Annual Report **2009**

Royal Belgian
Institute of Natural
Sciences

museum

museum

The financial crisis in autumn 2008 could have left us fearing the worst. However 2009 passed relatively calmly, enabling the establishment to preserve its essential operational capacities.

Although the grant was not indexed, it was nevertheless maintained. A personnel plan was prepared and validated – its implementation is awaited with impatience after the absence of recruitment possibilities in 2008. Visitor numbers to the museum fell only slightly, as envisaged after the exceptional year we had in 2008. The most visible impact of the crisis was the effect on revenue from the rental of spaces, which fell by 52%.

The Institute has therefore been able to carry out its programme for Darwin Year, on the 200th anniversary of the birth of this great scholar and the 150th anniversary of the publication of his seminal work, *On the Origin of Species*. His theory of evolution has provided the irrefutable framework to this day of a scientific explanation of biological diversity and of the history of life. Biology, palaeontology and ecology constantly refer to it. The Institute's research activity has demonstrated it permanently, and the following report provides numerous examples. Darwin Year also inspired events aimed at a wide-ranging audience. The opening of the *Gallery of Evolution* completes the renovation of the wing of the museum devoted to the history of life. Another very important component is the support provided to teachers from all countries, through the handbooks, training sessions and conferences, to integrate evolution more clearly into natural science classes. All of these tools will of course remain available and useable for many years to come.

Contemporary biodiversity is the result of evolution: the temporary exhibition *Whales and Dolphins* has provided an eloquent example. But it is pure coincidence that Darwin Year is being followed in 2010 by the International Biodiversity Year. To celebrate this field in which it has been active for 165 years, the whole Institute has been mobilised. Research, expertise, collections and knowledge diffusion went hand-in-hand to prepare a programme of actions aimed at the general public, researchers and decision makers alike.

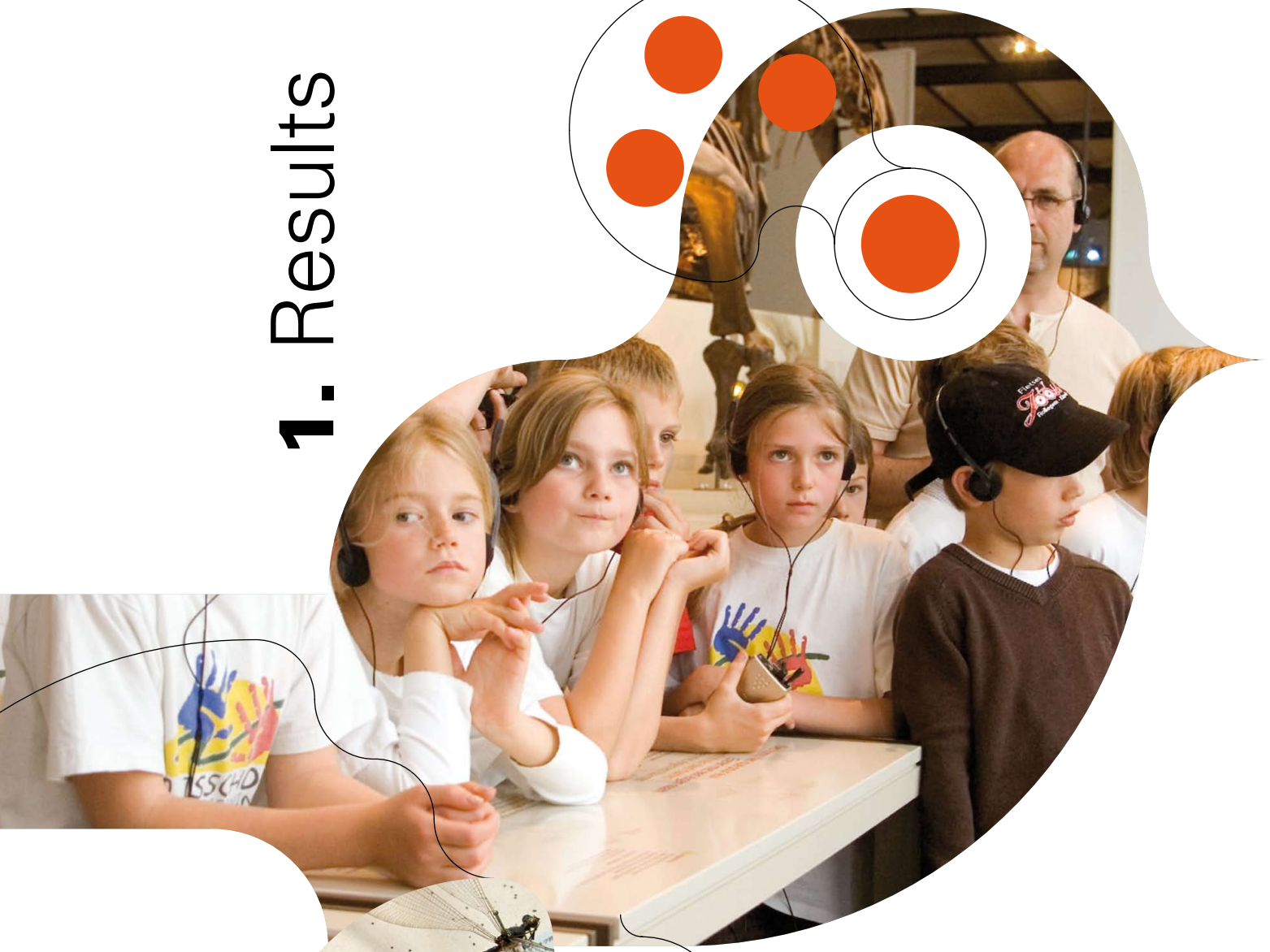
The official launch of this programme took place on 17th November. Will it be able to change people's mentalities? We shall report back to you in a year's time. For now, I wish you a pleasant reading of this 2009 activity report.

CAMILLE PISANI
MANAGING DIRECTOR

Royal Belgian Institute of Natural Sciences

Annual Report **2009**

1. Results



Finance

The positive trends observed in 2008 were confirmed in 2009. The museum and research activities generated one and a half times more revenue than the grant allocated to the Institute by the federal authorities.
Total revenue exceeded €19 M. Taking into account the outstanding items at the end of the year, the balance sheet resulted in a profit of €252 K.

Stable Revenue

In spite of the reduction in the number of visitors compared with 2008, 2009 remained a good year in terms of attendance, with nearly 320,000 visitors. The success of temporary exhibitions (110,000 visitors) made it possible to maintain ticket-related income at the same level as for the previous year.

All of the activities connected with the museum accounted for 35% of the Institute's self-generated income.

Revenue related to scientific activities fell slightly, but not significantly (-1.5%). Research activities accounted for nearly 57% of the Institute's self-generated income.

The Federal Scientific Policy (Belspo) remains the Institute's principal source of research contracts. The federal authorities as a whole account for nearly 50% of the research programme funding.

Research on behalf of the federated entities and the European Commission has not decreased. Alongside the growth in revenue from the private sector and after the federal authorities, it constitutes a third and increasingly important pillar of research funding within the Institute.

A Slight Expenditure Increase

Between 2008 and 2009, the Institute's expenditure increased by 2.51%. Efforts to harness the proportion of expenditure on personnel from the grant (-4% between 2008 and 2009) were cancelled out by the increase in operating costs. In this respect, the two most significant factors were: the increase in costs related to the oceanographic ship Belgica (+6%, from €1,926 K to €2,046 K); and the 40% increase in building maintenance contracts (from €167 K to €234 K), following the extension of the spaces made available to the public.

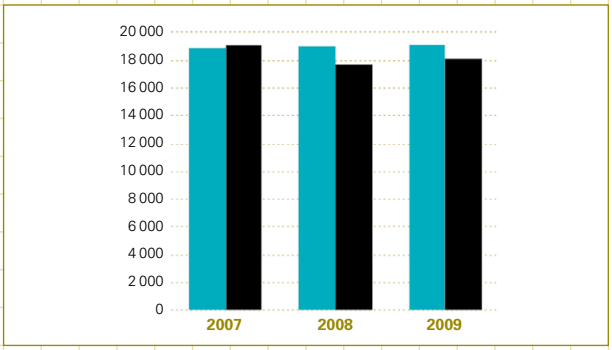
Conclusion

It is becoming increasingly clear that the Institute's development potential is related to its capacity to generate income. Resources from the grant are totally used to cover incompressible salary charges and operational costs: Some 99.58% of the expenditure budget paid from the grant has been used up! The diversity of its revenue is one of the Institute's specific features and strengths. Maintaining them at their current level whilst controlling structural costs will be one of the challenges for the coming year.

EVOLUTION OF EXPENDITURE AND REVENUE (IN K€)

Revenue and expenditure were balanced, owing to very strict control of expenditure combined with constant efforts to find new sources of self-generated revenue, in spite of a more difficult economic context.

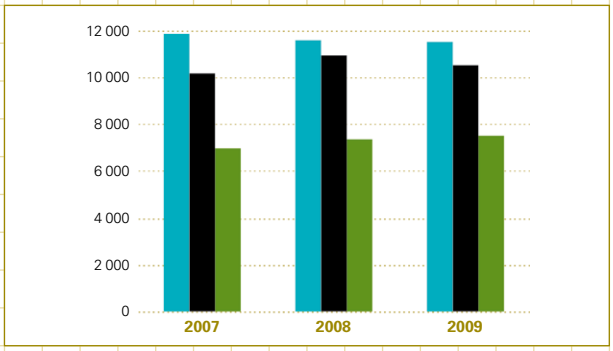
	2007	2008	2009
Revenue	18 885	19 008	19 092
Expenditure	19 076	17 686	18 098



SOURCES OF REVENUE (IN K€)

Self-generated income accounted for nearly 40% of total revenue and is 1½ times greater than the operational grant.

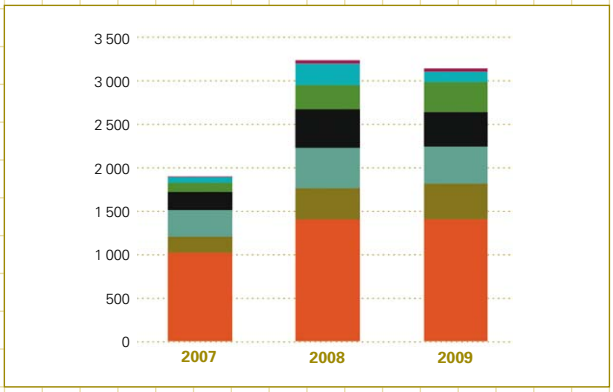
	2007	2008	2009
Self-generated income	11 891	11 614	11 548
Statutory personnel grant	10 209	10 974	10 553
Operational grant	6 994	7 385	7 544



BREAKDOWN OF MUSEUM REVENUE (IN K€)

In terms of Museum revenue, even though ticket-related income remains by far the principal source of revenue, the move towards diversification which began at the end of 2007 is continuing, thereby contributing to the financial stability of this activity.

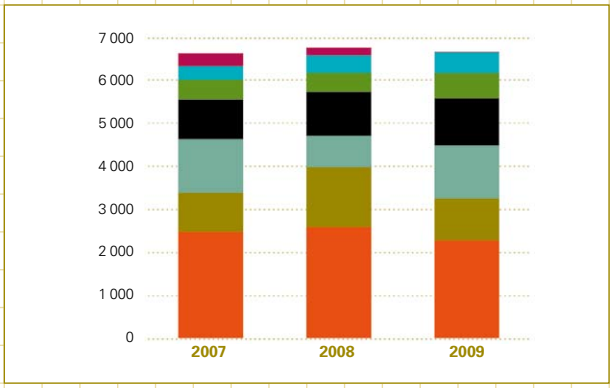
	2007	2008	2009
Ticketing	1 021	1 407	1 408
Exhibition rentals and sales	186	355	409
Shop	307	465	426
Donations - sponsoring - subsidies	205	443	394
Educational services	106	279	346
Events	65	245	118
Cafeteria concession	9	40	39
Total	**1 899**	**3 234**	**3 140**



EVOLUTION OF RESEARCH REVENUE BY SOURCE OF FUNDING (IN K€)

Whilst revenue from the federal government stabilised at around 49%, the RBINS is working increasingly on national and – above all – international projects.

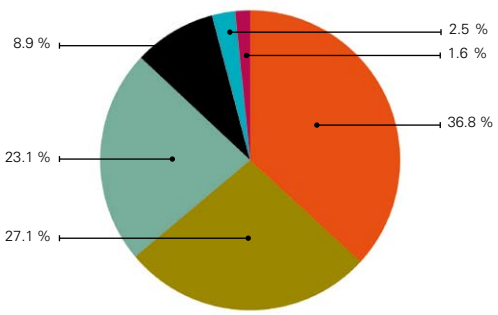
	2007	2008	2009
Federal Scientific Policy	2 484	2 596	2 286
Other federal departments	909	1 388	974
European Commission	1 244	732	1 230
Belgian federal entities	923	1 025	1 102
Private sector	457	443	587
International programmes	320	400	479
Belgian universities	303	183	18
Total	**6 640**	**6 767**	**6 676**



BREAKDOWN OF EXPENDITURE (IN K€)

On the expenditure side, whilst personnel costs are quite logically the largest constituent of this item, heavy equipment such as the plane and the ship accounted for nearly 25% of the remaining costs.

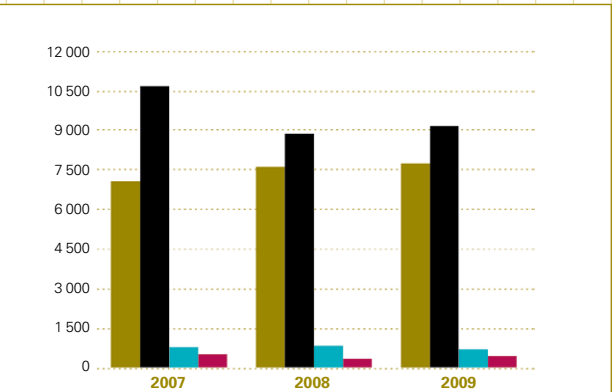
	2009
Statutory personnel (grant for personnel)	10 553
Contracted personnel (grant and self-generated income)	7 751
General operation	6 618
Operation of flying and sailing equipment	2 556
Equipment	708
Library and acquisition of collections	465



EVOLUTION OF EXPENDITURE (EXCL. STATUTORY PERSONNEL)

Expenditure as a whole remained stable (+2.3% between 2008 and 2009), having made a particular effort to control the wage bill.

	2007	2008	2009
Contracted personnel (grant and self-generated income)	7 069	7 621	7 751
Operations	10 675	8 870	9 174
Equipment	802	841	708
Library and acquisition of collections	530	354	465
Total	**19 076**	**17 686**	**18 098**



Personnel

We are witnessing a continuing fall in the number of statutory scientific employees and of statutory employees in general.

This situation is a source of concern. Reconstituting – or at least simply maintaining – the Institute's scientific potential and notably it's supervision will be a challenge that imperatively has to be addressed, if we are to avoid running a serious risk of etiolation.

Analysis of sources of funding for contractual personnel reveals an increase in the proportion of expenditure funded by self-generated income.

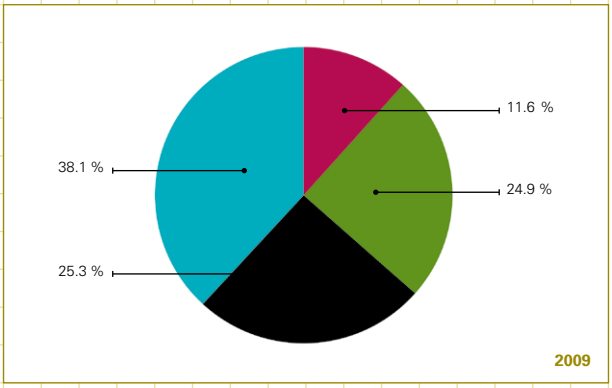
A positive signal has been identified in the relative increase in the number of women among the statutory personnel, principally non-scientific. However, the proportion of women among the statutory scientific personnel remains well below what we would expect.

Judging from the age pyramid for all personnel, the detailed information confirms the above diagnosis: there is a serious problem in the renewal of top-level staff among our statutory personnel, especially among the scientific staff. Analysis of the age pyramid of our female statutory scientific colleagues highlights the scale of this deficit even further.

A major recruitment campaign of statutory personnel, particularly among scientists, is therefore an absolute priority for the Institute.

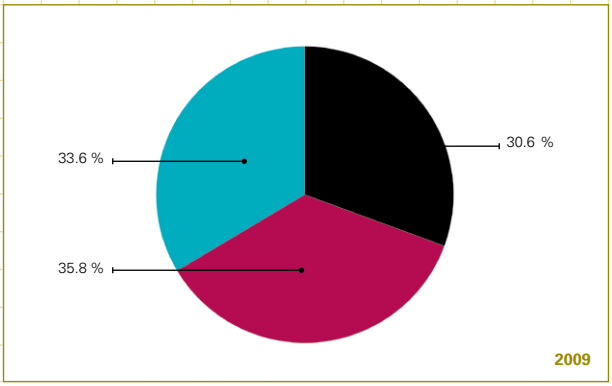
BREAKDOWN OF PERSONNEL

	2007	2008	2009
Statutory scientists	54	51	50
Contracted scientists	110	109	107
Non-scientific statutory personnel	112	111	109
Non-scientific contracted personnel	163	156	164
Total	**439**	**427**	**430**



SOURCES OF FUNDING FOR CONTRACTED PERSONNEL

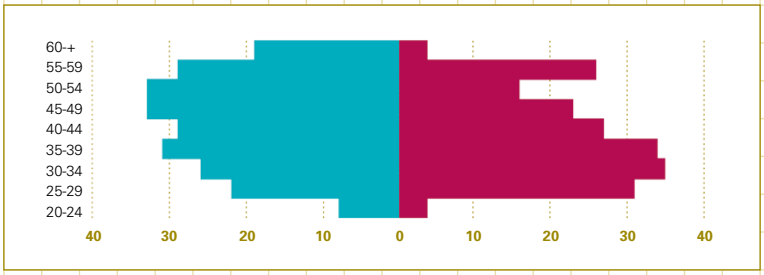
	2007	2008	2009
Grant	90	83	83
Own resources	86	92	97
External projects	96	90	91
Total	**272**	**265**	**271**



PERCENTAGE OF WOMEN AMONG PERSONNEL

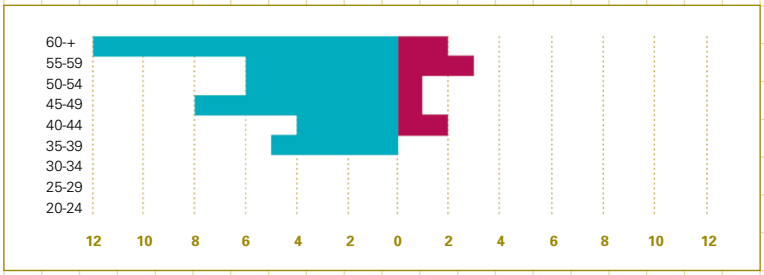
	2007	2008	2009
Statutory scientists	11,50 %	12,70 %	15,80 %
Non-scientific statutory personnel	30 %	28 %	40,30 %
Contracted scientists	53,60 %	58,70 %	55,10 %
Non-scientific contracted personnel	55,80 %	57,10 %	56,10 %

AGE PYRAMID FOR ALL PERSONNEL



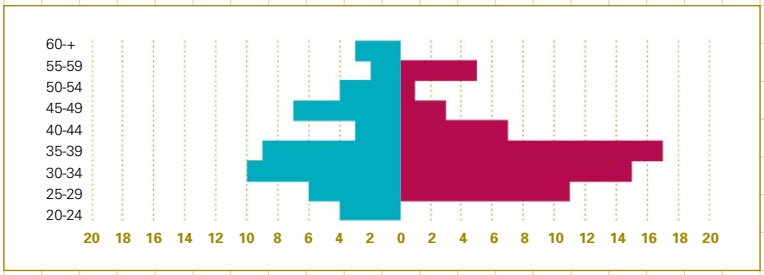
Age (average 48.43 years)	Men	Women
60-+	19	4
55-59	29	26
50-54	33	16
45-49	33	23
40-44	29	27
35-39	31	34
30-34	26	35
25-29	22	31
20-24	8	4

AGE PYRAMID OF STATUTORY SCIENTIFIC PERSONNEL



Age (average 52.24 years)	Men	Women
60-+	12	2
55-59	6	3
50-54	6	1
45-49	8	1
40-44	4	2
35-39	5	0
30-34	0	0
25-29	0	0
20-24	0	0

AGE PYRAMID OF CONTRACTUAL SCIENTIFIC PERSONNEL



Age (average 37.71 years)	Men	Women
60-+	3	0
55-59	2	5
50-54	4	1
45-49	7	3
40-44	3	7
35-39	9	17
30-34	10	15
25-29	6	11
20-24	4	0

2. Research

The following examples are only a part of the research work and expertise conducted by the RBINS.

MARINE ECOSYSTEM MANAGEMENT

A Whale in the Port of Antwerp

On 22nd September 2009, less than three weeks before the opening of the "Whales & Dolphins" temporary exhibition, researchers from the Institute were alerted by an unusual text message: a dead whale is drifting in the Port of Antwerp! Aware that it meant the start of a very long day for these researchers responsible for coordinating and monitoring marine mammals, they set off early, loaded up with all their autopsy equipment.

When they arrived, the animal in question was discovered to be a female common finback whale, whose exact length (19.9 metres) made it the largest animal to have beached on the Belgian coast since the 1970s.

It was soon established that the whale had been hit by the Colombian fruit cargo ship *Summer Flower* in the Atlantic and had remained caught on the ship's bows for several days before beaching in the port. This type of accident is unfortunately all too frequent and the threat to the whale population it represents is taken very seriously by the International Whaling Commission, in which Belgium is presiding over the working group that deals with such issues.

With the local and Flemish regional port authorities, the researchers agreed to tow the dead whale to the beach at St-Anneke, 20km further up the estuary, to conduct the autopsy. In spite of the intervention of firemen from the Port of Antwerp and the Civil Defence, the operation was not simple, as the whale weighed over 40 tonnes. After the autopsy, there was then the question of what to do with the skeleton: As the RBINS already had an exceptional collection of cetacean skeletons, it was decided that only the lower jaw (i.e. two mandibles, each 4.85 m long) would be conserved by the Faculty of Veterinary Medicine at the University of Ghent, to form the jewel of its museum in Merelbeke.

ANTHROPOLOGY - PREHISTORY

The Neanderthal Enigma

In Europe, between 40.000 and 30.000 years B.C., Neanderthal humans who inhabited Eurasia for several hundred thousand years were replaced by anatomically modern humans (our species), who originated in Africa. The disappearance of these last Neanderthals has remained a mystery: did they die out by themselves, were they killed or were they assimilated by modern humans?
The question is even more difficult to answer in that there are very few human fossils from this period and no site has been found that clearly proves the simultaneous existence of both populations. One of the problems is that the material with which researcher work comes from old archaeological sites that were not always excavated in a rigorous manner. As it is not possible to sift through the sites again, palaeoanthropologists from the RBINS have attempted to directly radiocarbon (re)date two Neanderthal skeletons found in Spy in 1886, of which Belgium can be proud.
They have now shown that the Neanderthals survived in Belgium until at least 36.000 years B.C. and were probably associated with a quite specific transition culture: Lincombian–Ranisian–Jerzmanowician, represented in numerous sites in North-West Europe dating back to this time, of which Spy offers one of the finest examples. But no one can state conclusively whether this technical culture is specific to modern humans (*Homo sapiens sapiens*) or Neanderthals. The only thing the new datings show is that in this region, technological evolution and the disappearance of the last Neanderthals can probably not simply be put down to acculturation by anatomically modern man and as such, the causes of their disappearance still remain unknown.

09 - 13.02

International conference *Tribute to Charles Darwin and Bernissart Iguanodons*, organised by the Palaeontology Department

12.02

Official inauguration of the Gallery of the Evolution, on the 200th anniversary of the birth of Charles Darwin

RECENT INVERTEBRATES

Habit Doesn't Make the Species

The study of biodiversity requires not only the identification and description of organisms, but also the unravelling of their evolutional history, in order to better understand their relations in the living world.

As the point of departure of descriptive taxonomy, the physical appearance of a living being is sometimes deceptive: resemblances and differences do not always correspond to a fundamental resemblance – or difference – with other species in the same group.

Thus, until now researchers thought that with their quite characteristic external appearance, the family of marine worms called *Desmoscolecida* had a special, unique place in the major phylum (group) of round worms, Nematodes. They have not managed to situate them in the phylogeny of other families of Nematodes, with which they saw no apparent resemblance. By sequencing a small sub-unit of DNA of the ribosome (18S DNAr), researchers from the RBINS working with other researchers from South Korea have managed, for the first time, to establish all the evolutional relationships of *Desmoscolecida* and thereby precisely situate them in the phylum of Nematodes.

Unlikely Marriage of a Viviparous and an Oviparous Animal

Winkles have been intensively studied as a crucial organism in the ecology of intertidal zones and are also widely used as bio-indicators of marine pollution. Clearly, this requires these organisms to be identified quickly and precisely. Yet among small marine invertebrates, identifying the different species is often very difficult, as they are morphologically very similar. This is the case with *Littorina saxatilis* and *Littorina arcana*, two species of winkles found frequently in intertidal zones along Western European coastlines. The shells of these two species show an incredible variety of forms and colours and the identification of the two types can not be based on the morphology of the shells. Neither is it possible to distinguish males from females through their reproductive systems, nor the young, which are sexually immature animals. Only the anatomy of the females can be easily identified, as *L. saxatilis* is viviparous and has a pouch containing young, whereas *L. arcana* is oviparous and does not have an "embryonic sack", but instead a gelatinous gland, which secretes the developing egg.

Working with researchers from the Academy of Science in Russia, biologists from the RBINS have been looking for a possible DNA marker to differentiate *L. saxatilis* from *L. arcana*. Initially, the researchers examined whether the mitochondrial DNA could potentially offer a solution, as is the case in many other animal groups. To their great surprise, this was not the case. They then used a different technique making it possible to study the animal's nuclear DNA and they managed to define "markers" which enabled them to unequivocally distinguish between the two species, independently from gender or stage of development.

The use of such markers on these populations in the White Sea and the Baring Sea to the North of Norway has already generated a surprising result: in these regions and under natural conditions, the two species spontaneously interbreed! This phenomenon is truly "extraordinary" when we consider that these animals have such different biological reproduction methods.

15.02

Official inauguration of the *Princess Elisabeth* polar station and establishment of the first direct telephone contact from the RBINS

28.02

First *Biology Masters Day*, organised by the Royal Belgian Zoological Society. It attracted 160 students to the RBINS, one third of the targeted audience.

19.03

The Brussels Tourist Office presented the Museum with the *Best Brussels Special Venue Award*

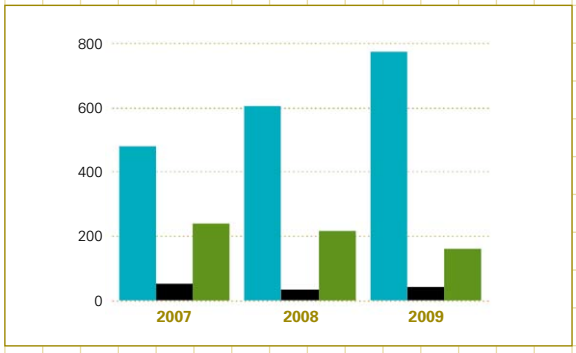
With nearly one thousand publications, a quarter of which appear in scientific journals with a high impact factor (IF), the RBINS makes a significant contribution to the dissemination of knowledge about natural sciences. It should be highlighted that in spite of a decline in 2009, there have been a large number of reports published (17%) notably reflecting the Institute's active role as an expert for the Belgian federal and regional public authorities, as well as for European bodies.

PUBLICATIONS BY TYPE AND DEPARTMENT

	Scientific Publi.		Popularisation work	Expert reports	Total
		incl. with IF			
Vertebrates	44	9	7	0	51
Invertebrates	117	47	4	17	138
Entomology	93	24	0	4	97
Education & Nature	84	26	5	14	103
Palaeontology	232	60	14	53	299
Marine ecosystems	59	22	1	61	121
Geologyw	143	1	13	13	169
Total	**772**	24 %	**44**	**162**	**978**

EVOLUTION OF PUBLICATIONS BY TYPE

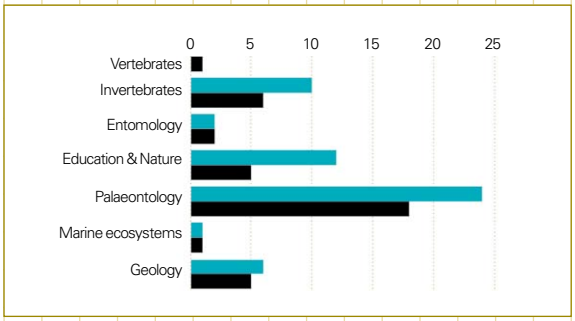
	Scientific Publications	Popularisation work	Expert reports	Total
2007	481	54	241	**776**
2008	606	36	218	**860**
2009	772	44	162	**978**



Although it does not have a teaching or training mandate as such, the RBINS plays a notable role in natural science training in Belgium. It offers places to students from all the universities in the country and thereby gives them preferential access to scientific collections.

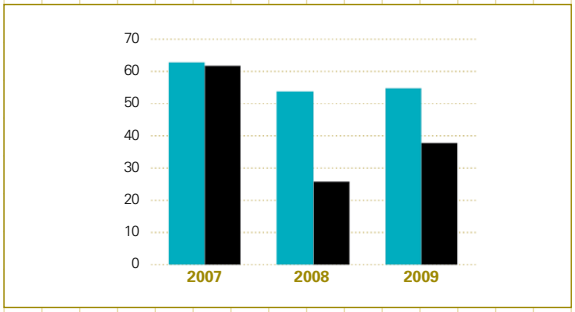
STUDENT SUPERVISION

	PhD	Master
Vertebrates	0	1
Invertebrates	10	6
Entomology	2	2
Education & Nature	12	5
Palaeontology	24	18
Marine ecosystems	1	1
Geology	6	5
Total	**55**	**38**



EVOLUTION OF SUPERVISION

	PhD	Master
2007	63	62
2008	54	26
2009	55	38



ENTOMOLOGY

The Dynamics of the Galapagos Islands in Detail

Lost in the middle of the ocean, the volcanic formations of the Galapagos archipelago provide a natural laboratory to study evolution. This archipelago is made up of 16 islands and some forty rock formations, which appeared between 4 and 0.5 million years ago near to the equator, 1.000 km from the South American continent, and is famous above all for its giant tortoises, iguanas and majestic cacti. But the RBINS has acquired a worldwide reputation for its expertise in the ecology of these islands through its study of insects and spiders.

Since 1982, researchers from the Entomology Department have studied the invertebrate fauna of these islands, initially focusing on spiders and coleopterans. Their principal objective was to identify the number and nature of species present on the various islands. More than half of the species are endemic to this island formation and often limited to just one island, which is an indicator of how fragile these ecosystems are. Ants, which have been studied more recently, present a different picture: 70% of some 50 species of ants are not indigenous and have been introduced recently by man. A major part of their study is aiming to explore the impact of these introduced species, which are sometimes very invasive.

Accumulated knowledge on invertebrate fauna, enhanced in 2009 by a series of field trips combined with laboratory DNA analyses, have made it possible to reconstruct the history of the evolution of these species and to identify the key factors involved in evolutionary mechanisms without which we would not be able to sustainably protect this sanctuary of biodiversity.

BELGIAN GEOLOGICAL SERVICE

Rising Sea Levels Do Not Mean the Total Submersion of Land

In the context of climate change, experts and medias are predicting disasters in relation to the rising sea level. But these models and scenarios do not include sedimentological data that describe natural sea level variations. Thus the North Sea coastal plain has been formed since the Holocene (10,000 years ago) by the gradual replacement of peat bogs (freshwater) by marine sediments. Researchers from the Belgian Geological Service have begun radiocarbon dating fossilised shells found in the most recent sediments. Combined with previous data, this work has made it possible to reconstruct the evolutionary mechanisms and processes of the coastal region over the past 3 000 years. It appears from this that the sea level has not fluctuated (oscillation between highs and lows) over the past 2,500 years, but has been characterised by a slow, regular rise of approximately 1 to 1.5 mm/year.

In developing countries, there are hardly any sea walls and the low-lying coastal area has always been in its natural state. This means therefore that these regions are going to evolve naturally, that is to say that the accumulation of marine sediment will be able to follow the rate of increase in the sea levels, as it has been the case over the past 6,000 years, as long as a sufficient amount of sediments is provided. Geological research has determined that even with an increase in sea level of approximately 2 to 4 m every 1,000 years, a large area of the coastline will continue to develop and there will not be a total submersion of land. This is the case for example in Bangladesh, Vietnam and Java, countries whose coastlines are notably characterised by mangrove vegetation, which forms an excellent trap for sediment.

06.04

Welcoming of the 600,000th visitor since the Museum was reopened

12.05

The Marine Ecosystem Management Department presented a new map of the positions of North Sea wind turbines

11.06

The Belgian Women in Science (BeWise) association organised a workshop on the subject *Women & Evolution*

H1N1: Wild Ducks under Close Watch

BELGIAN RINGING CENTRE

Public opinion worldwide was shocked when scientists announced the outbreak of a new type of flu virus, H1N1. Hardly ever fatal but easily transmissible, this virus surprised researchers owing to its ability to spread across species: ducks, pigs and then humans. These so-called "influenza" viruses are normally specific to the groups of animals in which they develop, and thus infection which takes place among wild animals generally leaves humans unaffected. Whilst the Belgian veterinary authorities were stepping up epidemiological surveillance in chicken, turkey and goose farms, the Belgian Bird Ringing Centre at the RBINS was mandated by the Federal Agency for the Safety of the Food Chain (FASFC) to monitor wild birds that could potentially transmit influenza viruses. Indeed, wild birds move about freely and the immense majority of them are protected. It is therefore essential to develop specific epidemiological monitoring programmes that are compatible with their protected status, whilst at the same time collecting the necessary data to develop public health policies. With its ringing specialists who have a long experience in gently capturing birds, combined with effective, tested sampling methodologies, the RBINS is capable of offering timely, additional information that is essential for monitoring and assessing such epidemics.

Apart from the collection of virological and serological samples, the RBINS is helping the health authorities to monitor the movements of wild birds (migrations) through the ringing programme that has been conducted since 1927. The data file collected so far has over 500,000 records. All of this information therefore makes it possible in this case to assess the dispersion capacities of these notorious viruses.

Biodiversity Platform

EDUCATION & NATURE

2009 was one of the most productive years for the Belgian Biodiversity Platform, with the organisation of numerous events and new projects both nationally and internationally:

- 11th May: national scientific conference on invasive species, in connection with the theme of the International Biodiversity Day on 22nd May;
- 9-12th October: organisation of an international symposium in cooperation with the EDIT Network of Excellence, during the second DIVERSITAS scientific conference in Cape Town, South Africa;
- 7th December: training session on communication for researchers

As the secretariat of the European Platform for Biodiversity Research Strategy (EPBRS), the Belgian Biodiversity Platform has also organised a participative symposium focusing on: *A knowledge network on Biodiversity*, in order to contribute to discussions for a potential Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).

Furthermore, the development of a note concerning ecosystem services has made it possible to initiate calls for projects in the context of the Belgian Federal Scientific Policy: *Science for Sustainable Development* and the European BiodivERsA ERA-Net.

Finally, the Platform has successfully contributed to such projects as SCAR-MarBIN which generated financial mobilisation from a number of international partners, and BioFresh, which was selected for European funding in 2009 (http://www.freshwaterbiodiversity.eu).

All of the activities conducted in 2009 highlight the Belgian Biodiversity Platform's credibility and commitment both nationally and internationally, and its crucial support role to the Belgian scientific community, in terms of international representation and as an interface between science and governance.

11.06

Science facing aliens, theme of the symposium organised by the Biodiversity Platform

12.06

Acquisition of the Debrun collection, which contains several thousand fossils, including vertebrates, invertebrates and plants from the major Belgian and European sites

SYSTEMATICS
AND BIOCHEMICAL
TAXONOMY

Belgium and the Congo Meet to Preserve Biodiversity

With 2 million km² of forested area, the Democratic Republic of Congo (DRC) contains nearly half of the tropical forests on the African continent. The River Congo alone accounts for 25% of Africa's renewable water. But the principal wealth of the Congo basin is its incredible biodiversity. For some years the Congolese government has made efforts to ensure that its tropical forests are exploited sustainably. However, owing to its limited financial resources, the DRC needs support from abroad to rebuild the human and technical capacities it requires to ensure that its tropical forests are not destroyed.

Although Congolese biodiversity, and more specifically its tropical swamp forests, have been studied for a long time, very little recent information is available and practically all of our present knowledge is based on data and collections of specimens dating back to the colonial era. As the competent Congolese scientific community who is able to conduct research into biodiversity has suffered greatly from the complete isolation into which it was plunged by the chaotic period of the war, the RBINS, the Royal Museum for Central Africa, the National Botanical Garden and the University of Kisangani have developed an ambitious project: *Congo-Belgique-2010*.

The project's main objectives are:

- to increase the capacity of the scientific community in the DRC by providing training to scientists and technicians;
- to create a Centre for the Study of Biodiversity at the University of Kisangani (collections, research, expertise and training);
- to organise a major expedition, in 2010, along the River Congo to collect biological specimens (land and fluvial) which will be kept at the Centre for the Study of Biodiversity and will serve as the basis for all subsequent projects to monitor biodiversity in the Congo Basin.

Work during 2009 focused on the organisation of a preparatory mission and the training of Congolese researchers in taxonomy, ecology and more widely in environmental sciences. With the support it received from the Belgian Federal Scientific and Development Cooperation Policy, the Congolese government and Unesco, the project has made it possible to acquire equipment, fund small research projects to be undertaken by the trainees, publish their results in reading committee reviews and organise a workshop on conservation strategies.

25.06

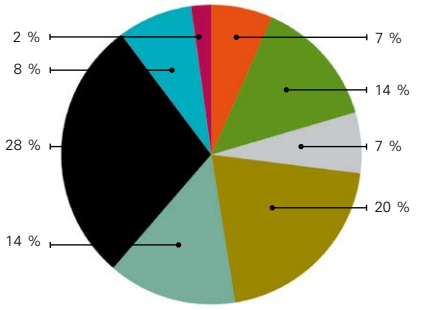
The bio-archaeological excavation campaign in Egyptian Predynastic tombs, known as *Les animaux des dieux* (Animals of the Gods), presented its results (Palaeontology Department)

EXTERNALLY-FUNDED PROJECTS BY DEPARTMENT

The Institute is managing or taking part in over 135 contracts which had already entered into force on 1st January 2009 or which began in 2009.

Just two departments – Marine Ecosystem Management and Education & Nature – account for almost half (49%) of these projects.

Vertebrates	9
Invertebrates	19
Entomology	9
Education & Nature	28
Geology	19
Marine ecosystems	39
Palaeontology	11
Other	3
Total	**137**



The total number of contracts in progress at the end of 2009 was slightly up compared with 2008 (+ 7%). Likewise, the number of contracts which entered into force during 2009 increased slightly compared with the previous year (+ 9%), which augurs well for the future. Furthermore, the financial sums generated by these contracts have remained stable.

PROJECTS IN PROGRESS BY SOURCE OF FUNDING

	2007	2008	2009	
	Number	Number	Number	Amount
Federal Scientific Policy	66	50	59	**2 323 493,11 €**
Federal excl. Scientific Policy	14	14	9	**1 841 016,50 €**
Loterie Nationale	1	2	3	**1 934,66 €**
Flemish Region + FWO	11	10	11	**419 584,78 €**
Walloon Region + FNRS	11	9	5	**492 891,32 €**
Universities	6	7	6	**18 300,00 €**
Brussels Capital Region	5	6	4	**318 709,18 €**
European Commission	14	9	18	**1 238 212,55 €**
International	16	16	18	**482 466,46 €**
Private	5	5	4	**586 802,21 €**
Total	**149**	**128**	**137**	**7 723 410,77 €**

PROJECTS IN PROGRESS BY SOURCE OF FUNDING

	2007	2008	2009	
	Number	Number	Number	Amount
Federal Scientific Policy	19	10	19	**1 318 250,00 €**
Federal excl. Scientific Policy	7	6	2	**86 265,80 €**
Loterie Nationale	0	2	1	**198 497,50 €**
Flemish Region + FWO	1	3	1	**18 826,60 €**
Walloon Region + FNRS	4	2	0	**- €**
Brussels Capital Region	2	2	2	**10 000,00 €**
Universities	5	3	2	**319 284,26 €**
European Commission	4	1	9	**1 977 623,42 €**
International	3	6	6	**200 475,00 €**
Private	2	3	2	**164 071,82 €**
Total	**47**	**38**	**44**	**4 293 294,40 €**

BIOLOGICAL EVALUATION

The Impact of Biofuels on Biodiversity in Belgium

At the request of the Federal Public Health Programming Service, the RBINS has launched research to assess the impact of the development of biofuel crops on biodiversity in Belgium. Considering the areas necessary for the production of raw materials, researchers have quantified the effects on several animal populations of an extension of the land used for agricultural purposes, which could result from the incentives to produce non-food raw materials.

Common countryside birds, whose population have fallen by nearly 50% over the past twenty-five years in Europe, have proven to be the best bio-indicators. If in open, natural habitats, one hectare produces 1 tonne of various grain each year and feeds 30 to 40kg of birds, in agricultural areas the same area produces 10 tonnes of cereals but feeds only 1 kg of birds.

By focusing on the evaluation of the impact of agro-fuels produced in Belgium, the RBINS is seeking to find out whether by further increasing the hold of agriculture on ecosystems, these new crops are going to aggravate – or not – this serious trend which is emptying our countryside of its birds, which play an essential part in the equilibrium of the food chain.

FRESHWATER BIOLOGY

The Freshwater Paradox

On our blue planet, fresh water accounts for only 0.01% of total water and covers less than 1% of the Earth's surface. However, paradoxically it contains 12% of all known species, i.e. 126,000 different species of animals.

Lakes are precious ecosystems that offer a high value of regional biodiversity. Unfortunately, their biological quality is deteriorating throughout Europe at an alarming rate. In order to protect them and increase their biodiversity, the RBINS, in partnership with some ten institutions, is coordinating the PONDSCAPE project, which is studying the dynamics of pond ecosystems and the effects of current management practices on their long-term existence.

Interdisciplinary research into bacteria, phytoplancton, zooplancton, invertebrates, amphibians and macrophytes has shown that local factors such as fish, macrophytes, the quality of sediments and turbidity have the most significant consequences on biodiversity in pools. These results provide clear information for the management of highly fragmented landscapes, such as agricultural areas. They notably recommend that groups of several pools near to one another should be considered as coherent management units. They also recommend the creation of groups of different types of ponds and pools (small-large, deep-shallow) in humid areas. In a complex of pools, certain expanses of water should only offer limited access to cattle, owing to the negative effects of trampling the ground around the water's edge. This does not mean however that access to cattle should be totally prohibited, as studies on the distribution of parasites indicate that natural pools where cattle also drink are healthier than had been thought until now.

More widely, research shows that pools could be used as models to improve conservation and the management of biodiversity as a whole, as they are still abundantly present in the landscape, their biodiversity can reach very high levels and recommended management practices could quickly reveal their positive effects.

03.07

Lubumbashi Zoo (DRC) inaugurated a Katanga nature conservation exhibition, with the support of the Belgian National Focal Point

10.07

Second EDIT summer school organised by the Invertebrates Department in the region of the Muránska Planina national park (Slovakia)

RECENT INVERTEBRATES

Taxonomy: the RBINS Brings Together European Competences

In order to effectively protect all the worldwide fauna and flora, as many specialists would be required as there are animal or plant groups! Yet this is far from being the case and furthermore, the available expertise is dispersed and heterogeneous. Funded by the European Commission (EC) for 5 years with a budget of 11.9 million euros, the network of excellence EDIT (European Distributed Institute of Taxonomy) has set itself the aim of uniting them around common practices and tools. It consists of 29 institutions including the largest biological collections in Europe. Within this network, the RBINS has been assigned the task of training and developing awareness of modern taxonomy throughout Europe.

The RBINS has therefore created the Distributed European School of Taxonomy (www.taxonomytraining.eu) which compiles and organises the provision of training which until now has been highly dispersed throughout the different countries. In this context the RBINS, working closely with the Royal Museum for Central Africa and the National Botanical Garden of Belgium, has coordinated the organisation of European summer schools. The second series of courses was held in Slovakia and brought together 18 professional taxonomists and 20 students from 16 European Universities (in 11 countries).

Alongside this, a programme called "experts-in-training" offered 31 training courses in 13 EDIT establishments and in 8 other partner institutions, aimed at young professionals from institutions and universities. With the budget provided by the EC, 17 grants (for 61 candidates) were allocated, equivalent to 36 weeks of training.

In order to prepare for the International Year of Biodiversity (2010), the RBINS, which is responsible for raising public awareness in EDIT, created an electronic agenda in 2009 containing all the public events that will enable European society to better understand the issues involved in biodiversity. At the end of 2009, this online agenda presented over 150 events organised in 30 countries. (www.countdown2010.net/byse).

Finally, to encourage young people to take up a career in taxonomy, the RBINS has also compiled profiles of young researchers, presenting all the aspects of this overlooked profession which nevertheless often resembles a fascinating adventure, as described in the accounts of expeditions published on the EDIT blog (http://systematicsblog.myspecies.info/).

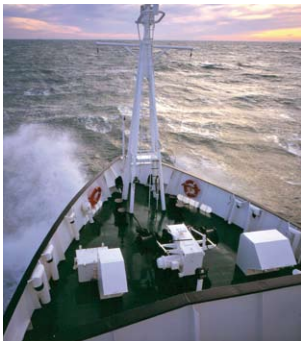
MARINE ECOSYSTEM MANAGEMENT

Sharing North Sea Databases

Access to marine data is of vital importance for an extensive range of research and studies, from forecasting climate change to coastal engineering.

But the marine observation system is highly fragmented and in countries bordering European seas, there are over 600 public and private laboratories which collect scientific data. All of these actors compile data by means of various sensors onboard research ships, submarines, fixed and floating platforms, aeroplanes and satellites, to measure physical, geophysical, geological, chemical and biological parameters. The data they collect are neither easily accessible nor standardised. They are not always checked and their security and availability are not always guaranteed.

In this context, the European Commission is supporting the SeaDataNet network, whose objective is to build a harmonised system for accessing high-quality data on the marine environment collected by oceanographic fleets and new automatic observation systems (buoys and satellites). The network's objective is to improve existing infrastructures in 35 countries



10.07

Celebration of the 25th anniversary of the oceanographic ship *Belgica*, in Zeebrugge

19 - 20.08

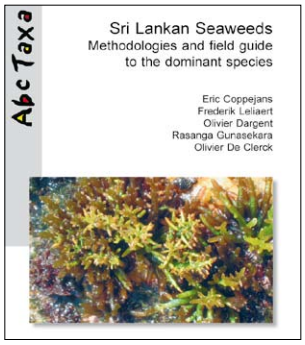
Training seminar for Dutch-speaking teachers on the subject of *Evolution in the classroom*

14.09

The internet project *Ikhebeenvraag.be* brought together over 70 researchers and scientific communicators from Flemish institutions and universities and federal scientific establishments

by equipping them with harmonised querying interfaces. In this way, users will be able to consult dozens of datasets in a single operation, via a virtual one-stop shop. Working in partnership with 49 institutions in SeaDataNet, the RBINS thus takes part in the archiving and conservation of Belgian data, guarantees the preservation of observation data that is impossible to recreate and enhances the data required for marine environmental management.

RECENT INVERTEBRATES



National CBD Focal Point

Mandated as the National Focal Point, the RBINS ensures that the Convention on Biological Diversity (CBD) is respected, by means of three principal activities: expertise and decision-making support, information and awareness and development cooperation.

The fourth National Report was published in 2009, which every four years assesses the implementation of the CBD and presents the state of biodiversity in the country.

The preparation of the International Year of Biodiversity is another highpoint. The combination of this International Year and the Belgian Presidency of the European Union, in 2010, offers a unique opportunity to raise the public's awareness and engage their responsibility about the importance of biodiversity, by encouraging them to adopt sustainable practices. At the end of 2009, in synergy with the *Je donne vie à ma planète* campaign, the Focal Point published *366 gestes pour la biodiversité*, a small book proposing one action per day to promote biodiversity. The success of this publication aimed at the general public was immediate: several thousand books were distributed in a few weeks and thousands of new commitments were made as part of the campaign.

The programme to support the introduction of the CBD in developing countries, funded by Belgian Development Cooperation, has had a fruitful year. The Focal Point took on 13 trainees from 9 countries for study visits in taxonomy and collection management. It also funded training courses in the field with RBINS researchers, in Peru, Vietnam and the Congo. With the support of the Congolese Institute for Nature Conservation, the Focal Point organised a workshop on the dynamics of habitats, in order to improve the standardisation of data collection in the field. Alongside this, it followed up and funded research conducted by three Congolese students in the Kahuzi-Biega and Virunga National Parks. The Focal Point also organised 9 training sessions for 60 people from 11 countries, on the development of websites connected with the *Clearing House Mechanism* (CHM), which should establish the signatory countries of the CBD to guarantee information exchange and scientific and technical cooperation. It funded 5 projects to provide technical back up for CHMs in Benin, Guinea, Ivory Coast and Madagascar, and 3 projects to raise awareness about biodiversity in Burundi, Cameroon and the Congo.

Volume six in the series of taxonomical handbooks, Abc Taxa, has now been published on the subject of Sri Lankan algae (www.abctaxa.be).

14.09

How were dogs domesticated? Mietje Germonpré (Palaeontology Department) replied to Greenfilms, at the request of the National Geographic Channel - UK

PALAEONTOLOGY

Preventive Conservation of Iguanodons

A treasured item at the museum, the thirty or so complete skeletons of the famous Bernissart Iguanodons are the focus of indefatigable scientific monitoring to guarantee their conservation.

The fossilisation of a bone is a complex phenomenon involving the decomposition of the organic material, recrystallisation of the osseous apatite, enrichment in trace elements, precipitation of new minerals into the cavities and finally compaction. In the case of the iguanodons, this all happened 125 million years ago in the depths of a coal mine. The fossilised bones are covered in pyrite, which makes them extremely fragile, as contact with the air and humidity oxidises the pyrite. As scratching away the visible damaged parts does not prevent the degradation of the rest of the bone, scientists then developed irradiation techniques to treat the bones so that the pyrite oxidisation is reduced. However, this approach also risks transforming the pyrite into other minerals, including sulphates which, as they develop, could completely break the bones.

By studying some fifty bones using X-ray diffraction, researchers in the Palaeontology Department, in association with mineralogists from the University of Liège, have identified 13 new minerals originating from the decomposition of pyrite. The two most abundant ones belong to the family of iron sulphates. Known as Szomolnokite and Rozenite, they differ only in their hydration level and can be transformed from one to the other depending on the humidity. Other sulphates, variants of apatite and compounds containing zinc, aluminium, calcium, sulphur and quartz have also been found, bringing up to twenty the number of minerals attacking the Bernissart iguanodons. Some were formed when the animals became buried; others formed during the long period under the earth and yet others formed in contact with the open air following their excavation, in 1878. The phenomenon is complex and sometimes, even in one cubic centimeter, researchers have observed both empty micro cavities and others full of pyrite. The identification and precise location of these different minerals then makes it possible to improve conservation conditions, to manage each bone of this incredible heritage on a case-by-case basis, which has been handed down to us from the depths of time and which has not yet revealed all of its secrets to us.

BIOLOGICAL EVALUATION

2009, the Year of the Gorilla

Gorillas share 98.4% of their genes with humans, a biological proximity that provides a permanent source of inspiration and fascination. Yet these great apes are threatened by hunting and the fragmentation and degradation of their habitats, diseases and epidemics, along with the incessant armed conflicts that are devastating their tropical forests. Following the initiative of the United Nations Convention on the Conservation of Migratory Species, better known as the Bonn Convention or CMS, to which the RBINS has contributed its scientific expertise for many years, 2009 was declared "The Year of the Gorilla" to alert public opinion: all the gorilla species are in fact on the IUCN red list of threatened species, as either at best *endangered* or at worst, *critically endangered*. Although it is difficult to quantify, the worldwide gorilla population is approximately 200,000 individuals and is constantly dwindling. Conservation biologists from the RBINS took an active part in this Year of the Gorilla by providing the necessary scientific data required to establish a new agreement on the conservation of gorillas and their habitats, which was ratified in 2009 by the 10 African States where the gorilla is found.

20.09

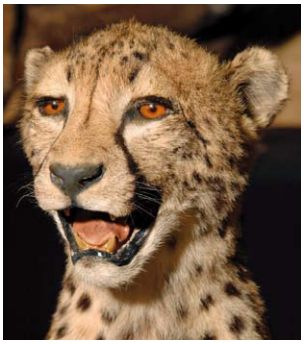
After having been seen by 100,158 visitors in Brussels, the *Survivors of the X-TREME* exhibition, co-produced by the RBINS, Naturalis (NL) and Experimentarium (DK), opened at the Pavilhão do Conhecimento in Lisbon (PT)

24.09

Adoption of the *4th Belgian National Report to the Convention on Biological Diversity*, prepared by the National Focal Point

3. Collections

Digitising the Complexity of Scientific Collections



Inventorying collections is one of the museum's basic tasks. With computerisation and above all Internet, digitising these inventories and making them available via the Web has also become a basic mission.

But when we are speaking of 37 million objects of all kinds (a flint blade, a jar containing an assortment of mussels, a map of the subsoil in Bernissart, a rare, unique fly, etc.), many of which were part of the collection well before the invention of the computer, this basic task then becomes a major challenge. A general audit of Belgian heritage (2002-2003) included for the RBINS no less than 46 sorts of collections classified according to the nature of the objects they are composed of (specimens of fauna, fossils, minerals and rocks; books, periodicals, archives and photographs; core samples, plans, etc.). Furthermore, to accomplish this digitisation correctly, it is not enough to scan the inventory files with character recognition software, it is also necessary to transcribe existing data into formats that are internationally recognised by the scientific community. Digitisation is therefore always followed by verification. It is essential to have both the necessary scientific supervision (selection, preparation, validation, etc.), of the trained operators ("encoders"), and the engineers and technicians required for the development, management and support of the IT tools.

Building up an inventory individually of each of the 37 million objects is therefore an unachievable objective, and would be of only limited interest. The natural science collections are often conducted in series. As such, the millions of objects in the Institute's collections relate to hundreds of thousands of "specimens", i.e. objects or groups of objects representing a significant unit (e.g. a taxon for zoology). Digitisation involves creating one record per "specimen".

The task nevertheless remains enormous. To accomplish it, the Institute like the other Federal Scientific Establishments receives support from the Federal Science Policy digitisation programme. Begun in 2006 with a pool of 10 encoders, the 2009 workforce was 6.5 full-time equivalent staff, owing to voluntary departures and the available budgets.

Priorities have been set on two levels:

- digitisation of "type" specimens. A "type" specimen is an individual which serves as a worldwide reference for naming the species. The RBINS's collections contain 110,000 such items, which clearly illustrates why they are considered to be some of the most important for international research. At the end of 2009, 52,793 type specimens, i.e. over half, had been digitised.
- The digitisation of recent zoology collections, with particular emphasis on Belgian material. 500,000 specimens – of the millions – have been classified as high priority. At the end of 2009, 284,987 non-type records had been digitised, i.e. 57% of the initial objective, representing information on 1,973,110 non-type objects in the collections.

All of this data has been included in DarWin, the database which uses management software shared by most of the scientific collections developed in open-source mode by the RBINS IT department. As soon as it is encoded, all the data can be accessed immediately via the Internet DarWin query interface (www.naturalsciences.be/darwin).

In total, at the end of December 2009, 306,812 records had been encoded in DarWin, representing information about a little under 2 million objects in collections, i.e. 5.47% of the total.

15.10

Opening of the *Baleines et dauphins* (Whales and Dolphins) temporary exhibition, created by the National Natural History Museum in Paris

15.10

The Minister Sabine Laruelle announced the review of the incremental salary scale for contracted scientists

Alongside this, efforts have also been made to encode data about two specific collections:

- the Institute's anthropology and prehistory collections. To date, the general inventory has been entirely encoded in MARS, a dedicated platform developed using open-source solutions.
- Data on bird ringing in Belgium. This data has been centralised since 1926 at the RBINS. Specific software, Papageno, which respects the EURING recommendations, is used by the RBINS. The database of "recoveries", which includes 450,000 fields, has been completely computerised. Other ringing data is for the most part only available on hand-written records. Owing to the volume of work, priority was given to the large bird species which have large rings. In 2009, 548,268 ringing files were encoded into Papageno.

The aim is to be able to pursue this basic, slow but essential work. One stage will have been accomplished when it is possible to connect up all the specific databases with DarWin, thereby unifying access and facilitating consultations.

Facilitating Access to Documentary Collections

Under the coordination of the Royal Library of Belgium, the RBINS is taking part in the development of a centralised digital catalogue of the publications found in the libraries of Belgian federal scientific establishments.

The digital catalogue was begun several years ago and already includes 194,423 entries; in 2009, the RBINS undertook the digitisation of 60,768 maps from the Belgian Geological Service.

With the General Archives of the Kingdom, the RBINS has also begun digitising remarkable or even exceptional items of its heritage. Using these criteria, the scientific library of the malacologist Philippe Dautzenberg (1849-1935) was selected.

The RBINS digitised these collections itself. At the end of 2009, nearly 9000 pages were scanned and 244 reference works were converted into PDF format.

The RBINS has a large quantity of publications of which are few or no available copies left. In response to researchers' requirements, 21,542 pages of these publications have already been converted into 157 PDF files that can be accessed for free on request.

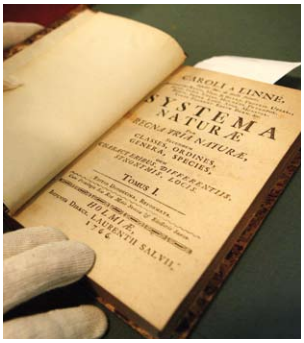
16.10

The acquisition of the Beaufays collection enabled the RBINS (Anthropology and Prehistory Section) to supplement the collection discovered in the cave at Spy in 1886

23.10

The acquisition of the Lucas collection, the largest privately-owned collection of meteorites in Belgium, enhanced the RBINS mineralogy collection

Towards the World Library of Life



Under the aegis of the Museum für Naturkunde (Berlin), the Biodiversity Heritage Library for Europe (BHL-Europe) project has brought together 28 institutions from 14 countries to coordinate Europe's contribution to the great world library of publications in relation to biodiversity.

One obstacle to the implementation of the Convention on Biological Diversity (CDB) is the lack of access to basic information about animals and plants. This is concentrated in books and scientific reviews from previous centuries, which are essentially found in Europe and North America, and the only means of accessing this knowledge is to visit several libraries. Since 2007, the Biodiversity Heritage Library project in America has begun publishing this literature on the Internet. The aim of BHL-Europe is to develop this approach by assembling the best European literature about biodiversity. A multilingual software interface will be developed and include other innovative research functions that will facilitate fast access to all information. Beyond the needs of the scientific community, all of the documents will be accessible to the general public via the European digital library Europeana. Everyone will then be able to obtain first-hand information about animals and plants, but also about rare publications, such as the original studies of Charles Darwin and Alexander von Humboldt, whilst admiring the illustrations from 17th and 18th century publications. Nature conservation organisations will have a data collection tool for rare or threatened species, in order to better plan protection activities.

"European Infrastructure" Labelled Collections"

In the context of the Synthesys project, some twenty institutions that manage biological collections are receiving a subsidy from the European Commission which will enable them to receive visiting scientists who wish to study their collections.

In Belgium, the RBINS is the partner responsible for BE-TAF (Belgian Trans-national Access to Facilities), which selects and manages visitors for three Belgian federal institutions: the RBINS, the Royal Museum for Central Africa (MRAC) and the National Botanic Garden (JBN).

In 2009, the Synthesys project, initially supposed to last for 5 years, was extended for another 6 months, due to the European researchers' growing interest in the availability of collections. In this last six months alone, the RBINS was visited by 22 researchers, the MRAC by 13 and the JBN by 6. The duration of visits to the RBINS varied between 2 and 20 days. The most popular collections studied were malacology and palaeontology.

During the final year of the project (2008-2009), 13 Belgian researchers took advantage of the Synthesys project, including 2 from the RBINS.

Boosted by its success, the Synthesys project was renewed for 4 years (2009-2013), but only the RBINS and the MRAC have remained partners of the BE-TAF.

An initial call for candidatures took place in November 2009, during which the BE-TAF received 52 candidatures, 17 of which were accepted and 5 had to be placed on a reserve list. Owing to the interest in the Belgian collections, 40 additional visitor days have been granted to the BE-TAF, thus bringing the total number allocated to European researchers to 173 days.

31.10

After 16 years of archaeological salvaging work along the route of the high-speed train in Wallonia and the study of the archaeological sites discovered there, the personnel trained by the RBINS (Anthropology and Prehistory Section) joined the Archaeology Directorate of the Walloon Public Service

09.11

The Belgian Geological Service was appointed to lead the expert group responsible for proposing a European-level code of conduct in relation to the capturing and storage of CO_2

Collections from the Past Useful for Future Research

Combined with those of the Royal Museum for Central Africa in Tervueren, the RBINS ornithological collections contain around 155,000 samples which originated from the Democratic Republic of Congo (DRC), including type specimens (unique worldwide references). Using these historic populations, researchers are studying how the fragmentation of habitats due to deforestation or climate change is altering the biodiversity of birds in Africa. Their objective is to extract DNA sequences from these old collections in order to constitute a reference library of DNA sequences to enable the rapid identification of Central African bird species.

In this way, some 950 specimens collected between 1845 and 2008 representing 225 species have been sequenced. Initial results show that DNA deterioration in the oldest specimens does not permit the amplification of the DNA fragment required to create an unequivocal barcode. Nevertheless, researchers have managed to sequence very short fragments for the majority of the selected samples, which has opened the way for the use of old Belgian collections for phylogenetic and phylogeographic research.

12 - 30.11

An entomologist from the RBINS took part in the biodiversity inventory of dry coastal forest in Mozambique. The *Our Planet Reviewed* programme

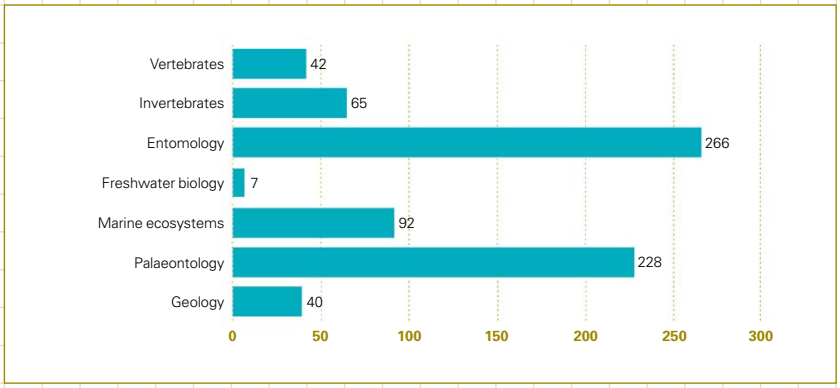
14.11

The RBINS Anthropology and Prehistory Section took part in an expedition organised by the Royal Museum of Art and History to Easter Island to excavate a funerary monument

SCIENTIFIC VISITORS

Scientific visitors are divided very unequally between departments, with the most visited remaining entomology, palaeontology and marine ecosystems.

In total, over 700 scientists from all specialist backgrounds have visited the Institute.



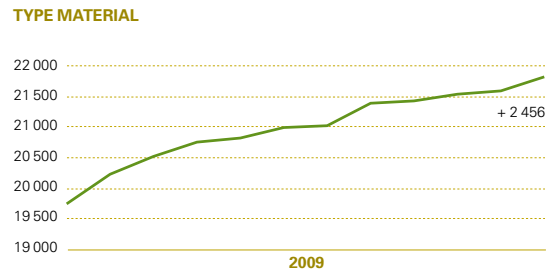
MANAGEMENT OF COLLECTIONS

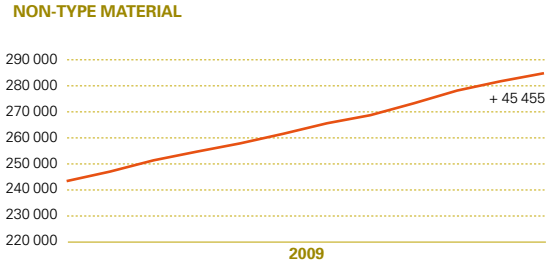
The collections were significantly enhanced in 2009 and these acquisitions have formed the focus of major promotion work, particularly for the Invertebrates Department. The number of loans also remains highly significant, particularly within the Entomology Department.

Management of Collections	Enhancements	Development / encoding	Number of loans
Vertebrates	4 560	5 241	45
Invertebrates	22 622	22 622	43
Entomology	178 422	6 400	257
Palaeontology	1 121	4 444	30
TOTAL	**206 725**	**38 707**	**375**

EVOLUTION OF RECORDS ENTERED IN DARWIN

Under far from ideal financial conditions, the Institute is pursuing its efforts to digitise its collections: nearly 48,000 additional records (type and non-type material) have been entered into DarWin in 2009!





Library

LIBRARY ACQUISITIONS

The development of the library is aimed at two types of visitors (physical and virtual), and is continuing work to digitise its collections, enhancing the catalogue of electronic journals and introducing an RSS alert service.
At the end of 2009, the RBINS library contained 193,423 documents converted for the central catalogue, which contains bibliographical data from 24 libraries belonging to the federal government.

	2007	2008	2009
Books and journals	5 716	5 922	7 823
Electronic journals	31	175	251
Total e-journals (A to Z)	262	437	688

INTER-LIBRARY LOAN

The number of external requests (loans) is more or less stable compared with last year. The number of borrowings reduced greatly, creating a positive balance in the annual Impala report (the Belgian electronic library management system). The RBINS is thus the most in demand of the federal scientific establishments.

	2007	2008	2009
Internal document loan	5 473	5 721	5 696
Inter-library loan			
Borrowing	337	294	197
Loans	179	247	245
Total	**516**	**541**	**442**
International exchanges	857	855	844

VISITORS TO THE LIBRARY

Research on paper documents is gradually being replaced by research using electronic documents. This is an international trend.

The number of registered members, like the number of visits to the reading rooms and the number of documents consulted have logically declined.

In 2009, the RBINS had on average 15.16 visitors per day, whereas requests via e-mail have increased over recent years to 402 in 2009.

	2007	2008	2009
External	707	669	466
Internal	4 055	3 509	3 254
Total	**4 762**	**4 178**	**3 720**

	2007	2008	2009
Requests for documents / e-mail	312	357	402

READING ROOM

The number of journals and magazines available in the reading room has reduced as a logical consequence of the reduction in the number of external visitors in 2009.

The visitors to the reading room at the RBINS who prefer printed sources are senior and retired and amateur researchers, whereas the younger generation would like to have access to documents directly from their workplace, via Internet.

	2007	2008	2009
Books	515	525	320
Journal articles	1 654	2 185	1 407
Total	**2 169**	**2 710**	**1 727**

ELECTRONIC JOURNALS

The growing tendency to increase the use of electronic journals through the "AtoZ" platform was confirmed in 2009. The Institute is harvesting the fruits of the fact that federal scientific establishments were the ones to pioneer the introduction of this system.

Owing to the addition of a number of titles available through free access, this platform serves as a central information and knowledge focal point in a landscape where information is becoming increasingly fragmented.

	2007	2008	2009
Consultation sessions	6 843	6 981	7 112
Periodicals	2 959	3 114	3 263
Abstracts	867	911	967
Full text	2 271	2 413	2 504

4. Museum

Celebration of Darwin Year

The highlight of 2009 was the opening, on 12th February 2009, the date of the 200th anniversary of Charles Darwin's birth, of a *Gallery of Evolution*, completing phase one of the major renovation work that began in 2007 with the Dinosaur Gallery and the PaleoLab. The whole complex – the history of life wing – offers the museum 5,000 m² of entirely renovated permanent exhibitions.

The aim of the *Gallery of Evolution* is to present in chronological order some of the major stages in the history of life and to explain the principal mechanisms of evolution. Six periods have been selected, either because the RBINS collections are particularly rich for this period, or because major events took place at these times which subsequently influenced different life forms.

The exhibition is designed as a combination of a narrative line illustrated by over 1.000 specimens, and an explanatory/demonstrative line supported by models, films, multimedia terminals and interactive devices presenting the logics underlying the main bifurcation points in the history of life.

Apart from families, the traditional visitors to the museum, the exhibition appears to have captured the imaginations of adult visitors who are not accompanied by children, and the final two years in secondary schools.

In the wake of this, phase two of the renovation, involving some 2700 m², has also been launched by the Exhibitions and Museology Services. The objective is to develop a new presentation of current fauna, organised around the relationships between environments and their biodiversity. The first stage in this renovation, which aims to present the dynamics of life, i.e. the adaptation and evolutionary processes, consists of the creation of a new gallery, focusing entirely on biodiversity in the city.

Finally, the interactive exhibition *Les survivants de l'X-Treme* designed jointly with Naturalis (Leyde) and Experimentarium (Copenhagen) was presented in Brussels from 14th October 2008 to 30th August 2009 (100,000 visitors), then in the Knowledge Pavilion (Lisbon) from 20th September 2009. The exhibition on criminalistics *Meurtre au Muséum* which was entirely devised and created by the RBINS, was rented to the Cité des Sciences (Paris), where it was visited by 265,000 people in 11 months.

Teaching Evolution in the Face of Creationism

To accompany the *Gallery of Evolution*, the educational service has developed new guided tours and educational workshops explaining the theory of evolution. It organised meetings to help teachers integrate evolutionary theory into their natural history lessons. With the help of researchers it notably identified the existing educational material that enables teachers to reply to questions raised by the creationist movement.

For several years, with funding from the Brussels Capital Region, the educational service has developed lightweight exhibitions and workshops that can be transported around the 19 municipalities of Brussels. They are free of charge and presented (in Fr and Nl) by museum guides, thereby constituting one of the major elements of the RBINS's provision of free services.

In this context, in 2009, the educational service toured and presented the *A vol d'oiseau / Vogels in de stad* exhibition-workshop, the end of the *Water-L'eau* presentation at the Kijkduin museum, Den Helder and the *Mini-Jungle* installation at the Palais de l'Univers et des Sciences in Dunkirk.

17/11

Launch of *2010 - International Year of Biodiversity*. The almanach *366 gestes pour la biodiversité* boosted the commitment campaign *Je donne vie à ma planète.*

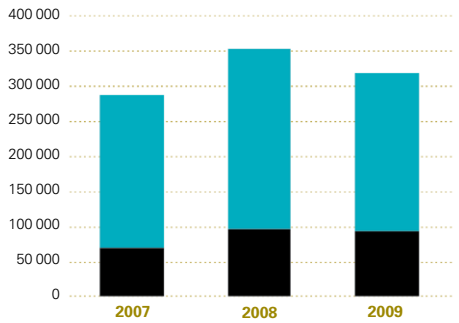
12.12

Over 3,000 people have already signed up to this campaign. You can join them via the website www.jedonnevieamaplanete.be

EVOLUTION IN THE NUMBER OF VISITORS TO THE MUSEUM

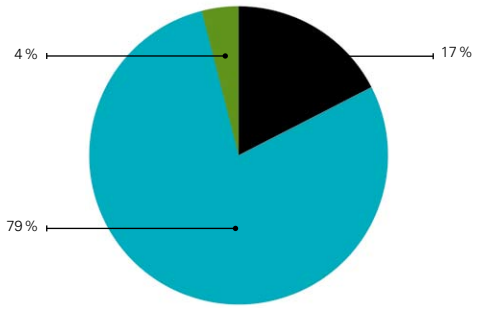
Whilst remainig at a high level compared with the years prior to the major renovations and extensions of the permanent rooms, frequentation has fallen in comparison with the record year of 2008. The proportion of individuals and families in the overall visitor figures for 2009 remained very high (70.73%), well above those observed before the reopening of the rooms in 2007.

	2007	2008	2009
Groups	70 028	96 472	93 490
Individuals and families	218 168	257371	225 956
Total	**288 196**	**353 843**	**319 446**



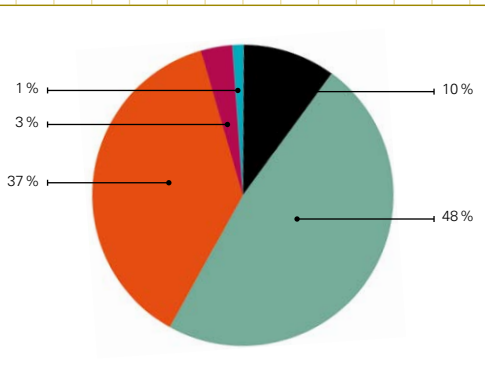
REDUCED ENTRY FEES AND FREE ENTRY

As in previous years, a significant proportion of visitors benefit from free access. Given this and the discounts offered to certain categories of visitors, the average entry fee paid per visitor is approximately 5 EUR.



PROFILE OF VISITORS BY AGE RANGE

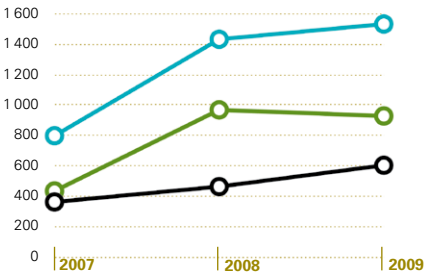
The museum attracts mainly young people, as nearly 58% of its visitors are under 18.



EVOLUTION OF GUIDED TOURS

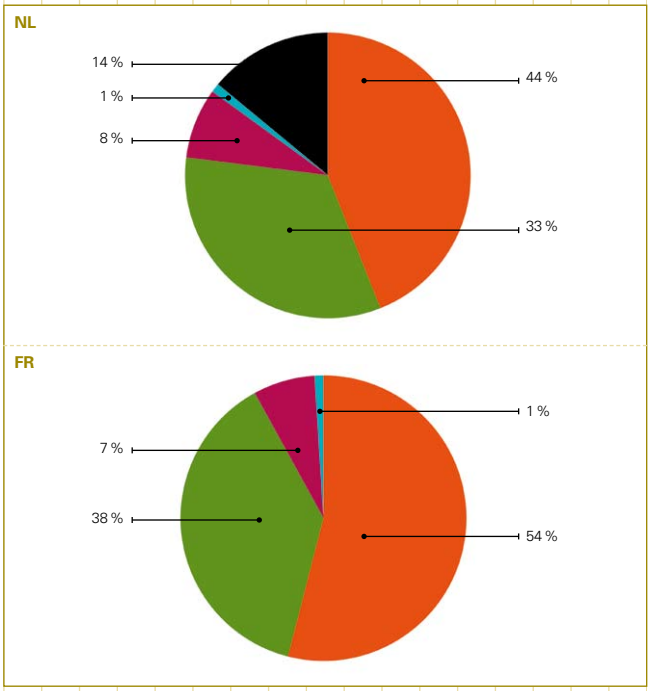
In spite of a slight fall in the number of visitors between 2008 and 2009, the number of guided tours has constantly increased (+7% in total). This is due to a significant increase in the number of guided tours in NL (+30%).

	2007	2008	2009
Dutch speakers	363	464	604
French speakers	435	968	928
Total	**798**	**1432**	**1532**



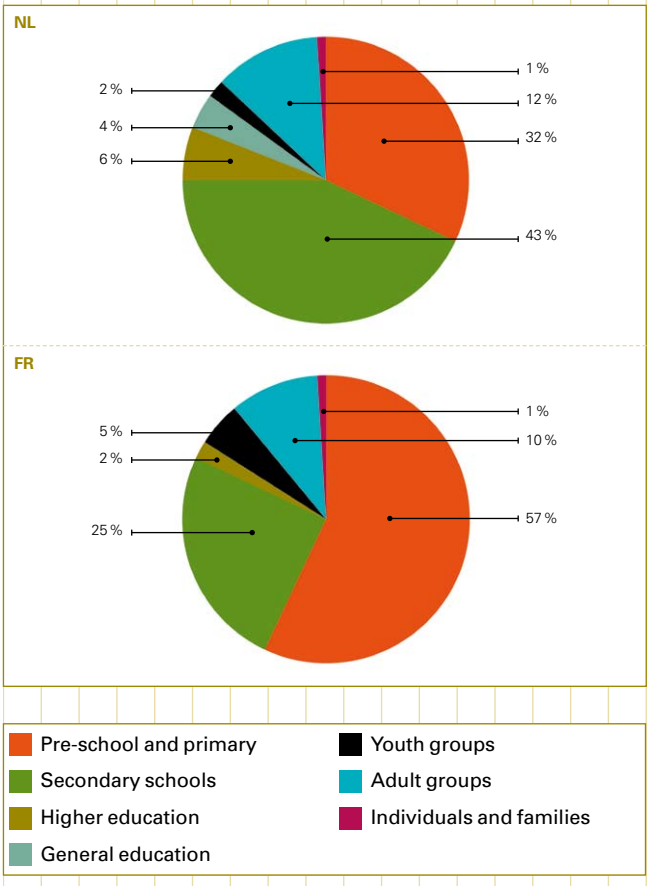
GUIDED TOURS BY SUBJECT

Two favourite themes clearly emerged:
evolution (and prehistory) and dinosaurs, whose rooms have been extensively renovated. It is worth noting that the general visit of the museum is above all of interest to NL visitors.



PROFILE OF GUIDED TOUR VISITORS

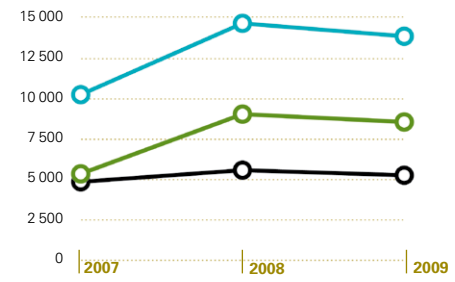
Guided visits are mostly organised for primary and secondary school groups, with slightly more frequent requests coming from the French speaking schools.



EVOLUTION IN THE NUMBER OF WORKSHOP PARTICIPANTS

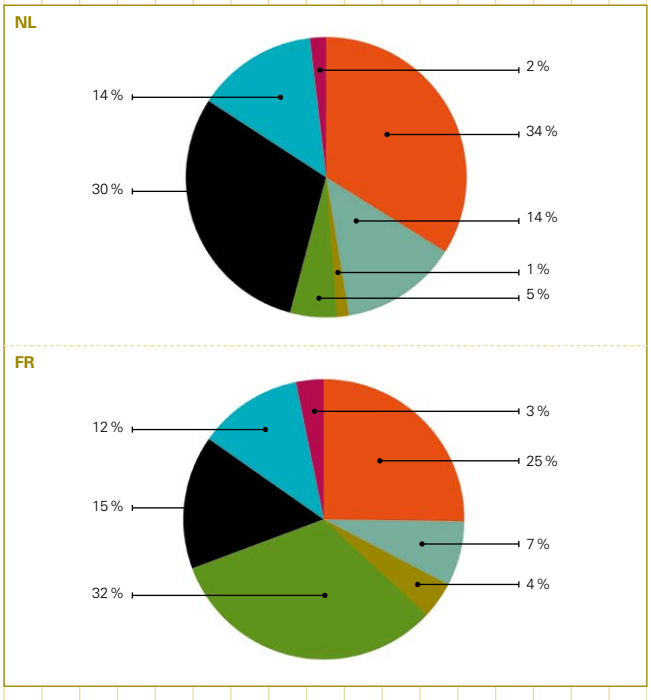
The evolution in the number of workshop participants follows the trend seen in the number of Museum visitors: a spectacular increase between 2007 and 2008 (principally among Dutch-speaking participants) and a slight fall between 2008 and 2009 (-5%).

	2007	2008	2009
Dutch speakers	5 373	9 051	8 569
French speakers	4 881	5 598	5 284
Total	**10 254**	**14 649**	**13 853**



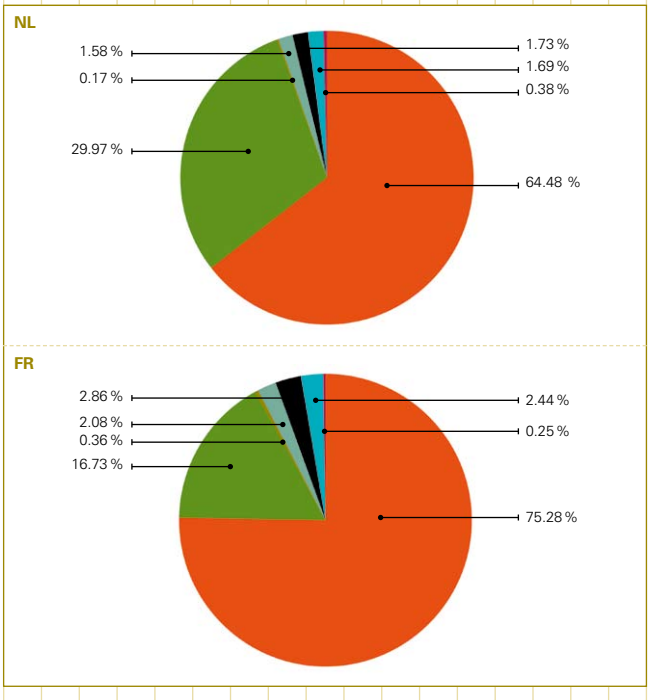
WORKSHOP PARTICIPANTS BY SUBJECT

Unlike the guided tours, the favourite subjects were quite varied: dinosaurs, evolution, prehistory and habitats were all equally favoured. We would note here the score achieved by the Paleolab, mainly among Dutch-speaking participants.



PROFILE OF WORKSHOP PARTICIPANTS

More than for the guided tours, workshop participants are for the most part school groups, and principally from primary schools. There is nevertheless a marked difference between the communities with regard to secondary school visits, as the demand is almost 2 times greater for Dutch-speaking visits.



VISITORS TO THE WEBSITE

The number of visitors to our website has increased steadily (12% between 2008 and 2009, 22% between 2007 and 2009!). If we look at the number of pages consulted, the evolution is even more spectacular (19% between 2008 and 2009, 53% between 2007 and 2009). These figures, like those for our visitors and educational activities, bear clear witness to the increasing attractiveness of both the Museum and the Institute.

	2007	2008	2009
Pages	12 880 828	16 556 385	19 708 760
Visitors	2 536 707	2 759 437	3 083 700

THE MUSEUM IN THE MEDIA

In both the written and spoken media, the impact of both the Museum and the Institute is equally remarkable. The themes most often mentioned, apart from the general articles, are evolution, *Whales and Dolphins* (more in the Dutch-speaking media) and the *Survivors of the X-TREME*. As in the past, many members of the staff at the Institute have contributed actively to the content of the information that is broadcast in this way.

	FR	NL
Press		
General articles	84	106
Evolution	52	57
Whales & Dolphins	25	44
Survivors of the X-TREME	26	30
Biodiversity	21	20
Total	**208**	**257**
of which Interviews with RBINS agents	24	21
Radio and TV		
Total radio and TV broadcasts	**70**	**40**
of which Interviews with RBINS agents	23	14

EVOLUTION OF SHOP CLIENTELE

The shop contributes significantly to the promotion and dissemination of natural sciences among the general public. In spite of its less than ideal location, the shop has several tens of thousands of customers. Although visits to the shop between 2007 and 2009 follow, in a more accentuated manner, those to the Museum, the average amount spent by the customer increased significantly between 2008 and 2009 (+10%).

	2007	2008	2009
Museum visitors	288 204	353 833	319 446
Shop customers	23 975	35 414	29 361
Expenditure / customer	12,80 €	12,87 €	14,21 €
Expenditure / visitor	1,07 €	1,29 €	1,31 €

Management Commission

Management Board of the Scientific Policy PPS

Scientific Council

Institutional Communication
International relations

GENERAL MANAGEMENT

Economic affairs
Accident Prevention and Wellbeing at Work

SUPPORT SERVICES

ICT and Multimedia Service
Finance Department
Personnel Service
Technical Department

PUBLIC SERVICES

Exhibitions
Museology
Communication
Educational service
Reception
Shop

SCIENTIFIC DEPARTMENTS

Vertebrates
Systematics and biochemical taxonomy
Invertebrates
Malacology
Recent invertebrates
NATIONAL CBD FOCAL POINT
Entomology
Insects
Insects and Arachnomorphs
Belgian Geological Service
General Geology and Mineralogy
Applied Geology and Geo-Information
Palaeontology
Micro-palaeontology and palaeo-botanics
Fossilised Invertebrates
Fossilised Vertebrates
Anthropology and Prehistory
Marine Ecosystem Management
Marine Environment Modelling
Marine Ecosystem Management
Education & Nature
Freshwater biology
Biological Evaluation
BELGIAN RINGING CENTRE
BELGIAN BIODIVERSITY PLATFORM

HERITAGE

Library
Collections

Contents

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Royal Belgian Institute of Natural Sciences,
Olivier Retout and Eric De Weer

Graphic Design:
www.tenfinger.be

MISSIONS

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

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.

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

- The Scientific Council, which includes RBINS and University researchers. It 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. It is made up of representatives from both institutions and external members. It is responsible for the financial and practical management of the RBINS.
- The Management Board, consisting of the Institute's management and heads of department. It 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 Belgian Scientific Policy Office.

RESEARCH & EXPERTISE

One out of every three people at the RBINS is a scientist. They are mainly biologists studying fauna, i.e. zoologists, taxonomists, systematicians, phylogenists and ecologists. The scientific personnel also includes oceanographers, geologists, palaeontologists, anthropologists, prehistorians and archaeologists, as well as geographers, physicists, bio-engineers and mathematicians, which enables it to conduct multidisciplinary research.

Lines of Research

- The study of biodiversity, through taxonomy, phylogeny and systematics in all animal groups (vertebrates, invertebrates and insects), be they extant or fossil.
- The study of land, freshwater and marine ecosystems.
- The study of the history of life, the climate and human installations. Research into the mechanisms involved in the evolution of life, along with the 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 approximately 37 million specimens conserved as Belgian heritage of universal significance, the RBINS's biological, palaeontological, prehistoric and geological collections serve above all as reference and research tools.

Just after the Natural history Museums in London and in 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.

The collections are dynamic; they are constantly being added to and provide an essential basis for numerous publications, taxonomical reviews and monographs.

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 Museum is the visible part of the RBINS. It has 16,000 m^2 of permanent galleries, temporary exhibition rooms and educational workshops, enabling it to welcome more than 300,000 visitors each year, approximately 30% of whom are school groups.

Its Dinosaur Gallery is world famous, it being the largest in Europe. In 2009, the complete renovation of 5,000 m2 was finalised and is now devoted exclusively to evolution and the history of life.

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.

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