students, constructed a Biodiversity Monitoring Centre in the Democratic Republic of Congo, launched a new scientific journal… the list goes on.

All this was done despite a reduction in the number of statutory staff recruitments and funding that was held at its existing level. 'Doing more with less' has been a much-touted phrase recently; the Institute is actually putting it into practice.

So what's our secret?

First, we love what we do. Even more than that, we love doing it well. Our partners know this, and have long-standing faith in us.

Second, we try to meet the needs of the society to which we belong, and never forget that the tax-payer is our main sponsor. 20 % of our 1 000 publications are reports or expert appraisals. 2 700 school groups visit us every year, and we offer all teachers educational resources online. Our shipping forecasts, which have now been adapted to smartphone, became even more accessible.

Research lies at the heart of our excellence; help with decision-making on the environment and the use of resources, support for schools and for science education, and public education, lie at the heart of our social responsibility.

Being useful, reliable, attractive, relevant; pursuing quality in all we do; seeking to progress: this is 'ordinary' for us. I believe we can be proud of this. Every development at the Museum – whether evolution or revolution – will continue to serve these goals.

Camille Pisani,
General director

TABLE OF CONTENTS

RESEARCH 1

Palaeontology > An entire fossil family found in the nest

In 2010 and 2011, one of the Institute's palaeontologists engaged in an extraordinary in-depth investigation into the lifestyle of mammals that lived 64 million years ago. This was quite a feat, as it is virtually impossible to observe the social behaviour of animals that died out millions of years ago based on the fossil record.
The animal in question was a kind of small opossum from the start of the Tertiary period: a marsupial known as *Pucadelphys andinus*.

In collaboration with colleagues from the National Museum of Natural History in Paris and the Alcide d'Orbigny Natural History Museum of Cochabamba in Bolivia, she studied several dozen skulls and skeletons of these fossilised creatures that had been found in groups in small blocks of sandstone. Males, females and young seem to have been trapped together, perhaps by the sudden flooding of a nearby river.
Apart from a clearly observable dimorphism between the skulls of the males and the females, specialists believe that the fact that animals of different ages and genders died together at the same time provides evidence of their social interaction. This is unusual in marsupials: opossums today, for example, are solitary and aggressive.
The surprising results of this study attracted widespread interest in 2011. Nature, one of the world's foremost scientific journals, published them in May.

Belgian Geological Service > In Iran, the 'Tells' talk about life long ago

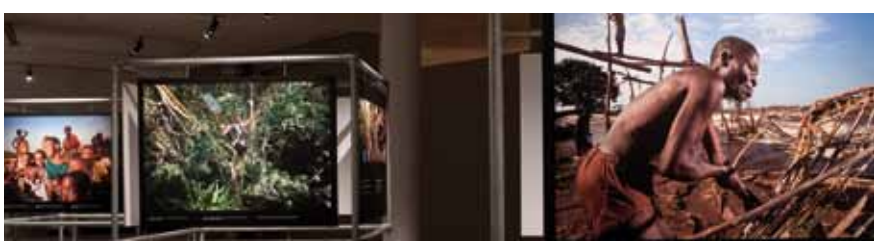
The history of mankind undeniably passes through Mesopotamia. Its traces can be discerned using a whole range of approaches, including geology, and this is why scientists from the Belgian Geological Service (BGS) have studied the alluvial plains in Lower Khuzestan (Iran). The main bed of the Rivers Karun, Karkheh and Jarrahi, with their modern and ancient irrigation channels, their agricultural zones and their 'Tells' – heaps of mud bricks that mark the position of abandoned dwellings – told them the story of the many generations that have lived there.

So what tools do our geologists use? Fieldwork, of course, in collaboration with Iranian scientists. But also the study of ancient documents – or indeed the most recent satellite images!

2011 marked the end of the second phase of this research programme, which brought together researchers from institutions such as the universities of Ghent (UGent), Leuven (KU Leuven) and Liège (ULg) within the framework of a federal IAP (Interuniversity Attraction Pole). The comprehensive mapping of the plain of Lower Khuzestan was completed, including archaeological data based on satellite images and a study of the development of canal systems starting from the River Karkheh. This data can now be used to create a detailed reconstruction of the landscapes that were home to multiple civilisations.

>
25.01

Kris Pannecoucke's photographic exhibition of the **Congo River expedition** opens at the Museum.



Anthropology and Prehistory > From Wallonia to the lab and back

On the face of it, the construction of a motorway exit or a supermarket has little to do with the work of the Institute's scientists. Except, that is, in the context of a new agreement signed in 2011 by the RBINS and the Walloon Region.

Eight archaeobiologists from the Institute are now all set to collaborate on the study of any site they might be notified of. Whether for preventive excavations on the margins of major infrastructure work or any other type of project, the expertise of the Institute's researchers is extensive and complements that of Wallonia's archaeologists. Archaeozoology (the study of animal bones), carpology (seeds and fruits), palynology (pollen), anthracology (charcoal), geoarchaeology (the stratigraphy of sites, levels of occupation): our specialists are there to help compile a comprehensive radiographic survey of sites dating back over 10 000 years.

By combining these multiple clues, every aspect of the lives of the Region's former occupants is laid bare. What were their farming practices and hence their diet, regarded here as a social indicator? In what environment did they live? How did the landscapes evolve? These are some of the questions that are obtaining revealing answers in the context of this partnership which has been set up thanks to the Institute's scientific collections, which are vital for this kind of research.

Palaeontology > Climate: reading the future in the past

How far will global warming go? Experts from the United Nations (IPCC) devise different scenarios depending on the volumes of greenhouse gases that we continue to emit into the atmosphere, and estimate the likely resultant average temperature rises: two degrees, three degrees, four degrees... But what impact will the warm-up have on the planet's life forms?

To answer this question, the Institute's palaeontologists prefer to look... under their feet! By analysing the isotopic composition of oxygen and carbon in sediments dating from the Palaeogene, they can go back some 55 million years in time and find out how temperatures have fluctuated.

At that period, the Earth underwent an intense and abrupt hyperthermal phase lasting tens of thousands of years. The average increase in atmospheric and oceanic temperatures was between five and eight degrees. Ten studies of this hyperthermal phase, conducted in collaboration with KU Leuven, were published in scientific journals in 2011. They analyse the causal links with effects on life: mass extinctions, specific adaptations of biological populations, the survival of certain species as a function of different temperatures. The results of the studies of these ancient phenomena now make it possible to assess the consequences of global warming today on nature and sea levels, as well as their impact on human activities. Can our bacon be saved? Hard to say, but at least the Palaeogene sediment gives us an idea of how hot the frying-pan is!

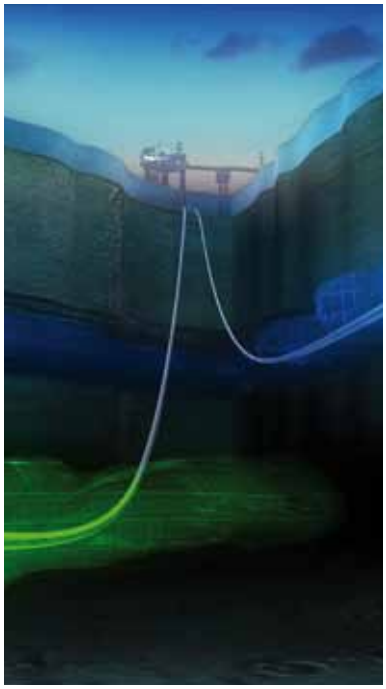
>
06.02

Dino News Day or how to find out all about the latest research into dinosaurs. Around a hundred enthusiasts meet our palaeontologists and visit our reserve collections.

>
08.02

Two of our researchers join the Polarstern to study **Antarctic amphipod crustaceans** in the context of global change.

Belgian Geological Service > **120 million tonnes of CO_2**



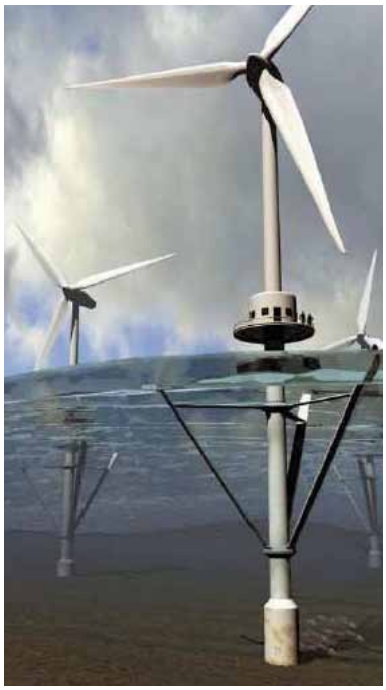
Every year, it is estimated that Belgium emits some 120 million tonnes of CO_2 into the atmosphere. It is vital to cut down on these greenhouse gases if we are to curb global warming.

To achieve this, several approaches are being explored: improving the efficiency of tools and machinery run on fossil fuel, using renewable energy sources, and capturing and storing greenhouse gases at the point of production.

This last possibility has long been the subject of work by the Belgian Geological Service (BGS), a department of the Institute, as part of the federal programme PSS-CCS I & II (Carbon Capture and Storage). The aim is to assess the potential and feasibility of introducing a system for the capture, transportation and storage of some of the CO_2 produced in Belgium.

In a first phase, the partners in this programme (Vito, ULg and UMons, coordinated by the BGS) developed simulation tools. In a second phase, they ran their models as far as the year 2050. It was concluded that 25 to 30 % of Belgium's CO_2 emissions could be captured and stored. Industry has particular potential for capture (electricity generation, cement production, petrochemicals, metallurgy, etc.). The study, the final report of which was published in 2011, also shows that the realistic geological storage capacity for CO_2 captured in Belgium would be 40 to 50 million tonnes per year. It certainly seems like a promising avenue.

Marine Ecosystem Management > **Watts under the sea?**



Wind farms can be built in order to generate renewable energy at sea. We can also try to capture energy from the waves and marine currents. So why not attempt to recover it off our own coastline? This question lay at the centre of the BOREAS (Belgian Ocean Energy Assessment) project. At the heart of this work, sponsored by the Belgian Science Policy Office, one simple question drove the researchers from MUMM (Management Unit of the North Sea Mathematical Models): is it feasible… and profitable?

With the collaboration of the Universities of Ghent (UGent) and Leuven (KU Leuven), and of the Hydraulics Research laboratory at Borgerhout/Antwerp, three specific aspects were explored: technical analysis of the equipment that can be used to transform energy from waves, ocean swell and marine currents into electricity; the modelling of wave systems over a ten-year period; and finally a simulation of the same kind relating to marine currents and their fluctuations in time and space. MUMM's contribution was in the design of this three-dimensional hydrodynamic model.

So what does all the data tell us? That the most promising site for hydroelectric turbines is near Zeebrugge. However, the intense shipping traffic there makes such a plan unrealistic. The alternative, therefore, would probably be to place these submarine generators near the wind farms which are already in place. One day, wind turbines and wave turbines could do their job there undisturbed… far from the shipping routes.

>
08.02

Using satellite data to analyse **jellyfish invasions** and their impact on tourism and fish-farming: this is the goal of MUMM in the project JELLYFOR.

Invertebrates > **Ten weeks at sea**

In 2011, researchers from the Institute's Department of Invertebrates spent ten weeks aboard the German scientific vessel Polarstern. From Punta Arenas in Tierra del Fuego to South Africa, via the Antarctic Peninsula, Weddell Sea and Bouvet Island, they cast their nets on numerous occasions in order to catch amphipods: small, extraordinarily diversified 'shrimps'. And the fishing trip was a success. At some sampling sites, the nets hauled back aboard the ice-breaker were simply overflowing with crustaceans.

One of the goals of this oceanographic expedition, named ANT-XXVII-3, which was organised by the Alfred Wegener Institute for Marine and Polar Research (Germany), was to assess the rate of colonisation of vast areas of sea off the Antarctic Peninsula. Ten years ago, a huge marine zone there (Larsen C) was still covered by a thick layer of ice that extended beyond the continent and prevented any light from reaching the water. But this ice shelf has become detached from the continental glacier, and has gradually taken to the sea in the form of icebergs. Since then, life has quickly reasserted its presence in this zone which has been restored to the light, as the samples taken by the Institute's researchers show. This gives some idea of what can be expected all around the Antarctic shore in the decades to come.

Biological Evaluation > **A date with the rorquals**

After its trip to the Antarctic Ocean at the start of the year, the German icebreaker Polarstern headed for the Greenland Sea. During the summer of 2011, in the marine zone known as Hausgarten, it hosted the Institute's researchers for a campaign to identify and count large cetaceans. The surprising finding was that these populations are clearly on the increase.

In July, during 186 count periods each lasting 30 minutes, and conducted from the vessel or by helicopter, and subsequently during 103 identification periods between 69 and 79 degrees north, as the vessel headed for Norway, the scientists counted no fewer than 237 large cetaceans, including 149 common rorquals and 17 blue whales. In 2008, the corresponding figures were just 16 rorquals and 4 blue whales and in the 1990s, during similar surveys, the researchers observed just a few whales in total…

Is this an effect of global warming? Perhaps. In the view of the Institute's team, it is clear that, as is the case with all animal species, the distribution of cetaceans depends on the presence of their prey, which has moved further north, and this also means that the whales' area of distribution is extending northward, probably due to the accelerating shrinkage of the sea ice in the summer.

>
09.02

A newly discovered nematode in Brazil is named *Lavareda decraemerae* in honour of our colleague Wilfrida Decraemer.

>
26.02

2 500 visitors are carried away by **Museum Night Fever**. For one night, dancers and musicians transform the Museum.

Marine Ecosystem Management > From the North Sea to South America

Monitoring coastal waters from space is no longer really something new. The researchers at MUMM (Management Unit of the North Sea Mathematical Models), a department of the RBINS, are 'past' masters in this field. In particular, they have developed a set of algorithms and tools for interpreting the satellite images.
Teledetection of this kind can be used to assess the quality of the water or to monitor from a distance the load quantity and size of suspended particles. The images from above also enable algae to be detected and identified. Deductions can then be made about the carbon that the algae may be able to fix, about the CO_2 dissolved in the water, and about the movement of sediments.
The model used by the MUMM's researchers works well, but can these algorithms designed for Belgian waters be applied to seas elsewhere in the world? It was with this question in mind that the project BELCOLOUR ARG (ARG for Argentina), financed by the Belgian Science Policy Office, was conducted in 2011. The results were extremely positive.
The study completed in 2011 on the banks of the River Plate demonstrates that the Belgian model can be exported without any problem. The same equations were successfully used to survey the estuary of one of the world's most turbid rivers.
In terms of applications, in Belgian territorial waters the MUMM model makes it possible in particular to estimate the effects of dredging or the development of sandbanks. In Argentina, it is the fisheries sector that could benefit from the model, for instance through the monitoring of certain fish larvae that proliferate in waters where turbidity protects them from predators.

Freshwater Biology > Fishing for cryptic species

What impact is global warming having on biodiversity in Antarctica? Before this question can be answered, of course, a reliable inventory is needed. This was the rationale for the federal programme BIANZO II, which was concluded in 2011. For four years, coordinated by the University of Ghent (UGent), BIANZO II mobilised several teams of researchers, including Institute personnel. Their mission was to perform the most comprehensive radiographic survey possible of certain marine species.

Three groups of species were singled out: roundworms (nematodes), sea urchins (echinoidea) and crustaceans (amphipods). The RBINS's scientists mainly worked on the latter. They concentrated on genetic research, and this choice in favour of molecular analysis was not a random one. The technique was indispensable for the painstaking identification of cryptic species – those that cannot be differentiated using traditional morphological methods because they resemble one another so closely. The first results of this work are quite exciting. Several species of amphipod previously thought to have been widespread around the White Continent have turned out to be distinct species with a more limited distribution. The biodiversity of amphipods in Antarctica is thus far richer than was thought before the BIANZO II programme, but, who knows, also more fragile.

>
12.03

The third **Biology Masters Day** at the Museum. All the country's universities present their biology programmes to future students.

>
18.03

Publication of Ronald Verheyen's mystery **Kaken en Klauwen** (Jaws and Claws), which is set in the Museum and features the Palaeontology Department.

Freshwater Biology > **Second World War newts**

Viewed from the air, the fields of Tommelen (Hasselt) still bear the scars of intensive bombing by Allied forces in April 1944. The farmland is still discoloured by dozens of craters. Nearly 70 years after the hostilities, these little hollows, which have now been turned into ponds, represent a setting rich in biodiversity. The newts will certainly endorse this view! Of six populations of crested newt (*Triturus cristatus*) studied in 2011 by the Institute's Freshwater Biology Service in the Flemish part of the country, those in Tommelen were doing the best. Conducted with the participation of the universities of Leuven (KU Leuven) and Ghent (UGent), as well as the Flemish Research Institute for Nature and Forest (INBO), the study focused on the genetic diversity of the newt populations at each of the selected sites. All the DNA analyses were performed at the RBINS. They revealed that it is in Tommelen, and to a lesser extent in Oosthoek, that these representatives of the salamander family are doing the best. Why is this?

In Belgium, the parcelling up of the land and of its natural habitats is generally unfavourable to batrachians. Moreover, newts need a twofold environment in order to survive. In the winter, they live on land, while in summer they prefer to frolic in the water. From the crested newt's point of view, this makes Tommelen and its network of ponds nothing short of paradise!

Entomology > **On the trail of parasites**

Science does not always proceed from theoretical research into possible applications. In the present case, the reverse occurred: efforts to shed light on a practical problem led to success in a whole area of innovative fundamental research.

Researchers were first alerted by a number of mysterious events. In countries as diverse as Australia, Denmark and Uruguay, livestock was suddenly dying for reasons nobody could explain. The death toll was in the hundreds. Was it a curse? From the entomologists' viewpoint, the cause of the hecatomb was more likely to be related to Symphyta. Their larvae, which live in areas of pasture, might well lie behind the wholesale losses of cattle.
In order to be sure, a new research programme was launched, combining ecological, morphological and genetic approaches. The analyses conducted on around thirty species at the RBINS, in collaboration with the UCL and museums in Munich and Tokyo, confirmed that the larvae do indeed contain toxic peptides. So why have these insects developed this kind of poison? Tests conducted in parallel showed that extracts from the larvae also poison natural predators of Symphyta, such as ants. The toxins are thus thought to be an evolutionary adaptation, a kind of chemical defence system developed by some insect families against their predators. Predators unrelated to cattle, of course. The only thing in common is their sensitivity to toxins.

>
19.03 - 02.04

Our palaeontologists discover fossilised mammals from the Eocene in **Gujarat**, India, during an international mission funded by **National Geographic**.

>
05.04

Kazakhstan decides to implement **clean coal-burning and carbon storage technologies**. The Belgian Geological Service contributes its expertise within the context of the ACCESS project.

Biological Evaluation > **Ornithology: dangerous liaisons**

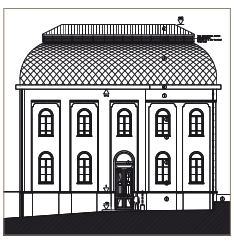
Cast your mind back to 2005. The H5N1 influenza virus, or 'bird flu', was threatening Europe. It was feared that the migration of wild birds from Asia might trigger an unprecedented veterinary crisis among livestock. The alert was serious. The Federal Agency for the Safety of the Food Chain (FASFC) took immediate measures. Orders were issued for poultry to be confined, in order to prevent any contact with any infected migratory birds. But FASFC and CERVA-CODA (the Veterinary and Agrochemical Research Centre) wanted to know exactly what risks our poultry and ducks were exposed to. When, how and for how long do wild birds that may carry the virus come into contact with farmyard animals? At the time, a study of this kind had never been conducted…

To shed light on the matter, the ornithologists of the Belgian Ringing Centre at the RBINS were called in. For months, they monitored two poultry houses night and day by camera: one in Wavre, in an urban setting, and the other in Longchamps, in a rural setting. These amateur poultry farms were not chosen at random. Both are located near water: the River Dyle in Wavre, and ponds in Longchamps. Above all, wild ducks had been observed in both places in the past.

The video surveillance produced 34 944 hours of images which then had to be analysed! When a wild animal appeared on screen, it was precisely identified. The ornithologists also observed contacts with domestic animals and measured how long they lasted. All these observations were recorded in the report of the research programme (FLUTREE) published in 2011. It turns out that migratory birds do indeed voluntarily interact with poultry. The length of these contacts differed strikingly between the town and the country. In Wavre, these dangerous liaisons averaged fifteen minutes in length. In Longchamps, they extended to nearly an hour and 40 minutes. Confinement was therefore a good idea: you have the scientists' word for it!

>
13.04

Start of the **architectural and technical study** for the renovation of the Convent Wing. Aim: a more functional, more eco-friendly building.



>
23.04

Toad eggs, dinosaur eggs, flea eggs…
On Easter Saturday, 1 000 visitors came to hunt for them in the Museum's galleries.

Vertebrates > **In the Congo, the BMC emerges from the ground**

In 2010, researchers conducted a huge international scientific campaign on the waters and banks of the River Congo. The RBINS took part in this adventure, dubbed Boyekoli ebale Congo 2010.

In 2011, as a direct follow-on from this expedition, the construction of a Biodiversity Monitoring Centre (BMC) was started in Kisangani (DRC). Walls, a roof, offices and laboratories all sprang up under the scientific and technical supervision of the Institute, the Royal Museum for Central Africa and the National Botanic Garden. The Belgian Development Agency took care of the funding.

This reference centre devoted to the study of biodiversity in the Congo Basin and its resources has taken the form of an institute belonging to the University of Kisangani. The equipment needed for field campaigns was donated to the centre at the end of the Boyekoli ebale Congo 2010 expedition. So too were the scientific tools: microscopes, analysis kits, dissection cases, etc. Some 35 Congolese scientists were recruited, and five administrative assistants.

But the Institute's help did not stop there. In order to get its scientific operations off to an optimal start, two research and training projects sponsored by the Belgian Science Policy Office were also launched. The RBINS is a partner of the first and the coordinator of the second.

National CBD Focal Point > **Highly biodiversified civil servants**

Biodiversity is everywhere. The Biodiversity Focal Point is well aware of this; so is the federal government. So much so that a general plan has been drawn up that seeks to integrate this dimension in the activities of the federal government agencies. And the honour of organising training courses for civil servants has fallen upon the Focal Point, a service of the Institute.

In 2011, application managers at the Belgian Credit Insurance Office were the first to benefit from the training. In the course of three four-hour modules, the specialists from the Focal Point cleared the ground and identified with the managers the environmental criteria that they need to consider in their everyday work. They helped them to acquire the biodiversity reflex.

The Credit Insurance Office offers credit insurance services to companies entering international trade. It covers certain risks, in particular political ones, associated with international export. To this end, the applications which are submitted to it relate to many different business activities and many different countries. The Office's decisions therefore have a potential impact on the environment and/or biodiversity.

Some fifteen people took part in each training module, and the level of satisfaction was high. Since then, other public bodies have received the training. Awareness of biodiversity is thus penetrating all the machinery of State.

>
17.05

896 lizards and 757 mammals from Papua New Guinea are added to our collections, a **gift from RUCA** (Rijksuniversitair Centrum Antwerpen).

Freshwater Biology > Taxonomic Europe on the move

The initiative comes from the Royal Belgian Institute of Natural Sciences! To ensure greater visibility for European researchers working on the description of species (i.e. taxonomy), it took the step in 2011 of proposing a new scientific journal in this field: EJT (the European Journal of Taxonomy). The journal's ambition was to become an essential part of the field in Europe and even further afield by publishing the best articles on the subject.

Five institutions participated in the launch of EJT. As well as the Institute, there were the National Botanic Garden, the Royal Museum for Central Africa and the natural history museums of Paris and London. Previously, each institution had its own taxonomic newsletters – a form of fragmentation that lacked efficiency in a globalised world.

EJT stands out from other scientific journals for its business model. It is not financed by costly subscriptions taken out by the libraries of scientific institutions, or by scientists paying to publish their articles in open access journals.

Instead, the European Journal of Taxonomy has opted for a third way. The project's partner institutions finance the journal's production costs. In the space of a few months, more than forty articles have already been submitted to the chief editor, based at the RBINS. The new formula is arousing a lot of enthusiasm!

> Experts in front of the class!

Throughout the year, the Museum attracts young and old alike. However, some events are more specifically aimed at an adult audience, and 2011 was no exception to this, as the following examples show.

Whenever there is a new exhibition, the Educational Service invites teachers to discover it before anyone else. During a VIP half-day, they get to see what educational services the department has to offer as well as the resources that have been specifically developed in connection with the new exhibition. For 'Senses!', this teachers' day was attended by some 238 participants at the beginning of the school year.

For the last four years, the Institute has also held the 'Biology Masters Day'. This event is aimed at bachelor's degree students, and puts them in touch with all universities in the country that offer master's degrees in biology. It provides an opportunity to take a comprehensive and objective look at the university courses on offer, on 'neutral territory', to answer all the questions that these future scientists might have and to learn more about a research institute such as RBINS. In 2011, around a hundred students attended the event.

However, the Institute also reaches out to confirmed researchers. In collaboration with the Royal Museum for Central Africa and the National Botanic Garden, it has set up a high-level training programme for European taxonomists, called DEST (the Distributed European School of Taxonomy).

>
27.05

Success for the **Je donne vie à ma planète/Ik geef leven aan mijn planeet** campaign, which receives the Belgian Energy and Environment Prize.

>
15.06 - 03.07

The Biodiversity Focal Point **trains the wardens of protected areas in DR Congo** to monitor the development of biodiversity there.

COLLECTIONS 2

Belgian Geological Service > **A fifth Belgian meteorite**

Every year, 10 000 tonnes of meteorites and meteorite dust fall on Earth. Two-thirds of this crashes into the sea. The remainder falls to ground, but only a fraction of these rocks from space is collected. In deserts such as the Sahara or in Antarctica, these rocks are easier to spot. In our part of the world, finding them in a field or in the undergrowth is quite a feat. Which is why the discovery made by a teacher in the Hautes Fagnes in 1965 is quite exceptional. Intrigued by the shape and colour of a stone, he pocketed it… and forgot all about it for the next 40 years. It was not until 2007 that he discovered the nature of the strange pebble. The RBINS was then given part of this 165 gram meteorite. It was studied and was the subject of official publications in 2011 in the Meteoritical Bulletin and in Geologica Belgica. From a technical viewpoint, the Hautes Fagnes meteorite is an ordinary chondrite (type LL5). Formed around 4,56 billion years ago, it is the product of the agglomeration of remnants of the primitive nebula that gave birth to our solar system, and it has never been melted. In short, this is a space version of sedimentary rock.

The Hautes Fagnes meteorite is now the fifth meteorite officially discovered in Belgium. Before it, four other chondrites were found in the country: at Sint-Denijs-Westrem in 1855, Tourinnes-la-Grosse in 1863, Lesves in 1896 and Bettrechies, in Hainaut in 1934. Samples of all these space rocks are now kept at the Institute.

Palaeontology > **Forensic science, Mesozoic style**

You don't buy a pig in a poke. That much is clear. And the rule holds true for palaeontological collections. When the opportunity to purchase and study a particularly fine ichthyosaurus fossil came up for the palaeontologists from the Institute, they began by asking questions. Where did this marine reptile come from? What era did it date from? What was its story? According to the seller, the fossil dated from the Jurassic period…
In order to make sure, the Belgian scientists first extracted some samples of sediments found in the skull of the specimen that was up for sale. With the help of colleagues from the University of Liège and the Pierre and Marie Curie University in Paris, the microfossils in these sediments were analysed. The result was a surprise: the specimen dated from the Barremian (Lower Cretaceous), a period from which few ichthyosaurus fossils date anywhere in the world.
Its origin still needed to be determined. Here, a palaeontologist from Saratov State University in Russia came up with the key to the riddle. Given the precise age of the fossil and its state of preservation, he was able to trace it to the Ulyanovsk deposits in the Volga valley in Russia.
Once this precious information had been validated, the ichthyosaurus was acquired by the Institute in 2011. This is a real stroke of luck for the researchers – and for the Museum and its visitors too! The fossil is virtually complete and has not been compressed over time. The result is a magnificent '3D' piece which could be displayed in one of the Museum's halls one day.

>
06.07

A spate of **thefts of rhinoceros horns** from museums. The Museum is no exception: a rare black rhino head is stolen.

>
28.07 - 11.08

In Vitrolles, France, our palaeontologists discover the **remains of dinosaurs** that lived in Europe just before the K-T extinction.

Entomology > **The Guérande ground beetle laid bare**

Genome sequencing is a real number-crunching exercise. The work carried out at the Department of Entomology inevitably involves such activities. In 2011, the genome for a ground beetle (a member of the Coleoptera family) living in the region of Guérande (France), preserved at the RBINS, was completely laid bare. Thanks to funding from the Belgian Science Policy Office, researchers from the Institute were able to use the latest technology available in this field to carry out their work: a highly advanced sequencer installed in the university hospital in Leuven (Gasthuisberg/KU Leuven). They also used the powerful computational resources of the University of Ghent (UGent) in order to digest the information obtained in Leuven.
40 billion base pairs from the ground beetle were read in this way, leading to the identification of some 15 000 genes.
The sequencing of a ground beetle is not, of course, an end in itself. The RBINS's researchers ultimately want to obtain the genetic mapping of ten ground beetle specimens from two neighbouring ecosystems: in the salt marshes of Guérande, very close to each other, two populations of the same species of ground beetle present a remarkable dimorphism. For example, one population has large wings, while the other has much smaller wings. To identify the causes of this dimorphism, the Institute's researchers plan to compare the genome of the one group with that of the other and identify the genes responsible for the differences. They also hope to learn more about the evolutionary processes that have led to this dimorphism.

Systematic Molecular Laboratory > **DNA from the collections kept nice and cool**

Minus 80 degrees… it can be very chilly in the Institute at times! Particularly in the new freezers used to house the tissue and DNA collections. JEMU (the Joint Experimental Molecular Unit), a joint unit run by the RBINS and the Royal Museum for Central Africa (and funded by the Belgian Science Policy Office) acquired state-of-the-art equipment in this domain in 2011.

There is no getting round the fact that the old 'fridges' (which only reached -25 degrees) were unable to ensure the long-term conservation of the numerous samples of tissue and genetic material that have been added to the collections in recent years.

The new freezers are part of an integrated global system for the management of specimens of this type. Each sample is identified by a barcode. It is stored in 48-cell boxes. A total of over 100 000 samples can be conserved in this new piece of equipment, acquired with support from the National Lottery.

Of course, this very particular collection is optimally managed by software developed specially for the purpose. But this is not all, because this genetic database has now been integrated, thanks to the work of the Museum's IT team, into the Institute's general, public database: the DaRWIN database. As a result, it has been made accessible to the entire scientific community.

>
28.08

The joint RBINS/Royal Library **certified training course in collection management** is run for the first time.

Biological Evaluation > **Digital ants**

A picture is worth a thousand words. In the Institute's Biological Evaluation Service, work has been carried out all year to put this saying into practice. The specific subjects of the exercise are ants and termites from the Amazon, the Andes and the Chaco.
These collections, mounted on pins, have undergone an intensive period of… digitisation. Over 300 ant specimens representing 250 species have been 'macro-photographed' from three angles (frontal, lateral and dorsal). Among other things, this makes it possible to record certain details of their anatomy, such as their colours, which may fade over time in traditional collections. Some 75 termites underwent the same photography shoots, organised in perfectly adjusted lighting.

Digitisation offers many benefits. Data sharing is faster, both internally and with foreign researchers. The risk of deterioration due to the handling of physical specimens is minimised. And as well as the visual data, a whole host of technical and scientific information about each specimen is added: location, collection method, nesting method, particular behaviour observed, social status in the colony, etc. All of which will facilitate the work of the researchers, who have access to a database of 10 000 new photos of ants and termites.

Library > **14 million publications at your fingertips**

In 2011, the RBINS's library joined the collective catalogue of Belgian libraries, UniCat.be. The Institute's scientific publications, periodicals and even offprints are now listed in this catalogue.

This portal, which is accessible on the Web, can be used to peruse a list of documents available in some 60 libraries throughout the country. Pretty handy! A single website thus lists all the collections of universities, colleges, various scientific institutes, heritage and religious organisations, federal and regional governments, etc.

A total of 14 million items are indexed in the catalogue. Of course, as this is an online catalogue, the individual library concerned must be contacted if you wish to borrow or consult a publication. It should be noted that the tool is intended for both library professionals and end users. By participating in this virtual catalogue, the RBINS has raised its profile in Belgium.

Incidentally, the documents most frequently consulted at the Institute's library include a number of leading general scientific journals such as *Science* and *Nature*, a host of more specialised publications in the various disciplines of interest to our researchers… and the monthly bulletin of climatological observations, which appears to be of interest to many people.

>
29.08 - 31.08

To promote a project involving the scanning of remarkable buildings in the city, the City of Ghent authorities **scan one of our iguanodons in 3D.**

>
09.09

This summer sees **a record-breaking number of stranded porpoises.** Our researchers believe that this is due to the movements of populations in search of food.

PUBLIC 3

> Sense and sensibility

The Museum's new temporary exhibition, opened in October 2011, plunges visitors into a world of 'Senses!' (which also happens to be its title).

Visitors are invited to (re)discover the five human senses (sight, hearing, smell, taste and touch): our indispensable tools for perceiving and interacting with the world around us. The idea is to smell, touch, handle and listen in order to realise the richness but also the limitations of our sensory antennae. Centred as it is around interactivity and experimentation, the exhibition also initiates visitors into other senses that they lack. Thermosensitivity, electrosensitivity and even magnetosensitivity are vital functions for certain animal species.

'Senses!' is aimed at primary school children, but the exhibition will also prove popular with a family audience.

It was on show at the Copenhagen Experimentarium before coming to Brussels. In Denmark, this multisensory experience drew in 297 000 visitors: the challenge is on. Never has the expression 'hands-on science' been so topical at the Museum as this year!

> 'Strength through unity' holds true for temporary exhibitions too!

For over ten years, the RBINS has been involved in an ambitious programme for the coproduction of its major exhibitions on a European scale. Although such an approach was already common for the theatre and for opera, it represented an innovation for exhibitions. 'Fatal Attraction', 'Survivors of the X-TREME', and now 'Senses!' are the products of this new way of working.

The most obvious benefit of this partnership is of course economic in nature: each partner contributes its collections and only has to invest a part of the total production cost. But the benefits go much further. As the specific practices of each institution are brought together, new museographic practices are given the opportunity to emerge, and working methods evolve. Each party benefits from the strengths of the others: a knack for writing vivid texts, special know-how in interactive displays, particular skills relating to the collections… By putting together multivocal exhibitions, the associated museums and scientific centres are able to achieve results that are richer, more attractive and more innovative. They are also ensured a wider audience, as the exhibition is presented at each of the partner institutions before going on tour to other institutions. This turns them into first-rate ambassadors for each party, which thus gains greater international visibility.

>
14.09

CETAF, an **association of major European natural science collections,** chooses the RBINS to undertake its secretarial duties.

>
19.09

The Museum becomes a partner of the **ARGUS 'Nature and Environment' photo contest.** The public is able to vote for the best photo on our website.

> Behind-the-scenes operator: the brain

The 'Sensashow' workshop, offered to teachers and their pupils by the Educational Service, forms the perfect complement to the Museum's new temporary exhibition, 'Senses!'. It looks at the relations between the signals received by our five senses and their processing by the brain. Visitors thus learn about the central role played by the brain in the use of the stimuli sent to it.

For more than an hour, pupils are involved in a variety of experiments. The Museum's activity leaders draw attention to the often complex links between sensory perceptions and the behaviours they may entail. The workshop provides an opportunity to gain an awareness of the 'work' done by the brain: an organ that can also misinterpret information and so make mistakes, as is the case with optical illusions, for example. On the other hand, this extremely complex organ is also capable of remarkable feats. Starting with a few incomplete signals, it can use previous learning or memory to reconstruct a relevant piece of information and make use of it. In response to stimuli, the brain of course sends messages to the body, enabling us to respond appropriately to the world around us.

In short, after (re)discovering our senses and their 'antennae' at the 'Senses!' exhibition, here we come to realise how the information they provide is integrated and used by our 'onboard computer'.

> Events (of a fun nature) at the Museum

Twice this year, the Communication Service scheduled events suitable for young visitors (and their parents) at the Museum.

On 23 April, around a thousand visitors took part in an 'egg hunt' of a rather unusual kind. It was set in the Museum's various rooms, and the treasure-seekers had to follow the trail of egg-laying animals. And that didn't just mean birds! Fleas, snakes, dinosaurs… the nests of eggs weren't always to be found in the places one might expect. The hunt was an opportunity to learn about different habitats, and in the course of the visit you could complete a series of cards which ultimately formed a set that you could bring home with you… or carry around with you on walks in the city… all to do with identifying various egg-laying creatures.

Later, throughout the summer of 2011, six-to-twelve-year-olds got involved in a treasure hunt that was laid out in the Museum. There were 11 puzzles to solve. Of course, the answers to the questions listed in the adventure logbook had to be tracked down in one Museum room or another. This free, trilingual trail (French, Dutch and English) lasting around an hour and a half proved a great success: nearly 2 000 children took part!

>
01.09 - 31.10

A restoration expert uses casts of potsherds from our collections to **recreate two corded ware vases** from the Neolithic site of Oleye-Al Zèpe.

>
06.10

Young and old alike **explore their senses and compare them with those of animals** in our new exhibition 'Senses!'.

> BiodiverCITY 4 KIDS: from computer to paving stones

Do you think of cities as dull, lifeless concrete jungles? How wrong you are! To learn to open your eyes and discover the biodiversity in our cities, just follow Max! This virtual urban fox has been conducting inquisitive children on walks around the city since 27 May 2011, on the Museum's website (www.sciencesnaturelles.be/4kids). At a bridge, in a patch of wasteland, in a garden, next to the Museum, Max reveals the many facets of life in the city. He has videos and some simple questions that raise awareness of these treasures, and he also invites young Internet users to behave in ways which are more favourable to this biodiversity: for example, by encouraging them to become 'locavores' (eating fruits and vegetables which are local and seasonal) or to opt for an environmentally friendly schoolbag, or by explaining why feeding bread to the ducks in the pond in the park isn't really a good idea.

Incidentally, there may not be a beach under the paving stones (as the old revolutionary slogan from '68 claimed), but there are plenty of earthworms. To find out for yourself, all you have to do is switch off the computer and set out to discover urban biodiversity for yourself. And hey, Max and his family are great examples: they've been perfectly adapted to the city for generations.

> 10 000 questions? 10 000 answers!

Ik heb een vraag

Can you extract a square root by counting on your fingers? Exactly what size is an atom? How can you generate energy from a sperm whale that has been found dead on the beach?

Scientific curiosity isn't a negative trait, and above all, it knows no bounds: these are the truths that the 'ikhebeenvraag.be' ('I have a question') initiative demonstrates. This website, launched in 2008 under the supervision of the RBINS with the support of the Flemish Government, gives online answers to questions from the young and the not-so-young in a wide range of scientific and technical disciplines. Inquisitive folk have been flocking to the website. In just three years of existence, over 10 000 questions have been given a reliable and relevant answer. As well as the Institute's scientists, some 600 researchers from forty institutions and universities in the country have given their support to 'ikhebeenvraag.be', a website which is consulted by users aged 6 to 90 years.

Although all kinds of questions can be dealt with there, some are not answered. For example, highly personal medical questions are rejected, as are questions of a legal nature, or for that matter questions that come straight out of someone's homework.

By the way, do you know 'why nature is organised so perfectly?' The answer to this, the 10 000th question, asked on the website in autumn 2011 by Elisa (15 years), can be found online, as all the questions (and their answers) are archived there.

>
11.10

XperiLAB.be (our science truck) **welcomes its 10 000th pupil,** after just fourteen months of activity!

>
11.10

The RBINS continues its **green management strategy.** A composting facility is created for all the institution's organic waste.

> Dances with dinosaurs

Saturday night fever seized the Museum on 26 February 2011. Until one o'clock in the morning, 3 000 inquisitive types and art lovers came to discover the dinosaur hall and the whale hall as part of Museum Night Fever. At the feet of the motionless giants, dozens of artists presented a series of experiments in choreography, music or the spoken word.
Traces, the main show of the night, brought together 40 to 60 dancers from two schools of Arts, the Lycée Martin V and the Académie de Court-St-Étienne & Ottignies-LLN. Backed by eclectic musicians, they set out on the trail of the giants in a poetical and light-hearted hunt, playing with the outsized nature of the venue.

There was atmosphere a-plenty during this feverish night organised by the Brussels Council of Museums. Setting up resonances between the architecture of the Museum's Janlet Wing, the glassy stares of a motley crew of dinosaurs and the movements of bodies: it was a bold venture. Under the adapted lighting of these great halls and to the jazzy accompaniment of the 'KOA Collective' which provided the musical interludes, the whole event was a success.

Museum Night Fever was a reminder that the Museum also participates in the city's night life, and an excellent opportunity to introduce aficionados of artistic culture to the scientific culture in which every corner of the Museum is steeped.

> Binomial: the clash of cultures

When a scientist meets an artist, what form does their conversation take? Great stories, of course!
This is the essence of the Binomial experiment, put on in our Institute in 2011 by a French team bringing together various scientific and artistic partners (Universcience, the 'Les sens des mots' company, the French National Theatre Centre).

The rules of the game couldn't be simpler. Five playwrights each meet a scientist. The two talk with each other, swap experiences, describe their working lives. The end product is a filmed document, a play and a 'dramatised reading' followed by a discussion between the audience, the writer and the researcher. One encounter between two people from two different cultures (artistic and scientific) has already taken place within the Museum, in Brussels, but the fruit of their encounter was presented in France: at Avignon during the summer and then in Paris in the autumn, at the Palais de la Découverte and the Cité des Sciences et de l'Industrie.
This exercise, though simple in theory, proved to be highly instructive. You have a researcher's word for it! He found out how difficult it can be to talk and communicate about your work or to present research about earthworms on stage... And he also came to appreciate the varied nature of the notion of criticism. Between the painstaking, rationalistic criticism of a scientific article which is peer-reviewed before publication and the criticism of an artistic adventure that is fuelled by instinct and passion, there is a world of difference. A clash of cultures indeed!

>
10.11

The MUMM shipping forecast website is now **accessible for smartphones:** http://m.mumm.ac.be.

>
21.11

The National Bank receives the **Prix Caïus Prijs grande enterprise/Grote Onderneming** for its support for the renovation of our Museum.

> The vibrant life of my planet

Websites are living communication tools. The one for the campaign 'Je donne vie à ma planète/Ik geef leven aan mijn planeet' (I give life to my planet), launched in partnership with the FPS for Public Health, Food Chain Security and the Environment, has a pulsating metabolism. By means of personal, concrete engagements and information that is both precise and accessible, it confidently sets out to encourage us to be less wasteful of the Earth's resources and riches, for the sake of biodiversity.

In 2011, the school version (jedonnevieamaplanete.enclasse.be/ikgeeflevenaanmijnplaneet.indeklas.be) was expanded with two new applications relating to food chains and Belgium's ecosystems. They are accessible in the site's media library, and their priority target group is therefore teachers and pupils aged 10 to 18.

To explore Belgian ecosystems, there are two options. Either you enter your postcode and set out to discover your local environment, or you navigate as your fancy takes you, by biotopes. You can also click on an interactive map of the country, which will take you straight to the nearest nature interpretation centre.

For food chains, not one but two versions have been put online (for schoolchildren and for teachers). Here too, you start with ecosystems to find out… who eats who. And guess who's at the top of the pyramid?

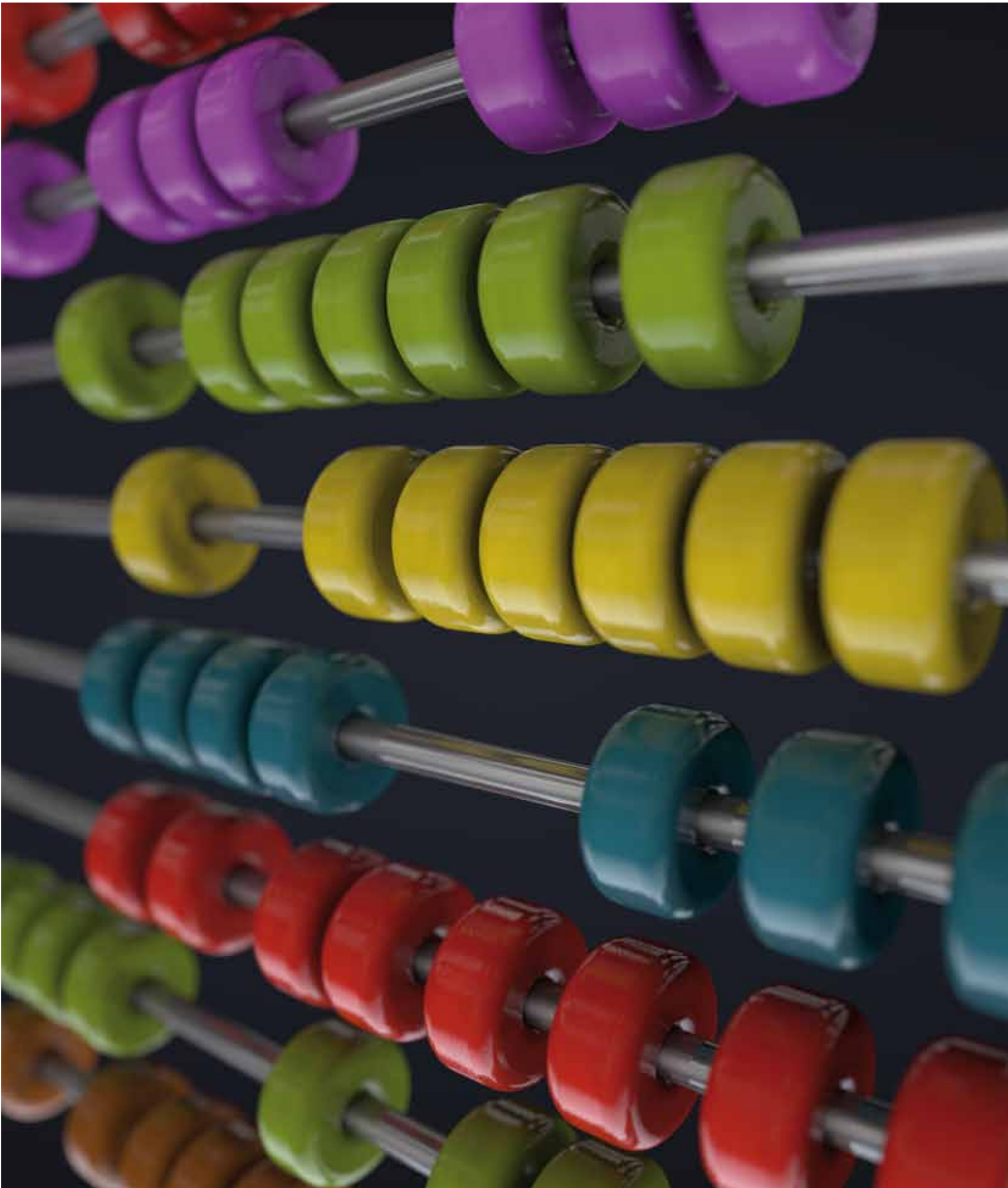
>
30.11

The **effect of biodiversity on public health.** The Belgian Biodiversity Platform gets 81 researchers, politicians and journalists to discuss this topic.

>
22.12

New. Discover various **Belgian ecosystems** at www.jedonnevieamaplanete.be › Sur la biodiversité/www.ikgeeflevenaanmijnplaneet.be › Over biodiversiteit.

FIGURES 4



> FINANCES

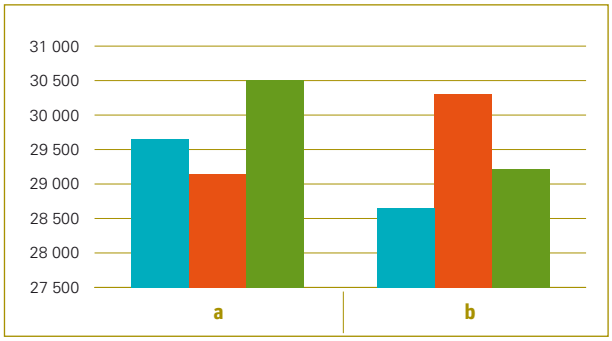
The Institute's financial situation developed positively in 2011: whereas income continued to grow (up €1 365 k or 4,7 %), expenses decreased by €1 085 k (- 3,6 %).

However, this overall picture is made up of contrasting elements. Unlike previous years, the Institute's grant was not increased in 2011; indeed, its amount was not even adjusted for inflation. The overall result was therefore achieved thanks to the Museum's own income, which was considerably higher than in 2010 (up €993 k or 8,9 %).

Again, on the expenditure side, staff costs paid out of the Institute's own resources rose by €712 k or + 8,2 %, mainly due to the intensification of contractual research activities, but this upward trend was counterbalanced by effective control of operating and equipment costs, which dropped significantly (down €775 k or 8,4 %). Finally, as the renovation work in the public galleries was interrupted in 2011, museum investment spending was greatly reduced (down €1 416 k or 82,9 %).

INCOME AND EXPENSES (IN €k)

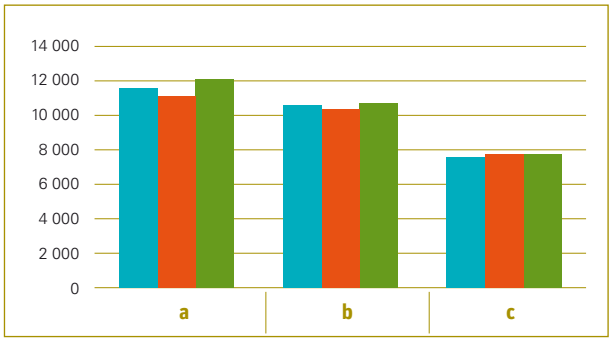
	2009	2010	**2011**
a Income	29 645	29 143	30 508
b Expenses	28 651	30 303	29 218
Balance	994	- 1 160	**1 290**



SOURCES OF INCOME (IN €k)

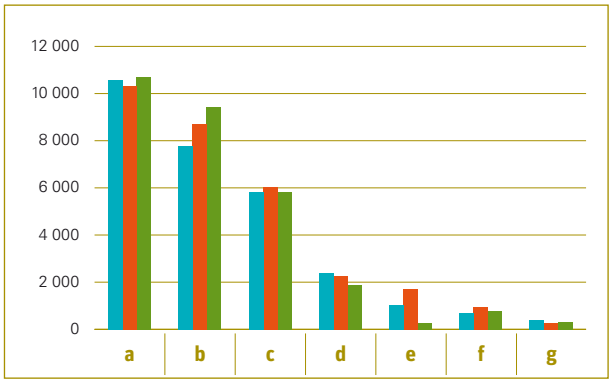
	2009	2010	**2011**
a Museum's own income	11 548	11 095	12 088
b Staff budget*	10 553	10 322	10 694
c General grant	7 544	7 726	7 726

* Statutory and contractual staff (for exceptional and temporary employment) are at the expense of the Belgian Science Policy Office.



CHANGE IN EXPENDITURE (IN €k)

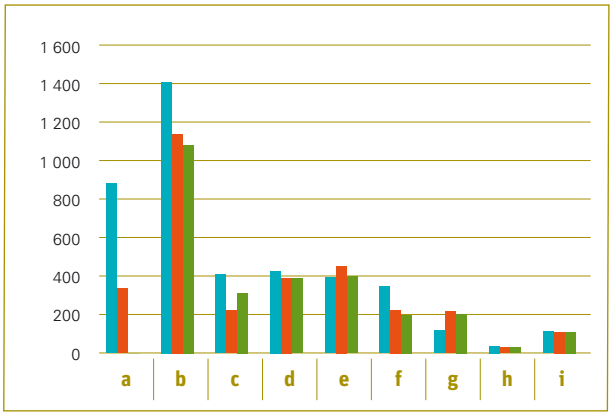
	2009	2010	**2011**
a Staff budget*	10 553	10 322	10 694
b Staff expenses financed from own resources	7 751	8 712	9 424
c Ordinary operational expenses	5 820	6 034	5 830
d Operation flight equipment/vessels	2 402	2 270	1 876
e Investment in the Museum	1 020	1 708	292
f Equipment	693	964	787
g Library and collections	412	293	315
Total	28 651	30 303	**29 218**



BREAKDOWN OF MUSEUM INCOME (IN €k)

Museum income was slightly down compared to 2010. This was due to the loss of the Museum renovation grant associated with the end of the first renovation phase, and the decrease in the sponsorship income that was closely associated with this renovation work. The other income items remained steady overall, while some showed a clear increase, such as Exhibition hire and sales, (up €91 k or 41,2 %), proof of just how attractive our Museum's output is.

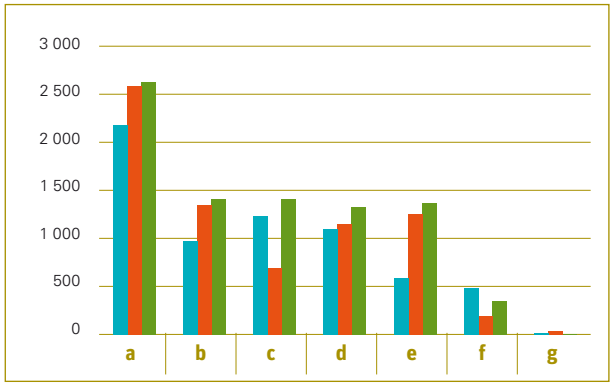
	2009	2010	**2011**
a Museum renovation grant	881	336	0
b Ticket sales	1 408	1 137	1 080
c Exhibition hire and sales	409	221	312
d Shop	426	390	387
e Donations - sponsorship - grants	394	452	398
f Educational Service	346	224	198
g Events	118	217	204
h Cafeteria concession	39	29	30
i User Observatory (all federal museums)	112	110	110
Total	4 133	3 116	**2 719**



BREAKDOWN OF RESEARCH INCOME (IN €k)

Research-related income, which was already up in 2010, underwent a real boom in 2011 (up €1 242 k or 17,1 %). This increase was particularly evident in the case of income from the European Commission, as well as from the Belgian federal bodies and the Private sector, but developments were positive for virtually all other financing sources. This again underlines the dynamism and strong reputation of our researchers, should evidence of this still be required.

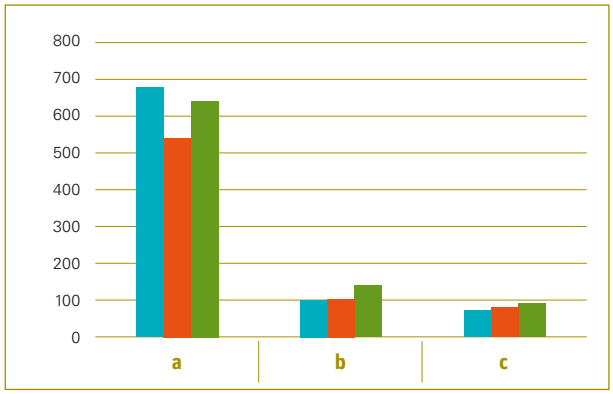
Projects financed by	2009	2010	**2011**
a Belspo	2 174	2 583	2 626
b Federal administrations (excl. Belspo)	974	1 343	1 410
c European Commission	1 230	695	1 408
d Belgian federal bodies	1 102	1 145	1 323
e Private sector	587	1 255	1 371
f Foreign institutions (non-EU)	479	197	347
g Belgian universities	18	36	1
Total	6 564	7 254	**8 496**



BREAKDOWN OF MISCELLANEOUS INCOME (IN €k)

After falling in 2010, miscellaneous income also increased (up €148 k, or 20,4 %). Again, most of the total figure (nearly 3/4) represents miscellaneous income associated with scientific activities; as a reminder, the latter include laboratory tests, the organisation of colloquia, the sale of geological maps, and so on.

	2009	2010	**2011**
a Scientific activities	678	540	641
b Social activities (mess, crèche)	101	104	141
c Management	72	81	91
Total	851	725	**873**

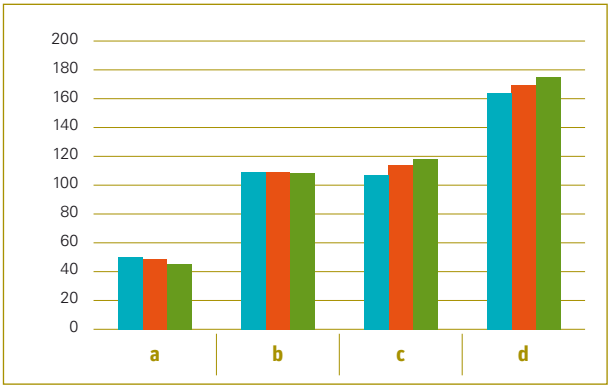


> STAFF

STAFF BREAKDOWN

Continuing the trend observed in recent years, the number of statutory staff continued to fall. In particular, this was the case with scientific staff (down 10 % since 2009). However, as of 31/12/2011, eleven positions were open, which suggests that the situation will improve in 2012. Conversely, the increase in the number of contractual staff members continues: there are 10 % more contractual scientific staff than in 2009, thanks to the increased activity connected with scientific projects, and 6,7 % more non-scientific contractual staff.

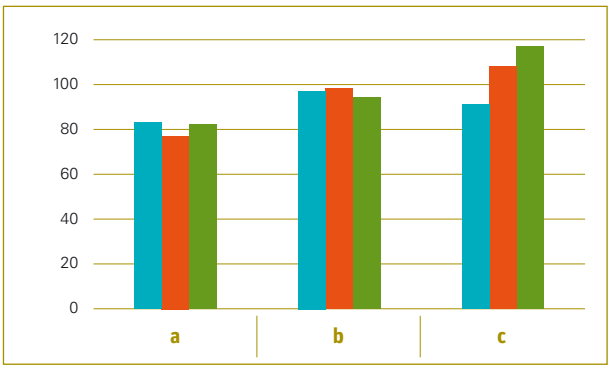
	2009	2010	**2011**
a Statutory scientists	50	49	45
b Statutory non-scientists	109	109	108
c Contractual scientists	107	114	118
d Contractual non-scientists	164	169	174
Total	430	441	**445**



SOURCES OF FINANCING FOR CONTRACTUAL STAFF

The analysis of sources of financing for contractual staff reveals that the number of recruitments associated with external projects continued to rise; on the other hand, recruitments financed out of the grant and ordinary income fell in 2011.

	2009	2010	**2011**
a Staff budget*	83	77	82
b Grant and ordinary income	97	98	94
c External projects	91	108	117
Total	271	283	**293**

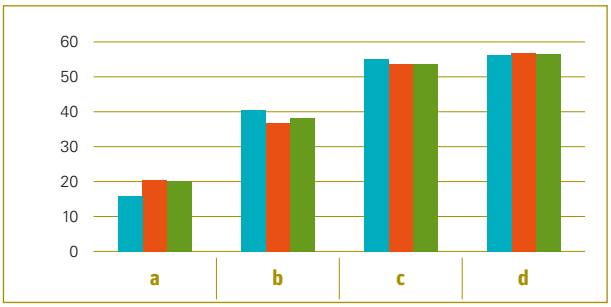


* Contractual staff (for exceptional and temporary employment) is at the expense of the Belgian Science Policy Office.

PERCENTAGE OF FEMALE STAFF

The male/female ratio amongst Institute staff is evolving positively towards a good overall balance. However, this improvement conceals significant disparities.
The proportion of women amongst the statutory scientific staff remained stable compared with 2010 (albeit after a significant increase in the previous year). The level is very low, and remains a priority concern for the Institute. However, the proportion of women amongst statutory non-scientific staff was slightly higher than in 2010. Among contractual staff, the proportion of women showed little change; it is over 50%.

	2009	2010	**2011**
a Statutory scientists	15,8	20,4	20
b Statutory non-scientists	40,3	36,7	38
c Contractual scientists	55,1	53,5	53,4
d Contractual non-scientists	56,1	56,8	56,3
Total	46,5	47,1	**47,4**

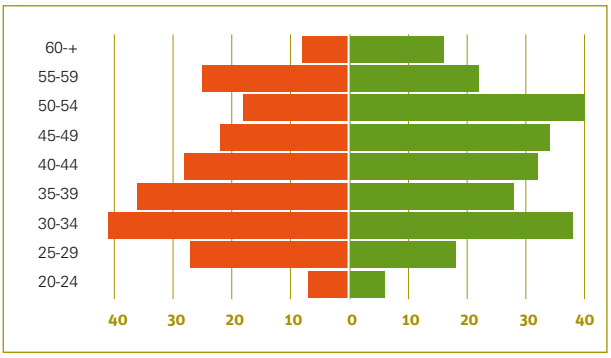


AGE PYRAMID

The age pyramid shows that there are a high number of staff members over the age of 55 and a small number of young staff members (those under 30, and especially those under 25).

However, the overall average staff age remained stable compared with the previous period (42 years of age). As was the case in 2010, female staff predominate in the 20-40 age groups (111 compared with 90), but this trend is reversed after the age of 40 (101 compared with 144), except in the 55-59 age group, where there is gender equilibrium.

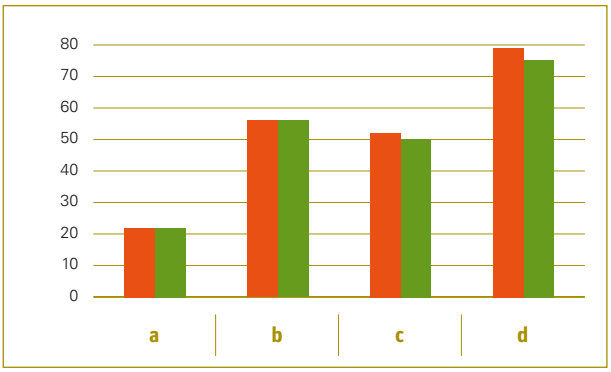
	Women	Men
60-+	7	16
55-59	25	22
50-54	18	40
45-49	22	34
40-44	28	32
35-39	36	28
30-34	41	38
25-29	27	18
20-24	7	6
Average age: 42 years		



STAFF BREAKDOWN BY LINUSTIC ROLE

The linguistic balance requirements were 98 % satisfied, allowing for two categories that do not enter into the calculation: staff based in Ostend and foreign staff members.

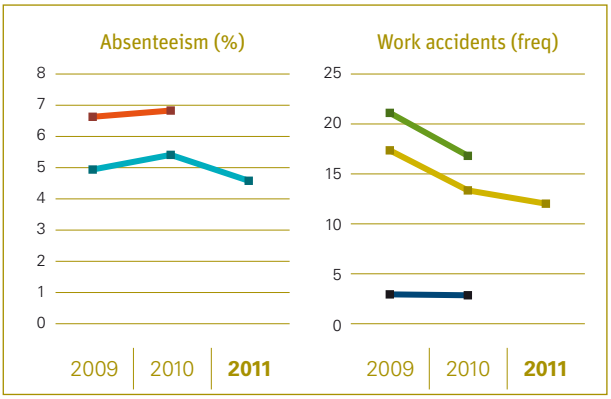
	FR	NL	For.	Ostend
a Statutory scientists	22	22	-	1
b Contractual scientists	56	56	3	3
c Statutory non-scientists	52	50	-	6
d Contractual non-scientists	79	75	12	9
Total	**209**	**203**	**15**	**19**



ABSENTEEISM AND WORK ACCIDENTS

Absences due to illness and work accidents decreased slightly from the level in previous periods. Rates of sick leave are well below the federal average. With regard to work accidents, the results are poor by comparison with institutions active in R&D – Physical and natural sciences (NACE code 72190); on the other hand, if they are compared with the Museums (NACE code 91020), the results of the RBINS are at the low end of the normal range for the sector.

	2009	2010	**2011**
Absenteeism RBINS (%)	4,94	5,41	4,58
Absenteeism federal level (%)	6,63	6,83	-
Work accidents RBINS (frequency)	17,36	13,35	12,02
Work accidents R&D (frequency)	2,94	2,85	-
Work accidents Museums (frequency)	21,11	16,81	-
Work accidents RBINS (number)	13	10	9
Accidents RBINS on the way to work (number)	9	13	10



> RESEARCH

Despite a stable number of scientific staff, the Institute achieved a record number of publications, passing the 1 000 mark in 2011! A further 256 manuscripts were submitted and accepted for publication. Scientific publications experienced especially positive growth (+ 6,3 %).

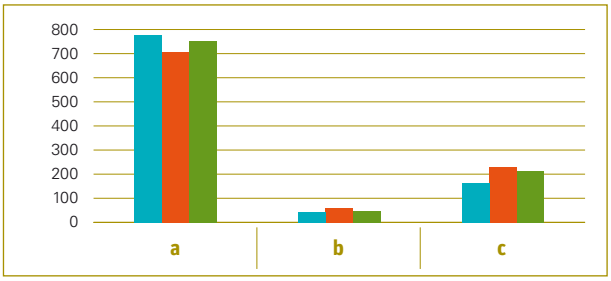
However, it should be noted that there were falls in relation to 2010 in the proportion of publications with an impact factor (IF) (from 26,3 % to 19,7 %), and of those with an international editorial board (from 13,9 % to 11,8 %).

BREAKDOWN OF PUBLICATIONS

	Scientific publications				Popular works	Expert reports	Total
	Total	*of which journals with IF*	*of which journals with international editorial board*	*of which others*			
Vertebrates	26	*13*	*6*	*7*	4	12	**42**
Invertebrates	93	*21*	*17*	*55*	12	39	**144**
Entomology	75	*15*	*17*	*43*	0	3	**78**
Education & Nature	121	*34*	*6*	*81*	10	25	**156**
Palaeontology	226	*32*	*30*	*164*	14	37	**277**
Marine Ecosystem	83	*24*	*6*	*53*	3	86	**172**
Geology	123	*8*	*6*	*109*	4	10	**137**
Museum	1	*0*	*0*	*1*	0	0	**1**
Total	**748**	***147***	***88***	***513***	**47**	**212**	**1 007**

CHANGE IN PUBLICATIONS

	2009	2010	**2011**
a Scientific publications	772	704	748
b Popularisation	44	59	47
c Reports	162	229	212
Total	978	992	**1 007**



SCIENTIFIC PROJECTS WITH EXTERNAL FUNDING

During 2011, the Institute managed or played a significant part in 156 contracts, one more than in 2010, which was itself a particularly remarkable year in this respect. The Institute has thus confirmed its position as a key player in research at both national and international level.

	Projects with external funding
Vertebrates	10
Invertebrates	18
Entomology	9
Education & Nature	33
Palaeontology	16
Marine Ecosystems	46
Geology	19
Other	5
Total	**156**

BREAKDOWN OF CURRENT PROJECTS ACCORDING TO SOURCE OF FINANCING

Although the number of projects was nearly the same in 2011 as in 2010, the growth in financing flows generated was spectacular (+ 11,7%). These flows derive from a wide range of institutions: the Belgian Science Policy Office remains the largest source, but the European Commission, federated entities and the Private sector are growing in importance as income sources.

	2009	2010	**2011**	**2011**
	Number	**Number**	**Number**	**Amount (in €)**
Belgian Science Policy Office	59	70	66	2 625 760
Federal funding from other sources	9	12	12	1 208 758
National Lottery	3	3	5	211 100
Flemish Region + FWO	11	10	13	446 157
Walloon Region + FNRS	5	3	6	661 242
Brussels-Capital Region	6	3	4	215 764
Universities	4	5	3	1 300
European Commission	18	29	28	1 407 815
International	18	12	12	346 564
Private sector	4	8	7	1 370 647
Total	137	155	**156**	**8 495 110**

SUPERVISION OF STUDENTS

A substantial increase can be seen in the number of students receiving supervision (+ 23,1 % compared with 2010). This confirms the trend already observed in 2010.
The number of doctoral students was greater than the number of those taking master's degrees. This demonstrates the attractiveness of the RBINS to high-level science students, who find contacts and research equipment at the Institute that meet their requirements. In addition, many students who were supervised during their master's degree return to the RBINS when they go on to study for a doctorate.

CHANGE IN SUPERVISION OF STUDENTS

	2009	2010	**2011**
PhD	55	56	81
Master	38	65	68
Total	93	121	**149**

BREAKDOWN OF THE SUPERVISION OF STUDENTS

	PhD	Master	**Total**
Vertebrates	5	1	6
Invertebrates	15	17	32
Entomology	7	3	10
Education & Nature	18	9	27
Palaeontology	17	27	44
Marine Ecosystem	12	8	20
Geology	7	3	10
Total	**81**	**68**	**149**

> LIBRARY

The library continued to grow overall, but the most marked area of growth was in subscriptions to electronic journals, which totalled 789 by the end of 2011.

As was the case in previous years, internal document loans fell significantly, whereas external and inter-library loans rose and international exchanges remained stable.

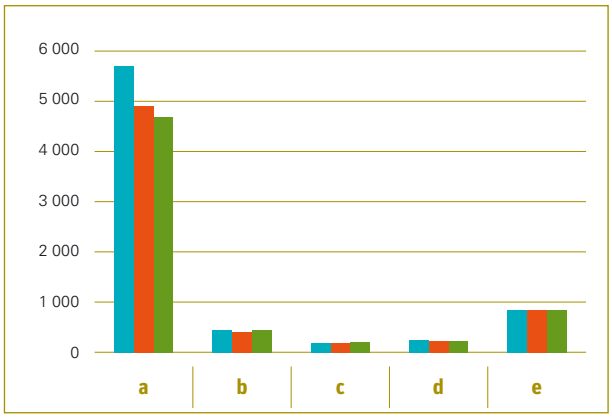
The total consultation sessions of electronic journals increased (+ 3,4 %). This increased use is particularly sensitive for abstracts (+ 3,3 %). The consultation of periodicals increases slightly (+ 2,0 %), whereas the consultation of complete texts stays more or less stable (+ 0,9%).

ACQUISITIONS

	2009	2010	**2011**
Books and journals	+ 7 823	+ 8 291	+ 8 068
Electronic journals	+ 251	+ 42	+ 59

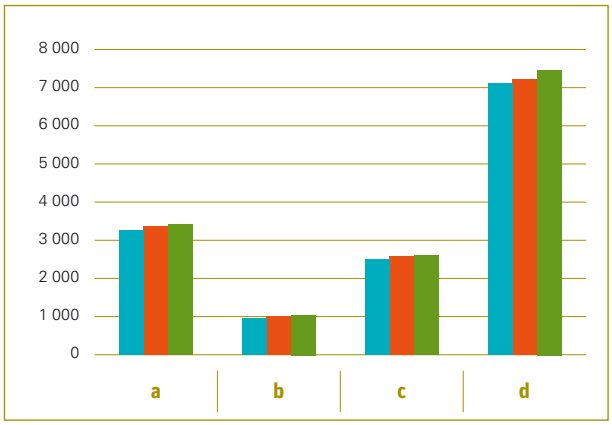
LOANS

	2009	2010	**2011**
a Internal loan of documents	5 696	4 907	4 690
b Inter-library loans	442	414	447
c Borrowings	197	179	211
d Loans	245	235	236
e International exchanges	844	847	851



TYPES OF CONSULTED ELECTRONIC DOCUMENTS

	2009	2010	**2011**
a Periodicals	3 263	3 351	3 419
b Abstracts	967	1 014	1 047
c Complete text	2 504	2 589	2 611
d Total consultation sessions	7 112	7 207	7 455



> COLLECTIONS

SCIENTIFIC VALORIZATION

A slight decrease can be observed in the number of visiting scientists compared with 2010. This trend is probably due to ongoing digitisation, leading to greater opportunities for consultation at a distance (both of the actual collections and of the database). However, the number of visiting scientists remains high, particularly for the Entomology, Palaeontology and Invertebrates Departments.
The expansion of the collections continued, very significantly in the case of some departments, thanks to targeted purchasing and gifts. Moreover, the number of loans continued to rise (+ 5,0 %), testifying to the growing interest in our collections, which are valued both as objects of scientific study and as potential exhibits.

	Number of visiting scientists	Additions to the collections	Number of loans
Vertebrates	50	3 330	19
Invertebrates	116	2 800	27
Entomology	225	120 271	271
Education and Nature	19	0	0
Palaeontology	135	1 150	8
Marine Ecosystem	25	0	0
Geology	42	748	10
Total	**612**	**128 299**	**335**

DIGITISATION OF THE COLLECTIONS

The Institute continues to digitise its huge collections, though unfortunately with limited resources.

In 2011, a new version of DaRWIN, which is easier to use, was implemented. This software update has taken some time for the encoders to get used to, leading to a significant decrease in the recording of type and above all non-type specimens compared with 2010 (down 14 901 or 28,1 %). However, the growth in the number of records remains substantial (up 38 195), and DaRWIN included more than 400 000 records by the end of 2011.

The addition of data again accounted for the bulk of encoding work, although updates and the deletion of data represent an increasing part of the workload.

With the exception of the Entomology Department, whose collections were significantly expanded in 2011, the number of items encoded exceeded the number of accessions to the collections, significantly so in some cases. The work of the encoders is thus reducing the digitisation backlog progressively.

ENCODING PER DEPARTEMENT	
Vertebrates	14 305
Invertebrates	11 127
Entomology	4 755
Palaeontology	7 120
Geology	1 638
Total	**38 945**

BREAKDOWN OF ENCODING TASKS (%)	
Addition of data	66,9
Updating of data	30,7
Deletion of data	2,4

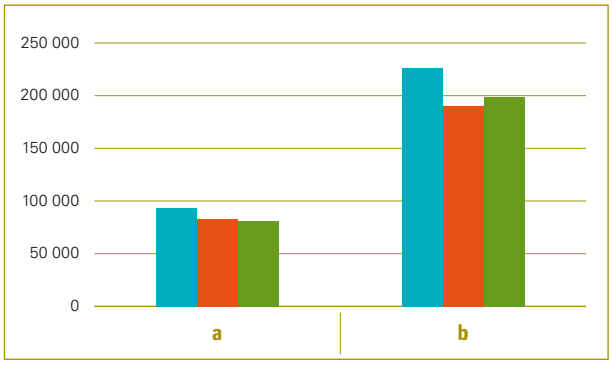
ENCODING IN THE DaRWIN DATABASE			
	Recording of types	Recording of non-types	Total items recorded in DaRWIN
January	-	-	-
February	25 284	339 362	364 646
March	25 364	342 448	367 812
April	25 516	345 302	370 818
May	-	-	-
June	2 6074	353 419	379 493
July	26 332	355 887	382 219
August	26 483	360 041	386 524
September	26 737	364 058	390 795
October	26 690	369 386	396 076
November	26 735	372 903	399 638
December	26 829	376 012	402 841
Increase	**1 545**	**36 650**	**38 195**

> MUSEUM

CHANGES IN MUSEUM ATTENDANCE

The number of visitors was up 2,6 % compared with 2010. Although there was a slight increase in numbers of individuals and families, the structure of our visitor profile between groups on the one hand and individuals and families on the other remains stable at around 30 % and 70 % respectively.

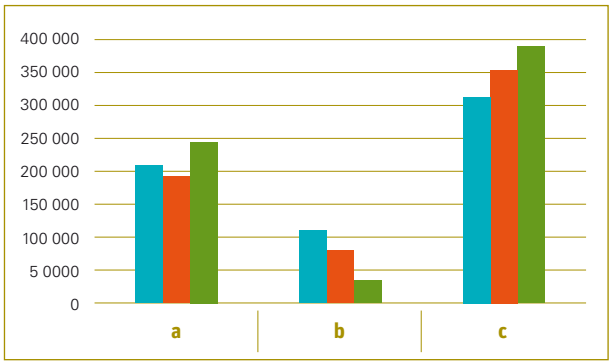
	2009	2010	**2011**
a Visitors in groups	93 490	82 393	80 544
b Individuals and families	225 956	189 541	198 500
Total	319 446	271 934	**279 044**



BREAKDOWN OF MUSEUM ATTENDANCE

In 2011, the Museum only presented a temporary exhibition for three months: the number of visitors in this category is therefore inevitably much lower than in previous years, when temporary exhibitions lasted ten months. On the other hand, the numbers visiting the permanent galleries was markedly higher than in the previous year (+ 27,5 %). Attendance at off-site temporary exhibitions, i.e. travelling exhibitions (co)produced by the Museum, remained high in 2011, and surpassed the attendance figures for the Museum itself by a clear margin. This demonstrates the success of our output abroad.

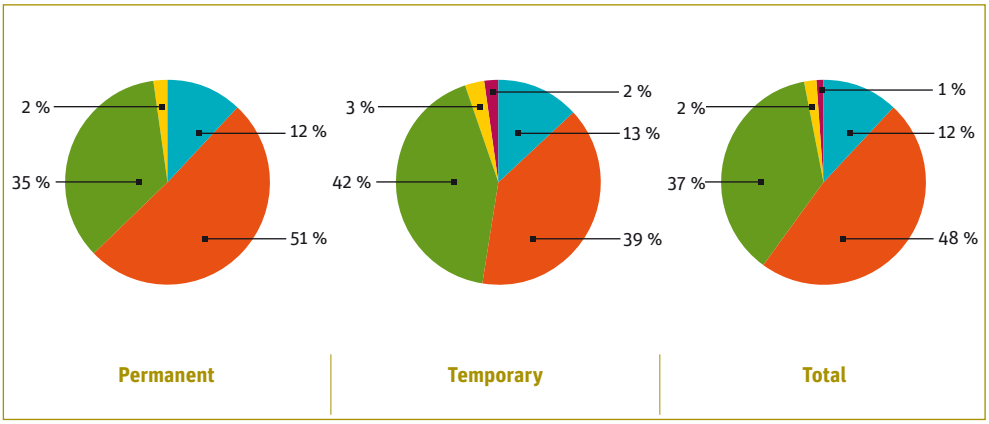
	2009	2010	**2011**
a Permanent galleries	208 900	191 926	244 648
b Temporary exhibitions (on-site)	110 546	80 008	34 396
Total Museum	319 446	271 934	**279 044**
c Temporary exhibitions (off-site)	313 000	353 000	389 000



BREAKDOWN OF VISITORS BY AGE GROUP (%)

Children and young people remain the majority category, either visiting in groups or accompanied by their parents or grandparents.

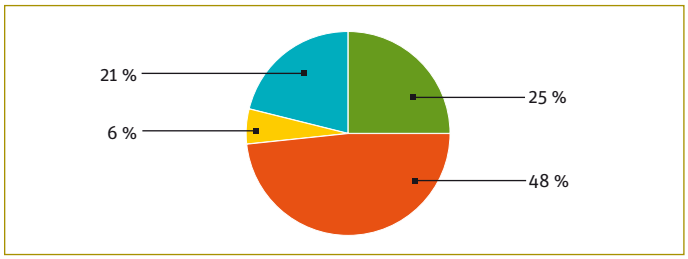
- Small children (0-5 years)
- Young people (6-17 years)
- Adults (18-59 ans)
- Senior citizens (60+)
- Not known



REDUCED AND FREE ADMISSION

The Museum stays financially very accessible as three of the four visitors took advantage of free or reduced price entry. As consequence, the number of visitors benefiting from free admission fees increased in 2011. Reason: 0-5 year-olds were present in bigger number, and also the younger audience was more interested in special formulas such as the Brussels Card or Bongo.

	Number
Full admission	70 344
Reduced admission	134 327
Free admission on 1st Weds of month	15 510
Other free admission	58 863
Total	**279 044**



VISITS TO WEBSITE

As in the previous year, the number of web pages viewed continued to decrease, confirming a change in users' behaviour that needs to be taken into account in the development of the new website for the Institute, scheduled for 2012-2013.

	2009	2010	**2011**
Pages	19 624 938	14 034 726	11 509 570
Visitors	3 065 299	3 076 161	2 924 777

CHANGE IN SHOP CUSTOMERS

Although the number of visitors to the Museum rose slightly (+ 2,6 %), the number of visitors to the shop fell in 2011 (- 3,0 %). As a logical consequence of this, although the average spend per customer increased (+ 1,7 %), the amount spent per visitor to the Museum was down (- 3,5 %).

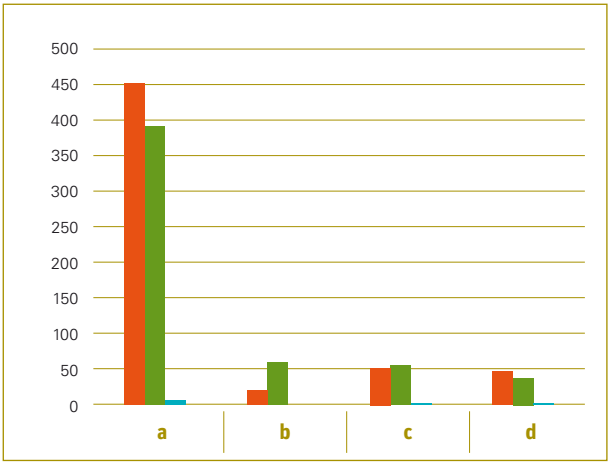
	2009	2010	**2011**
Museum visitors	319 438	271 934	279 044
Shop customers	29 361	26 494	25 688
Expenditure/customer	14,21	14,51	14,76
Expenditure/visitor	1,31	1,41	1,36

THE MUSEUM IN THE MEDIA

After a bumper year in 2010 (International Year of Biodiversity), the Museum's profile in the media (in print and on radio and television) revealed disparate trends: its presence in the print media, especially the French-speaking part of it, increased, whereas it declined in the audiovisual media on both sides of the linguistic frontier.

The number of interviews of RBINS staff, although down on 2010, was still very high, especially in the Dutch-speaking part.

	FR	NL	Others
Printed press			
Articles Museum and Institute	344	283	6
Exhibition Mars	3	2	0
Exhibition Senses	35	33	0
Biodiversity + expo BiodiverCITY	68	72	0
a Total printed press	**450**	**390**	**6**
b *of which interviews RBINS employees*	21	60	0
Radio and TV			
c Total Radio and TV	**52**	**56**	**1**
d *of which interviews RBINS employees*	47	38	1



ACTIVITIES ORGANISED BY THE EDUCATIONAL SERVICE

After decreasing in 2010, the range of educational activities organised by the Educational Service returned to a level comparable with 2009: a total of 2 828 were organised. Average attendance was also up considerably (+ 6,5 %).

	2009	2010	**2011**
Number of participants	51 804	50 965	55 387
of which groups (on-site + off-site)	*46 872*	*47 155*	*50 911*
of which individuals	*4 932*	*3 810*	*4 476*
Number of activities organised	2 861	2 768	2 828
Average attendance per activity	18,1	18,4	19,6

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

Almost half of the visitors in group (47,4 %), crossing the doors of the Museum, are hosted by the Educational Service. This number slightly decreases compared with 2010 (- 2,7 %). This is probably due to the lack of temporary exhibitions for much of the year.
This downturn is also observed in the proportion of the number of guided groups and the total number of visitors at the Museum (- 1,5 %).

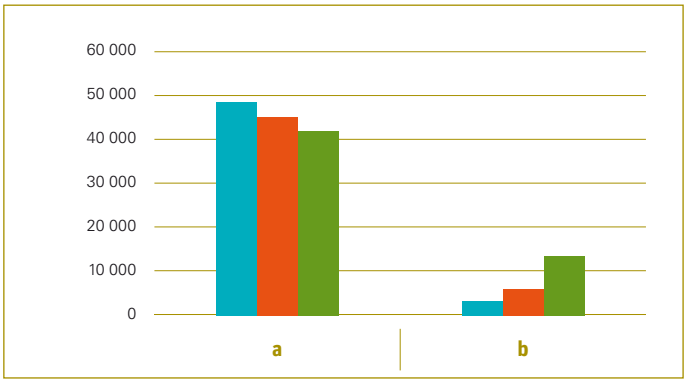
	2009	2010	**2011**
Compared with total number of visitors to the Museum	15,1	16,5	15,0
Compared with total number of visitors in groups	46,6	50,1	47,4

VISITORS WELCOMED BY THE EDUCATIONAL SERVICE

The activities of the Educational Service are mainly directed to groups, but also to individuals. They are unfolded in the Museum, but also outside the museum walls with the Science truck, animations of the Brussels Centre of Education of Nature (CBEN/BNEC) and excursions.

In 2011, the number of visitors receiving staff supervision in the Museum fell (- 7,1 %), while the attendance of activities outside the Museum exploded (+ 127,9 %). This was due mainly to the success of the science truck, XperiLAB.be, which travelled through Belgium throughout the school year. This new activity confirms the desire of RBINS to reach the whole of Belgium with its educational provision.

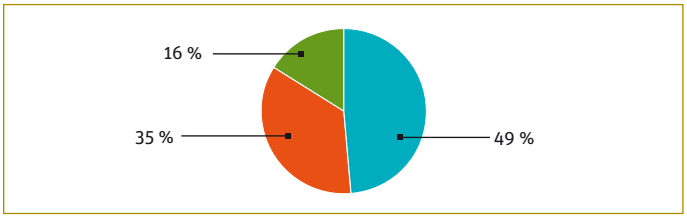
	2009	2010	**2011**
a Total number of visitors (on-site)	48 421	45 026	41 851
b Total number of visitors (off-site)	3 383	5 939	13 536



BREAKDOWN OF VISITORS PER ACTIVITY

Guided tours continue to dominate educational activities on Museum premises; however, due to the growing success of the workshops, their share of total activities has fallen from 53,5 % in 2010 to 48,8 % in 2011. The item 'Other activities' continues to grow. It includes a diverse range of activities such as birthday parties, holiday courses and so on.

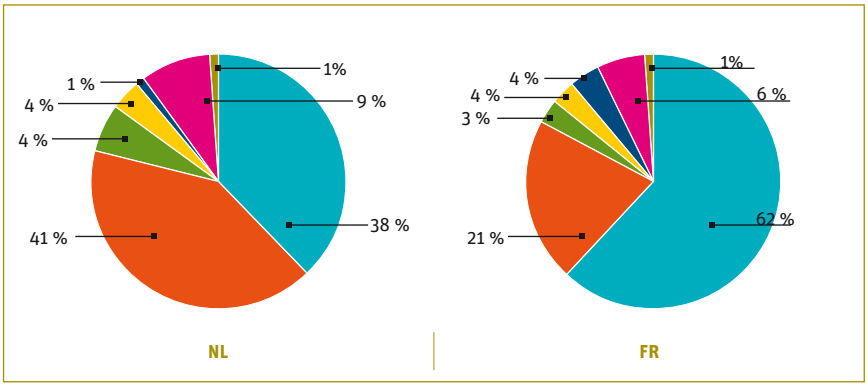
	Number
Guided tours	20 448
Workshops	14 764
Other	6 639
Total	**41 851**



PROFILE OF PARTICIPANTS IN GUIDED TOURS (%)

The profile of those participating in guided tours reveals a considerable difference between education in the French-speaking and Dutch-speaking communities: nursery and primary schools account for 2/3 of French-speaking groups, whereas on the Flemish side, secondary schools and higher education are definitely better represented.

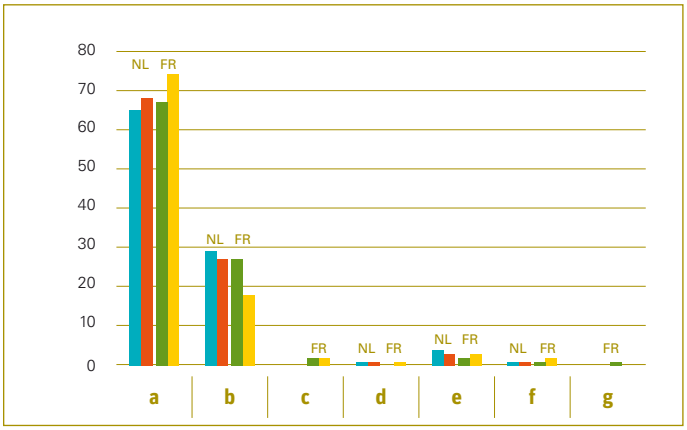
- Nursery & primary school
- Secondary school
- Higher education
- General education
- Youth groups
- Groups of adults
- Individuals and families



PROFILE OF PARTICIPANTS IN WORKSHOPS (%)

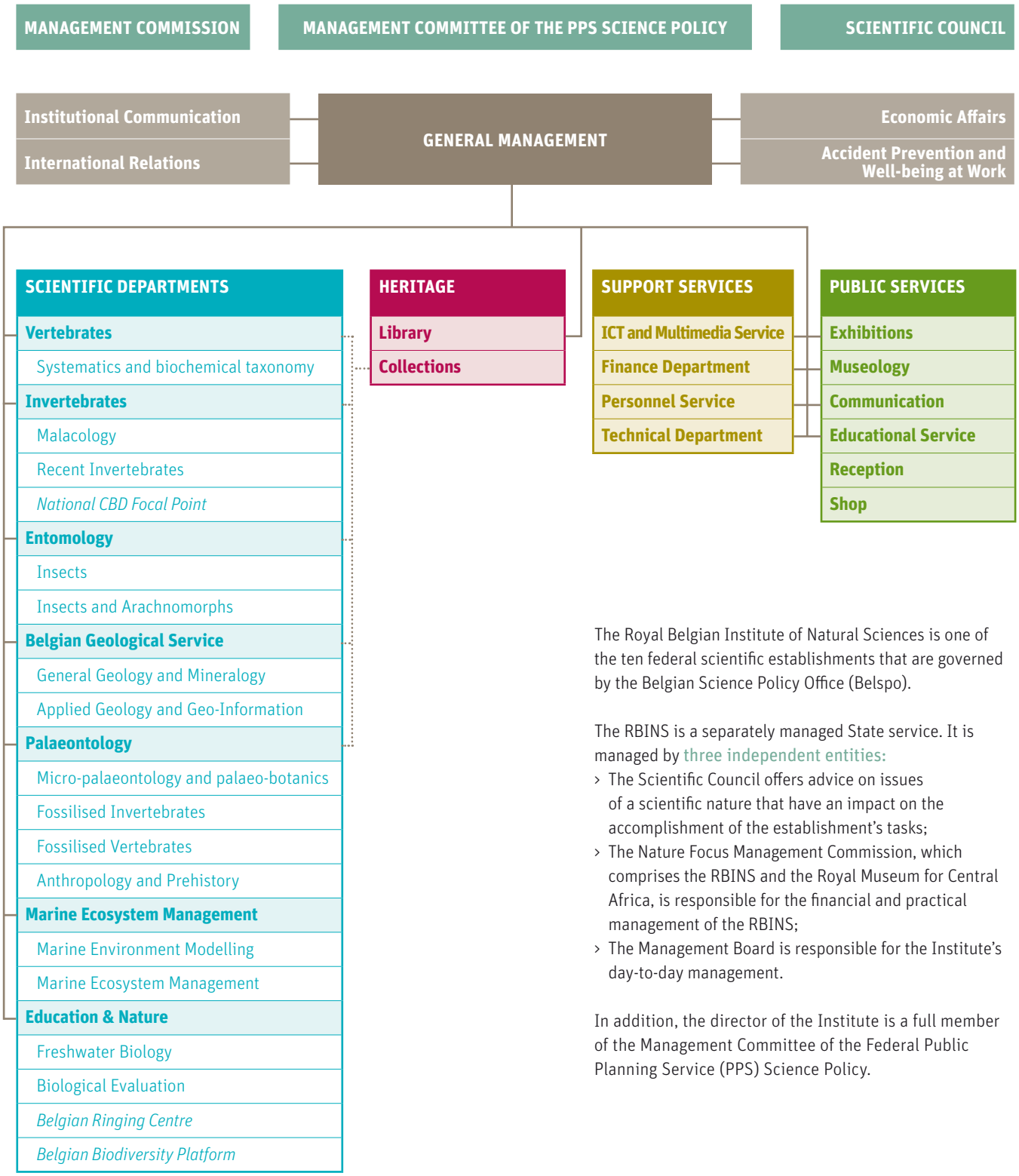
Despite a diversified provision, workshop participants increasingly come from nursery and primary schools, which are already in a clear majority (+ 7,0 % and + 3,0 % for French-speakers and Dutch-speakers respectively), whereas secondary schools are participating less in these (- 9,0 % and - 2,0 % respectively).

	2010		**2011**	
	NL	FR	NL	FR
a Nursery & primary school	65	67	68	74
b Secondary school	29	27	27	18
c Higher education	0	2	0	2
d General education	1	0	1	1
e Youth groups	4	2	3	3
f Groups of adults	1	1	1	2
g Individuals and families	0	1	0	0



THE RBINS IN BRIEF

Organisation



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

The RBINS is a separately managed State service. It is managed by three independent entities:

- The Scientific Council offers advice on issues of a scientific nature that have an impact on the accomplishment of the establishment's tasks;
- 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 Institute's day-to-day management.

In addition, the director of the Institute is a full member of the Management Committee of the Federal Public Planning Service (PPS) Science Policy.

Missions

It has been entrusted with four major missions:
› Scientific research into natural sciences;
› Scientific expertise at the service of the public authorities;
› Conservation and management of scientific and heritage collections;
› Dissemination of scientific knowledge in society.

Research & expertise

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

Lines of Research

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

Service Provision

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

Collections

With its 37 million specimens conserved as Belgian heritage of universal significance, the RBINS's collections serve above all as reference and research tools.
Just behind London and Paris in the European classification, the collections in Brussels have been awarded the European label of 'major research infrastructure' and in this respect are constantly being visited and studied by researchers from around the world.
For several years now, the RBINS has been committed to an ambitious programme to digitise its collections and to do so has developed an open-source software, DaRWIN, which has made it possible to encode all the data on any collection of specimens, whatever their taxonomical group.

Museum

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

museum

Royal Belgian Institute of Natural Sciences
www.naturalsciences.be
M.E.: Camille Pisani - 29 Rue Vautierstraat - B.1000 Brussels

.be

belspo

cover
© RBINS
Quartz with needles of rutile

p. 3
© RBINS
The tufted duck
(*Aythya fuligua*)

p. 4
Picture © MNHN, Lemzaouda
Reconstitution © MNHN, Fernandez
Pucadelphys andinus

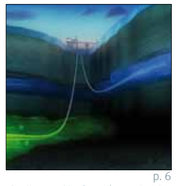
p. 4
© RBINS
Fieldwork (Cyprus)

p. 4
© Kris Pannecoucke
Photographic exhibition Congo
River Expedition

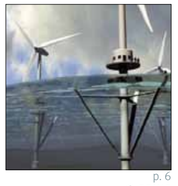
p. 5
© RBINS
Fieldwork (Wallonia)

p. 5
© RBINS
Fieldwork (Corbières)

p. 5
© Henri ROBERT
(RBINS-AWI ANTXXVII-3 2011)
On board of the Polarstern



p. 6
© Alligator film/BUG/StatoilHydro
Capturing and storing of green-
house gases



p. 6
© RBINS
Capture of energy from the sea

p. 6
© Hans Hillewaert, Wikimedia
commons, CC-BY-SA-3.0
The mauve stinger
(*Pelagia noctiluca*)

p. 7
© RBINS, H.Robert, 2008
An amphipod
(*Epimeria rubrieques*)

p. 7
© David Monticelli 2011,
pbase.com/david_monticelli
The fin whale
(*Balaenoptera physalus*)

p. 7
© Jean Vaden
Museum Night Fever

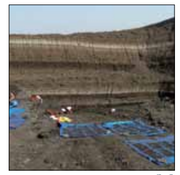
p. 8
© Ana I. Dogliotti, IAFE
The banks of the river Plate
(Argentina)

p. 8
© Henri ROBERT
(RBINS-AWI ANTXXVII-3 2011)
Sampling on the Polarstern

p. 8
© Philippe Helsen
Biology Masters Day

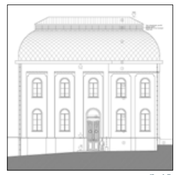
p. 9
© Piet Spaans, Wikimedia
commons, CC-BY-SA 2.5
The great crested newt
(*Triturus cristatus*)

p. 9
© RBINS
Larvae of symphyta



p. 9
© RBINS
Fieldwork (Gujarat)

p. 10
© RBINS
Mute swans
(*Cygnus olor*)



p. 10
© RBINS
Start of study for the
renovation of the Convent Wing

p. 10
© RBINS
Egg hunt

p. 11
© RMCA, Hilde Keunen
Biodiversity Monitoring Centre

p. 11
© RBINS
Beehives

p. 11
© RBINS
Collections

p. 12
© RBINS
DEST-training

p. 12
© RBINS
Stand of Jedonnevieàmaplanète/
Ikgeeflevenaanmijnplaneet

p. 13
© RBINS
Collections

p. 14
© Aline, Wikimedia Commons,
CC-BY-SA 3.0
The high fens

p. 14
© Nikolay Zverkov 2012,
zverkovnik@rambler.ru
Reconstruction of
an ichyosaurus

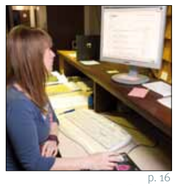
p. 14
© RBINS
Fieldwork (Vitrolles)

p. 15
© Tim Faasen - Ecologica
A ground beetle
(*Pogonus chalceus*)

p. 15
© RBINS
New freezers for storing
samples

p. 15
© RBINS
Collections

p. 16
© RBINS
Digital ant



p. 16
© RBINS
UniCat.be

p. 16
© RBINS
Stranded porpoise
(*Phocoena phocoena*)

p. 17
© RBINS
Senses!
Observing

p. 18
© RBINS
Senses!
Smelling

p. 18
© RBINS, Koen Broos
Fatal Attraction

p. 18
© Ludo Goossens
Winner ARGUS of the category
Biodiversity

p. 19
© RBINS
Sensashow

p. 19
© RBINS
Where is Max?

p. 19
© RBINS
Senses!
Touching

p. 20
© RBINS
BiodiverCITY 4 Kids

p. 20
© RBINS
Composting facility

p. 21
© Jean Vaden
Museum Night Fever

p. 21
© Paul Allain
Binomial

p. 21
© Whitevision
Award of Prix Caïus-prijs
grande entreprise/Grote
Ondernemingen

p. 22
© Willy Kubben
Grazing of Koniks in
Kerkeweerd - De Wissen

p. 22
© Jan Caudron-Anaklasis
Conference Biodiversity and
public health

p. 23
© RBINS
An abacus - Figures