

More Belgian Bio-Marine Contributions since 1830

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ABSTRACT - The paper is a follow-up and, *in partim*, updates communications made at preceding ICHOs (Monaco 1966; Kaliningrad 2003; Charlier and Leloup 1966; 1998; Charlier 2004b; Capart 1966). It adds to the history of understanding the biological aspects of the seas by Belgian scientists and institutions. For a long time oceanography was confined in Belgium to the academic world and research institutes. As a wider audience developed, ocean-related matters eventually found niches in industry and in the media. Occasionally links were established with activities of the past, such as the Antarctic campaigns conducted by Belgians. Due to an increasing curiosity about ports and beaches and ocean-related disciplines in general, life in the ocean has fired many an imagination, fascinating people and kindling a growing interest in marine scientific achievements.

In addition to the Belgian Royal Institute of Natural Sciences, several research centers and universities have given biological oceanography a merited share of attention. The *Belgica* expedition to the South Pole (Balaban 1998), for example, provided opportunities for sea life observation, while the troves of fossil bones in Antwerp also fostered the study of cetaceans, sireneans, sea mammals and sharks. Among the fossil dinosaurs unearthed was an aquatic species *Mosasaurus* (literally, the dinosaur of the River Meuse¹), which has proved to be more common than scientists once believed. Fossils of the marine *Mosasaurus* have been found in North Africa and in the Hainaut province of Belgium. It was first discovered in an underground quarry near Maastricht, The Netherlands, in 1780. Members of the invading French forces (French Republic) sent a specimen to the Paris *Muséum national d'Histoire naturelle*. The animal could reach fifteen meters in length. No post-Cretaceous individual was ever discovered.

¹ Meuse in French, Maas in Dutch, German and Flemish, Mosa in Latin.

Early Belgian marine biology research sites

World's first marine biology station

The Guinness Book of Records does not mention it, but the very first marine biology station was erected in Ostend, Belgium, near oyster beds and the fish market. In fact these furnished the specimens that Professor P.J. Van Beneden studied.

Pierre-Joseph Van Beneden (1809-1894) conducted, in addition to his studies in biology, extensive research in marine biology and created an aquarium and marine laboratory in Ostend (1843). This was the world's first laboratory of marine biology. (Figure 1) His 1858 memoir got him the *Institut de France Grand prix des sciences physiques*. He became interested in living and fossil whales as excavations for the fortifications of the military stronghold of Antwerp exhumed fossil whale bones. This led to several publications, among others, in the *Annales du Musée Royal d'Histoire naturelle de Bruxelles*, and, with French zoologist Paul Gervais (1816-1879), *Ostéographie des Cétacés, vivants et fossiles* (published in Paris by A. Bertrand, in 1880).



Fig. 1 - Location of the oyster Valcke-Deknuyt farm where P.J. Van Beneden's laboratory was sited. (Breyne et al. 2010)

The marine biology station, baptized *Laboratoire des Dunes* (Dunes laboratory), was funded from his own assets and located on his in-laws' Valcke-Deknuyt oyster farm. Van Beneden's work there rested on the foundation of his pioneering research on fish parasites and the Belgian coastal fauna, "Recherches sur la faune littorale de Belgique" (*Mémoires de l'Académie Royale de Belgique*, 33 [1861]).

The station attracted many biology researchers, Belgian and foreign, among them German ichthyologist Johannes Müller (1801-1858) and his compatriots Anton Schneider (1831-1890), Franz Schultze (1840-1921), Christian Ehrenberg (1795-1876) and Justus von Liebig (1803-1873), as well as French Jean-Louis de Quatrefages (1810-1892), Henri de Lacaze-Duthiers (1821-1901), and Belgian Julien Fraipont (1857-1910).

Van Beneden's son, Edouard Van Beneden (1846-1910), who is credited with the discovery of meiosis, also founded a marine research station in Ostend (1883), at walking distance from his father's. As professor of oceanography at Liège State University, he invited his students to the Ostend facilities and organized excursions. The elder Van Beneden was a creationist while his son was a Darwinist who introduced the evolution theory into the Belgian academic world.

The new national fisheries museum

The small resort town of Wenduine was at one time (see below) the only site where whaling was practiced, out of desperation, it is said, because the mammals were believed to deplete the fish stocks. Another small resort occupies an important place in Belgian coastal oceanography. Oostduinkerke (literally, the church in the eastern dunes) was once near an inlet, called *Schipgat*, that allowed high tide access inland to sea-going ships (16th century).

In 2010, Oostduinkerke was proposed for inclusion in the UNESCO Heritage of Mankind List, for its horseback shrimp fishing, but it is equally significant in the area of research and history, thanks to its refurbished National Museum of Fisheries (Charlier 2011a; 2012).

The Natural Reserve of the Zwin

At the opposite end of the coastline, another sea inlet that silted up was the Zwin. The breakthrough near the contemporary Dutch border, known as the Zwin, was the consequence of an exceptionally strong storm, and the inlet made the medieval Bruges (Brugge) the richest city of non-Mediterranean Europe (Charlier 2011b). Today the inlet is barely a waist-high wading pool, but it is also the heart of a universally praised ornithological and floral natural reserve. The "Golden Inlet" has transformed into a reserve where research and observation are accessible to the amateur naturalist and the professional scientist alike. An entirely new center is to be inaugurated in 2012-2013 (Charlier 2011).

The epopaea of the *Belgica* (1897-1899)

The South Pole adventure arranged by Adrien de Gerlache de Gomery (1866-1934) brought together scientists and laymen of several nationalities who enjoyed worldwide fame. This was also the first expedition to collect hundreds of species of marine life. (Figure 2) The voyage of the *Belgica* contributed to the progress of all branches of the marine sciences and to global meteorology (Bănărescu 1998). Among the scientific complement, Romanian biologist Emil Racovița (Racovița 1998) contributed to biological oceanography; his activities and accomplishments are aptly recalled by a grandson of the expedition's director (Gerlache 1998) and by Alexandru Bologna (Bologna 1990; 1993; 1997; Benson and Rehbock 2002). The discoveries of the *Belgica* expedition have been touched upon by Hugo Declair (1998) at the celebration (in Romania!) of the centennial of the famous voyage. The correspondence of the responsible parties of the Antarctic expedition constitutes a valuable resource for the history of science (Marinescu 1998). The Gerlache family (Gerlache B. de 1998; Gerlache G. de 1998) has pursued its oceanographic endeavors to the present day, and the current Belgian oceanographic vessel (a unit of the Belgian Naval Force), the *Belgica*, carries on a fine tradition. In 2007, Belgium has established a new Antarctic research station, *Princess Elisabeth*, which is, incidentally, entirely powered by solar energy (Charlier 2010).

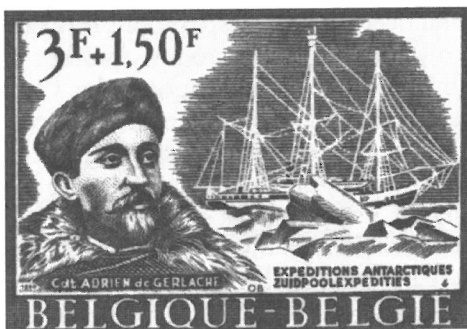


Fig. 2 - Baron Adrien Victor Joseph de Gerlache de Gomery (2 August 1866 – 4 December 1934) was an officer in the Belgian Royal Navy who led the Belgian Antarctic Expedition of 1897 to 1899. Belgian postage stamp on the occasion of the 100th anniversary of the expedition.

Adrien de Gerlache de Gomery's travels to the South Pole included biological research. During the first trip of the *Belgica*, Emil Racovitza (Racovița) gathered considerable bio-geographical information on Antarctic pelagic and abyssal species. On different journeys, David Damas and E. Geert Koefoed studied the Greenland Sea plankton. On later trips of the *Belgica*, Louis Stappers gathered valuable information on biotic zones. Damas captured a young *Spirula*, a zoological rarity whose spiral shell resembles that of the fossil am-

monites. His laboratory studies concentrated on floating organisms and their adaptations to the environment and life conditions.

The travails, travels and achievements of the *Belgica* were highlighted in a conference held in Romania honoring Racovița and the 100th anniversary of the first voyage (Proceedings 1998), while a book dedicated to its commander, Adrien de Gerlache de Gomery, was released at the end of the 20th century (Schelfhout 1998).

Belgium organized an Antarctic Expedition during the years 1957-1958 and established an Antarctic base, *Base Roi Baudouin*, which lasted ten years (1957-1967). Forty years later the *Princess Elisabeth* South Pole Station (2007) reestablished the Belgian presence on the icy continent. Some of its scientists participated in research cruises. A full list would be too lengthy for the present purposes, but one example is Claude Joiris (Vrije Universiteit Brussels), who conducted microbiological and ornithological research (some in association with L. Tan and H.-J. Rügner of the Alfred Wegener Institute at Bremerhaven and the late Nicolas Glansdorff, V.U.B) during Antarctic and Arctic cruises onboard the German ice-breaker *Polarstern* (Xu 2003c; 2003d). C.R. Joiris and his coworker L. Holsbeek also studied the effects of various pollutants on sea mammals. Daniel Prieur (University of Brest) and Christian Jeanthon (IFREMER) led the *Amistad Campaign* (1999) on the *Atalante* in the Pacific Ocean in which Nicolas Glansdorff (V.U.B.) and Max Mergeay (V.I.T.O, Mol Nuclear Center, Belgium) participated. Their main topic was bacterial resistance to heavy metals, which are abundant in the volcanic flow of the Pacific Ocean ridges. Ying Xu, formerly a Chinese researcher and currently V.U.B.-connected (a recent "visiting resident" at the Marine Sciences Center of the State University of New York at Stony Brook), N. Glansdorff (VUB) and H.-J. Rügner (A. Wegener Institute) described new deep-sea bacterial species of the genera *Moritella* and *Psychromonas* (Xu et al. 2003a; 2003b).

The *Princess Elisabeth* polar base is located on Queen Maud's Land and will be the first so-called "Zero [gas] Emission [into the atmosphere]" base ever operated. Power will come exclusively from aeolean and photovoltaic sources. According to experts involved, the energy aspects of the building and of the materials used, as well as the energy control system, guarantee that the station will be the Antarctic base with the lowest energy consumption. Inaugurated in February 2009, the station contributes to the activities of the International Polar Foundation.² The aerodynamic construction, recently completed, is ten meters high and measures 22 meters on the sides. It is covered with "inox", *viz.* non-oxidable material. Financing came mostly from such private sources as energy giants ELECTRABEL, LABORELEC, Compagnie de SUEZ.

² Prince Philippe of Belgium, heir to the throne, presides over the Foundation. Elisabeth is the name of his first-born, the grand-daughter of King Albert II.

Fisheries and aquaculture

In the area of fisheries and aquaculture, the work of A. Beavis (at the time an engineer at Ghent-based HAECON; Beavis et al. 1986a; 1886b) and J. Goes (then at Antwerp-based SOPEC; Goes 1986; 1988) deserves mention. C.P. Demeyer has contributed to the work of Bastin and Beavis in the area of aquaculture and to the work of B. Malherbe and K. Devos in their bio-remediation projects. The latter have published their results in various periodicals including the *International Journal of Environmental Studies* and *Sea Technology* (De Meyer et al. 1987). These endeavors cover a period of some twelve years but came to a standstill, except for the exploitation (commercial) phase, in 1998.

Over the past several decades, harvests of mussels and oysters have been decimated by pollution in the North Sea and competition from aquaculture, though a modest revival of myti- and ostreiculture has been attempted since the turn of the 21st century. Wild-caught shellfish had become inedible and their beds had virtually disappeared. Claims of revival have been made, research has been conducted in academic institutions, and the product has regained access to markets. Fisheries, a traditional occupation of the villages (a.o. Coxyde [Koksijde], Newport [Nieuwpoort, Nieuport], Ostend (Oostende, Ostende), Blankenberge, Zeebruges [Zeebrugge], Heist) bordering the North Sea, have likewise declined and, of the numerous fishing vessels' registrations, *de facto*, only those of Newport, Ostend, Zeebruges and Heist subsist (Van Bladel 1930). Many a former fishing harbor has been turned *in toto* or *in partim* in a yacht basin (Newport, Blankenberge, Zeebruges). The horseback shrimp-fishermen of Oostduinkerke are, to a great extent, a folkloric carry-over of bygone times (Chaineux and Charlier 2012; Charlier 2012).

The *Belgica* expedition, at the end of the 19th century, contributed substantially to the work of researchers, but research has also been conducted, in academe, on fossil fishes and their environment by Maximin Lohest and others.

The economic aspects of fisheries are discussed to some extent in the lecture cycle "Offshore and Coastal Zone" of the Inter-university Institute for Instruction and Training, organized by the Agencies for Aid to Development; these are particularly addressed to individuals from developing and formerly centralized economy countries.

Whales and dolphins

Belgian research has also focused on cetaceans with Van Beneden's (1886) and others' contributions. W. De Smet studied whales and dolphins while he was at the Royal Institute of Natural Sciences (De Smet and Bultinck 1972; 1974) and at the University of Antwerp (formerly RUCA), until his appointment at the University of Rwanda-Kigali. He is, although retired, still active in

that field, and involved with promoting a new biological nomenclature.³ For more than 25 years he spearheaded the Flemish Association for the Study of Sea Mammals (*Vlaamse Vereniging voor de Studie van Zeezoogdieren*). The society's modest bulletin, *Marswijn* (cf. *marswin* in Danish, *marsouin* in French) in its third issue of volume 3 (1977), published a rather detailed and well-illustrated review of dolphins and whales in and around Belgium. Charlier (1998; 2002) described, in a paper at the Sixth International Congress on the History of Oceanography (Qingdao, China), cetaceans of Belgium and the research conducted mainly at the Royal Institute of Natural Sciences. Parmentier has been instrumental in their study at the State University of Ghent (now University of Ghent-Universiteit Gent; Charlier 2004b).

Antwerp has perhaps yielded the largest trove of fossil bones of cetaceans in the world. The collection is so large that hundreds of specimens, mostly dating from the Miocene and Pliocene, have not yet been studied, more than half a century after their discovery. Moreover, new finds were made when excavations were carried out for the construction of the city's "metro"⁴ and the harbor extension works. Pelagic sharks and sirenians were not uncommon in Oligocene seas. A sea probably existed during that time, stretching from south of present day Antwerp to nearby contemporary Scotland and being connected with the ocean. The fossils included at least 22 species of Odontoceti and seven of Mysticeti, and Van Beneden even identified a humpback whale (*Megaptera*). Basically 18 species of cetaceans have been identified in recent times; the mammals were present off the Belgian coast as early as the 9th century and identified since the 16th; the mammals were Oligocene sea dwellers. Study has been hampered through history because the carcasses of the "monsters" were usually rapidly buried to get rid of the bad odor. Information about marine mammals was provided by the harbor and resort town of Ostend (Oostende) that boasted a private museum of the sea nearby at Slijkens until 1860.

The *Université Catholique de Louvain*⁵ had a *Balaenoptera physalus* shipped in 1869 by rail to its laboratories and its mounted skeleton stood for decades on display at the Antwerp-sited National Zoological Garden.⁶ It is now at Planckendaal Domain in Muizen, near Mechlin (in Flemish Mechelen, in French Malines). Maximin Lohest, professor at both the universities of Liège and the Catholic University of Louvain, did significant research in paleo-bio-oceanography, on the fossil fishes of the Upper Devonian sea that covered a large segment of what is today Belgium.

³ With regard to marine biological nomenclature, according to the *World Register of Marine Species*, there were in June 2008 some 122,500 known marine species. One third of these are said to be identical but designated by various names. *Crangon crangon* L., the grey shrimp, for instance, has fifteen scientific synonymic names. The approximately 56,000 duplicating names are due to discovery and re-discovery by marine scientists. A new nomenclature was [is] therefore perhaps called for.

⁴ Metropolitan underground railway system, subway.

⁵ now split in the *Kat[h]olieke Universiteit Leuven* at Louvain (in Flemish *Leuven*) and the *Université Catholique de Louvain* at Louvain-la-Neuve.

⁶ Officially the Garden of the *Koninklijke Maatschappij voor Dierkunde/Société Royale de Zoologie*.

A whale's requiem

Honouring the memory of a whale seems at first to be somehow odd. However, Belgians are not a *unicum* in taking such steps. Vietnamese fishermen of the center and south coasts consider the whale a friend who helps and gives them support at sea. Their custom thus dictates, if they sight a whale that is dying or in its last throes, that they interrupt their fishing, call other fishermen to the rescue and tow the animal to shore.

Once there, they provide a dignified funeral in their village; Hai Chu is one of them. Some three years thence they exhume the animal, move it to the local whales' temple, and provide another funeral ceremony according to ancestral rituals. Whales are duly honoured at their memorial. Wally Koksijde's grave carries the initials RIP that happen to fit "Rest in Peace", but actually stand for the Latin *Requiescat in pace*.

When people, centuries ago, found fossils – whether bones, imprints or coproliths, – they were, understandably, puzzled. They turned to the closest source of knowledge, namely, their priests. Priests, who at that time were no more knowledgeable about the natural world than the common mortal but felt pressured to offer an explanation, labeled the odd finds "games of the devil." This attitude was not unique; the immense bodies that occasionally stranded on beaches, dead or alive, were inexplicable. The lack of explanation led to the ascription of the "diabolical" nature of cetaceans. Only in or about the 12th century did whales, dolphins and the like escape their supposed association with the devil. Their fate, however, did not improve; they were often killed off with sticks and knives or hunted at sea. In one instance, records relate the killing of a whale on the Land of Saeftingen by hordes of uncontrolled villagers.⁷ The Land of Saeftingen sank beneath the waters but the hunt was not over (De Pauw and Willemsen 1905). Granted, the cetaceans provided meat and medicines and hard materials including baleen used in women's corsets. Today all the products that can be retrieved from a whale can be found in nature or produced at a lower cost by artificial means. There is no reason to hunt them, no matter what Norwegians, Icelanders or Japanese give as reasons, setting aside, of course, some "artisanal" catches of Faroërs, Azoreans, Suva Sea ripuarians, and Eskimos or Inuits.

Humans and mammals in competition

A charter providing whale hunting rights was granted by the count of Flanders to the inhabitants of Newport (in Flemish Nieuwpoort, in French Nieupoort) in 1163, after the devil-relationship of the animals had been set aside.

⁷ At the 6th International Congress of the History of Oceanography (Qingdao, PRC, 1998) the author discussed to some extent whaling through Belgian history and provided a map of sightings (Charlier 2004, fig.1; table 1).

Five centuries later (1663), a company was founded in Bruges for the business of whale hunting in Greenland. Little is known of the activities of this 17th century company. (Figure 3)

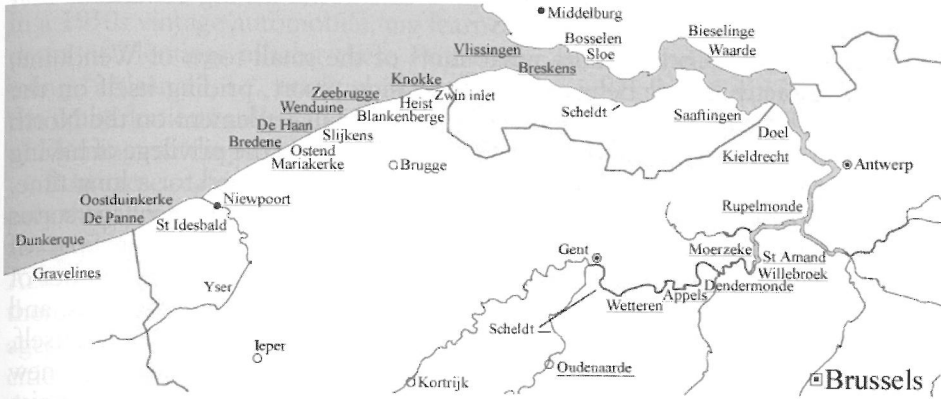


Fig. 3 - Sightings and strandings along the coasts of Belgian, French and Zeeland Flanders; also up-stream some rivers; underlined names of towns are sites of repeated sightings and/or strandings (see Table 1).

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- Gravelines (F) [Grevelingen] Flushing (NL) [Vlissingen] Along Scheldt R.
 - La/De Panne Zouteland (NL) Kieldrecht
 - St Idesbald Middelburg (NL) Doel
 - Coxyde (Koksijde)
 - Nieuwpoort Bosselen (NL) Rupelmonde
 - Mariakerke Sloe (NL) St Amand
 - Bredene Breskens (NL) Willebroek
 - Slijkens Bieselinghe (NL) Moerzeke
 - De[n] Haan Waarde (NL) Grembergen
 - Wenduine Saafingen (NL) Dendermonde
 - Zeebrugge Wetteren
 - Heist Appels
 - Knokke
-

Table 1 - Listing of principal sightings and strandings along the Northern French, Belgian and Zeeland (NL) coasts and some upstream locations (16th to mid-20th century). Abbreviations: F=France; NL=The Netherlands (all other sites are in Belgium).

The fishermen of Wenduine petitioned the count of Flanders for permission to hunt whales. Flanders was a vassal political entity of the French Kingdom, but had, under the feudal system, considerable autonomy. The count agreed to the request and granted the Wenduine inhabitants a charter that also allowed them to hunt sea mammals. It might be surmised that they were *afficionados* of whale

meat. Perhaps they were indeed consumers, but the real purpose for which they solicited the count's approval for whale hunting was different. Whales and porpoises, quite numerous in those days, actually competed with the local fishermen for the fish. It was thus primarily to create better fishing conditions that whale hunting was intensified.

Flemish whalers included the inhabitants of the small town of Wenduine, today an attractive small Belgian bathing seaside resort, priding itself on the nickname of Princess of the Beaches. The quite small settlement on the North Sea coast of Flanders had no coat of arms. When granted the privilege of having one, the community adopted one that the fishermen had used for a long time. Only in the first quarter of the 20th century did the town receive village status and gain an official coat of arms. The potvis – or porpoise – thus became part of the *armoiries*. Alas the Belgian governmental fervour to reduce the number of independent municipalities brought about fusion of several communities, and Wenduine found itself absorbed in a unit called De Haan, which includes itself, De Haan, and also the former towns of Klemskerke and Vosseslag. The new coat of arms combines those of the former municipalities and thus the porpoise is also part of the new *armoiries*.⁸

Victims of international politics

Ostend (Oostende, Ostende) became a thriving port in the 17th and 18th centuries and the seat of a quite active overseas trading and shipping company. During the early years of the 18th century, the Ostend Company, created by Charles VI (Holy Roman Emperor 1711-1740), brought considerable wealth to Ostend. In its wake Bruges benefited also. Unfortunately the travels of the Company's ships angered both England and Holland, which did not appreciate the competition that was cutting into the sumptuous profits they were making through trade with India and the Pacific. Unwilling to get into a conflict, Charles VI agreed that the subsidies paid to the Company be suspended for a period of seven years, thereby tolling the bells for the *Compagnie d'Ostende*. Bruges, which was already struggling with financial problems and the loss of its access to the sea, was severely hit because it was the seat of another group which was sending whale hunters to the Greenland shores (1727). The breach between Spain and Austria (1729) gave the *coup de grâce*.

⁸ The coat of arms of Wenduine pictured a "potvis" (Flemish name; in French and English: *cachalot*; in English also sperm whale) pierced by spears to indicate the town had been granted whale hunting privileges by the count. When several villages were grouped in a single administrative unit (*commune*=municipality) the combined coat of arms still included the speared "potvis".

The Flemish islands

The reputation of Flemish whale hunters went beyond their area of the North Sea coast. On travels around Fayal (one of the Azores Islands) in 1973, in a 1930s vintage automobile, my learned guide explained that many descendants of Flemings inhabit these Portuguese islands and that whale hunting, using “artisanal”, i.e., traditional methods was still practiced. He showed me the embarkations still used in local whale hunting. There are, indeed, records of Flemings settling in this geographical area.

Portuguese seafarers baptized the islands they discovered in the mid 16th century the Azores, or Birds Islands, because birds were the only insular dwellers the explorers encountered. For thirty years thereafter nothing happened on the Azores except that some domestic quadrupeds which the mariners had landed there multiplied. These were times when Flanders suffered from food shortages, unemployment and creeping poverty that ravaged rural areas and proud cities such as Ghent and Bruges. Robbers and pirates were holding sway. While the Zwin, the lifeline linking Bruges to the sea, was silting, the cloth industry, a main economy activity, slid into the doldrums and trade with the Hansa League ports was dropping off (Charlier 2005; 2011).

The Sire of Moerkerke, a town in North Central Flanders, urged Isabelle, duchess of Burgundy, who ruled Flanders, to inquire whether her brother Afonso V, King of Portugal (1438-1481), would devolve the Azores to her. She followed up on the suggestion and the king granted her request. de Moerkerke got some 2000 “colonists” together, representing all trades, in Bruges’ agglomeration [Het Vrije van Brugge], Furnes [Veurne Ambacht], while Duchess Isabelle provided all the possible labour equipment and house furnishings. Men, women and equipment went to the “Birds” Islands. It took two centuries for the Portuguese to displace the Flemish vernacular and the Flandrian culture. Fayal Island had actually been called New Flanders, and geographer Pieter van den Broeck called the islands “The Flemish Islands”.

The Flemish Islands and whale hunting by Flemings have been linked, particularly where the people of Wenduine were concerned. However, as stated earlier, if indeed the Wenduinaars received a deed (charter) from the Count of Flanders allowing them to hunt whales, it was less to catch them, particularly the *potvis*, than to rein in the competition these mammals gave the fishermen for the offshore fish. It made the fishermen good whale hunters and those who went to the Azores took their *savoir-faire* with them. Whale hunting was thus also part of the culture, and the habit “accompanied” the settlers. It was still practised in the 20th century and is tolerated today, provided that “artisanal” (historical, traditional) methods are used.

From hunting to loving

On the Belgian coast, the last throes of whale hunting and trading ended in 1849, according to documents displayed at the museum of the former abbey-farm Ten Bogaerde (outlying farm of the Cistercian Abbey Ter Duinen founded in 1136 at contemporary Coxyde, [in Flemish Koksijde] Belgium). Yet, there is also some evidence that efforts were made to put back on track the whale-business shortly after the end of World War II. These efforts failed because of the lower cost of artificially-produced “whale-products”, so the undertaking folded (1958).

The date of 1849, though, might best not be taken too literally, as there are claims that, even in that year, two Flemish whale-hunter vessels were still in service and the naval yards at Bremerhaven, Germany (then Free Hansa City-State of Bremen), built (1843) three-master *Bremen* and the standard-whaler *Océanie*.

The paper on whaling in Belgium includes a print of a stranded whale being carved up in 1577 in the Lower Scheldt, close to the river’s North Sea estuary (Charlier 2004b, 390). The best information on this imagery credits a H.R. Gotzius as the author of the original and the copy to Jacob Mathoun (1598). Also mentioned is a beluga whale whose painting adorns a room of the city hall of Dendermonde (in French *Termonde*; meaning mouth of the Dendre [or Dender], at the confluent with the Scheldt River). There is some controversy on the nature of the depicted animal; it is not clear whether this was the representation of a dolphin which stranded in 1711 and was donated to the city.

Belgians, Flemings, Bruxellois, Walloons or Germanophones alike, are keen on carnivals, parades, some called *ommeganck* (“going around” because the cortege snakes through the city’s major thoroughfares) or are part of a *fiesta* known as *kermesse* (*kermis* in Flemish), *ducasse*, etc. The Flemish *Beiaardom-meganck* (*ommeganck* of the carillon), elevated very recently to part of the cultural heritage of humanity by UNESCO, parades a float whereon is set a cetacean made of *reet* and straw.

Some sensational strandings, recent and not-so-recent, are still talked about today: 1989, 1994, 2004, 2011. Extensive press releases appeared in Belgian-Flemish language dailies such as *Nieuwsblad*, *Het Volk* in November 1994 and, in the 19th century in *Zeewacht*, on *i.a.* February 17, 1889. Enthusiasts of the film *Free Willie* might be interested in the love developed by locals for the whale of 1994, who was given a grave and tombstone.

Animals that land nowadays have strayed off their feeding routes. The North Sea and its shallow coastal areas are not the “normal grounds” for whales. Ill, hurt, tired, or too old, they could not follow the herd and got lost. A frequent illness they get is acanthosis, the petrol platform workers’ disease, due to accumulation of mercury and/or cadmium, for instance, in the liver. Other whales have been “fooled” by the reflection of the bottom and/or its shallowness.

In academe

As part of the seminars sponsored by the European Commission in the latter part of the last century, national and international studies, often involving Belgian contributions, were published that focused on the utilization of algae – food, feed, pharmacology, therapies, methanization – and on efforts to solve problems linked to eutrophication and blooms (Charlier 1986; Charlier, Morand and Finkl 2008; Morand, Charlier and Mazé 1990; Charlier and Senten 1992).

Studies are currently performed on shellfish (conchyli-, ostrei- and mytili-culture) and research conducted in academe and fisheries media of saltwater fishes (Free University of Brussels, VUB), but it is difficult to trace the historical development of these activities. The “mathematical model of the North Sea” is an on-going project that has progressed for several decades; interdisciplinary coastal oceanographer Roland Wollast’s name (Free University of Brussels, ULB; 1927-2004) is frequently associated with that undertaking. Polar scientist Christiane Lancelot (1990), G. Billen (1991) and others have published in that area for several decades.

Hugo Decler, now emeritus professor of the Free University of Brussels (VUB), has made several trips to Antarctica. However, his research has been more directed towards climatology and physical geography than towards marine biology observations. Problems of marine eutrophication retain the attention of researchers, e.g. at the University of Louvain and to some extent at the Free University of Brussels [VUB] (Charlier), ULB (Houvenaghel), and State University of Liège (respectively Charlier and Thierry Lonhienne).

If the major disciplines of oceanography are no longer taught at the Free University of Brussels [VUB] since Roger Henri Charlier reached emeritus status and the IFAQ and FAME programs folded with the retirement of professors Roland Paepe and Philippe Polk, when UNESCO, the Belgian Agency for Development Aid and the University itself ended funding, there remain some activities which definitively belong to the realm of biological oceanography. The ULB, e.g., has a section which focuses on agronomy and marine biology.

More information is available by contacting Guy Houvenaghel. The University of Liège, whose oceanographic activities addressed especially fluid dynamics, has expanded its bio-oceanography interests through its biology department and also through its Gembloux-located Faculty of Veterinary Medicine.

Charlier included, in his course of economic and applied oceanography at the Free University of Brussels-VUB, fisheries and ecology especially geared to practical aspects and he encouraged applied biological oceanography in oceanography courses taught under the banner of the above mentioned International Fundamental Applied Quaternary Geology [IFAQ] program. He served as vice-chairman during several years. The IFAQ program, led by Roland Paepe (now emeritus) and Elfie Van Overloop (then assistant at the VUB, now college professor in Ghent), provided dozens of students from Third World countries,

over nearly two decades, with an opportunity to pursue graduate studies in earth sciences focused on the present. The folding of these offerings was, in this author's view, an error, particularly at a university that bestowed a doctorate *honoris causa* upon Jacques-Yves Cousteau, origin of a Cousteau chair which, un-funded, has apparently born no fruit.

Philippe Polk fathered a FAME⁹ program that centered its efforts on the study of the coastal zone of Kenya. Jane Tack has contributed to the knowledge of the effects of subsurface water on the mangrove ecosystem. Efforts of mangrove reforestation and ostreiculture have met with some success, while the theoretical aspects of mangrove research have been explored.

The sea-snails Conidae family's protective poison Adarts (against *i.a.* worms and small fishes) contains a substance which binds neurotransmitters in the human brain. These biologically active molecules are an important link in vital processes including blood pressure and psychomotor activities. The poison, isolated by Gau Vauquelin and his team and whose mechanism has been identified, can play the part of an antagonist and oppose undesirable reactions.

The role of carbon dioxide and nitrogen and their role in global warming, in oceans and the coastal zone, may be mostly the domain of chemical oceanography, but the work of Willy Baeyens, F. Dehairs and L. Goeyens has some ramifications for life in the ocean.

Elsewhere

Marine biology research is conducted, of course, outside of university laboratories, and the Royal Institute of Natural Sciences, with its museum, pursues a tradition which goes back to Gilson, Leloup and others. While at the Institute, W.M.A. De Smet, founder of the Flemish Society for the Study of Sea-Mammals, studied cetaceans.¹⁰

The Royal Zoological Society of Antwerp (*Société Royale de Zoologie d'Anvers – Koninklijke Maatschappij voor Dierkunde*) has an extensive zoological garden, an impressive museum of natural history, a large aquarium and a reptile house. Its periodical, *Zoo*, has published some marine biology articles, e.g. on sea mammals. The dolfinarium conducted some research on marine mammals; it was however closed because it did not conform to the newly created norms of the European Union Commission. A large dolfinarium exists near Bruges in the province of West Flanders, but it is probably more geared to the amusement park crowd than to scientific research.

A thorough volume on the benthic populations of the Belgian part of the North Sea was recently released as a polyglot *vade mecum* (Degraer et al. 2005) by the marine biology section of the University of Ghent.

⁹ Fundamental and Applied Marine Ecology

¹⁰ Now emeritus, he may be contacted at 38 Hertendreef, Kalmthout, (prov. of Antwerp) Belgium. The organization ended its activities in 2004.

Geological oceanography embodies important marine biology considerations, for instance with regard to the biological impacts of beach nourishment and material dredging offshore. A field of investigations is opening up with the planned removal of dune toe protection in the Westhoek (La/De Panne) Natural Reserve area to allow tidal waters to enter the dune barrier. At the other end of the Belgian coast, the Zwin Natural Reserve has provided rich opportunities for marine related biological studies, particularly in ornithology (Charlier 2011). Migrating birds, marine and others, have been closely studied in the nearby Heist Clay Pits Reserve; an in-depth report was recently made (1991) in connection with the environmental impact study of the routing of the new STATOIL pipeline through the reserve. (Anonymous 1998; Charlier 1998). STATOIL, however, did not go along with the report, and selected alternative routing.

The placing of a field of marine wind energy captors at some 30 km from the Belgian coast, likewise, raised some ecological concerns for marine birds. Indeed, their migration route might, at times, cross that artificial "forest," running the risk of subjecting the birds to being chopped to death. Nevertheless, after years of legal wrangling, the green light was given by the courts for a marine wind park.

Belonging jointly to the chemical and biological domains are some publications from J. Rudy Senten¹¹ that stretch over 25 years and began with his thesis at the Free University of Brussels (VUB); some papers of the CATS meetings (International Conference on Advanced Technologies with Sludge); and bioremediation approaches developed at private laboratories (e.g. HAECON, N-Vironment, both of Ghent).¹²

Since the late 1980s, reports on marine science education in general, including marine biology, have been published. Guy T. Houvenaghel gave a review of ocean activity before 1883 (Houvenaghel 1990). Declair, in 1990, reviewed two centuries of biological oceanography in Belgium (Declair et al. 1990). Papers on secondary and higher education levels, and the philosophy thereof, occasionally with a strong environmental twist, were read at BORDOMER 92 and Coastal Zone Canada 96 by Distèche and Chaineux respectively, and two followed in the *International Journal for Environmental Studies*.

Conclusion

Though the coastal area of Belgium is quite small, its researchers have gone well beyond the nation's horizons, both on ships and in laboratories, reaching even Nigeria and the Galapagos Islands, for instance. Fisheries areas extended

¹¹ Senten is now emeritus of the Hogeschool Antwerpen. For contact: Dr J. Rudy Senten, 15 Karel Mertensstraat B-2020 Antwerp 2 Belgium.

¹² HAECON folded as a company in 2003. N-Vironment had been sold to a foreign company the preceding year.

to Iceland and still include Suriname. Traditions set a hundred years ago have not been lost, and descendants of de Gerlache have accepted the baton. There have been even “dynasties” of marine biologists, such as those of the Van Benedens and Damas in Liège.

The public interest, already sharpened by television programs such as those of the late Jacques-Yves Cousteau and his legendary *Calypso* (Charlier 2012) and the France 3 channel weekly “Thalassa,” has been further kindled by revived memories of the *Belgica* and her successors, the open air museum at Ostend where the school ship *Mercator* is docked, the founding in Ostend of both a UNESCO-ICO ocean data center and the Flemish Institute for Sea Research, and the second open air exhibit at Zeebrugge where the lightship *Westbinder* was retired, as well as the mounting environmental concerns about sea mammals’ and penguins’ survival, the melting ice caps, the carbon dioxide problem, water pollution, etc. The creation of a Royal Marine Academy¹³ and the numerous relevant international programs contribute to the broadening of interest in oceanography whether biological or other.

There are few specific, *viz.* “dedicated”, departments of oceanography in universities in Belgium, but marine studies are pursued in departments of biology, chemistry, geology, physics and engineering. The only university with a masters degree in oceanography is Liège, and this program is strictly geared towards physical oceanography centering on fluid dynamics.¹⁴ An occasional scholar looks now and then at the history of oceanography, so the topic is not entirely forgotten when history and philosophy of science meetings are organized.

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References

- Anonymous, 1998, *Milieu studie in betrekking met het leggen van een metaan pipeline door het kleiputten gebied van Heist*, Gent: HAECÓN.
- Bănărescu P.M. and Nalbant T.T., 1998, “Résultats ichtyologiques de l’expédition antarctique de la *Belgica*”, *Noesis*, XXIII: 47-54.

¹³ For contact: Prof. Dr. Christian Koninckx, dept. of history, Faculty of Philosophy & Letters, Vrije Universiteit Brussel, 2 Pleinlaan 1050 Brussels, Belgium.

¹⁴ For contact: Université de Liège, Dept. of Physics, Fluid Dynamics, Place du XX août, Liège, Belgium.

- Beavis A. and Charlier R.H., 1986, "An economic appraisal for the onshore cultivation of *Laminaria spp.*", *Hydrobiologia*, 151/152: 387-398.
- Beavis A., Charlier R.H. and De Meyer C.P., 1986, "*Laminaria ssp.* as energy source", *Oceans '86 Proceedings*, 621-626.
- Balaban A.T., 1998, "Centenaire Belgica", *Noesis – Travaux du Comité Roumain d'Histoire et de Philosophie des Sciences*, XXIII: 13-87.
- Benson K.R. and Rehbock P.F. (eds), 2002, *Oceanographic History. The Pacific and Beyond*, Proceedings of the 5th International Congress on the History of Oceanography at Scripps, La Jolla, CA), Seattle & Washington: University of Washington Press.
- Billen G., 1991, "Historical retrospective of eutrophication", *Abstracts NATO-ARW [North Atlantic Treaty Organization-Advanced Research Workshop] Château de Bonas, France "Global Change and the Coastal Zone"* [handout].
- Bologa A.Ş., 1990, "The Romanian Marine Research Institute at its 20th anniversary: tradition, status, perspectives", *Cercetari marine-Recherches marines*, 23: 7-13.
- Bologa A.Ş., 1993, "Romania and the International Commission for the Scientific Exploration of the Mediterranean Sea", *Noesis*, 19: 129-138.
- Bologa A.Ş., Papadopol N., Nae I., 1997, "Evolution of vessel use in Romanian oceanographic research activities (1893-1997)", Abstract, XXth ICHS, Liège, Belgium, 417.
- Breyne M., Seys J., Lescauwaeat A.-K., Debergh H., Haspelslagh J., Lust H. and Mees J., 2010, "The World's very first marine station in Oostend (Belgium)", *Earthzine August*, 18: 4.
- Capart A., 1966, "L'œuvre de Gustave Gilson, pionnier de l'océanographie belge", *Comptes Rendus du Premier Congrès International de l'Histoire de l'Océanographie*, Monaco, 311-316.
- Charlier R.H., 1986, "Macro-algae research and studies in Belgium", *Actes du 1^{er} Symposium sur l'utilisation des algues*, Lhoumeau, France, 12-15.
- Charlier R.H., 1998, *Environmental-Ecological impact of a gasoduct through the claypits area of West Flanders*, Ghent: HAECON (in-house report for STATOIL)
- Charlier R.H., 2004a, "Thirteen decades of biological oceanography in Belgium (1840-1970)", Proceedings of the 6th International Congress of the History of Oceanography, Qingdao PRC 1998. In: Morcos S.E.A., Zhu M., Charlier R.H., Kullenberg G., Lenz W., Lu M. and Zou E. (eds), *Ocean sciences bridging the millennia. A spectrum of historical accounts*, ed. by S. Paris: UNESCO/Qingdao: China Ocean Press, 369-384.
- Charlier R.H., 2004b, "Cetaceans and whaling in Belgium", Proceedings of the 6th International Congress of the History of Oceanography, Qingdao PRC 1998. In: Morcos S. et al., Zhu M., Charlier R.H., Kullenberg G., Lenz W., Lu M. and Zou E. (eds), *Ocean sciences bridging the millennia. A spectrum of historical accounts*, Paris: UNESCO/Qingdao: China Ocean Press, 385-398.
- Charlier R.H., 2010, "Philatelic panorama of some Belgian Antarctic marine contributions, 19th-21st centuries: from *Belgica* to *Princess Elisabeth*", *Journal of Coastal Research*, 26(2): 359-376.
- Charlier R.H., 2011, "The Zwin from golden inlet to natural reserve", *Journal of Coastal Research*, 27(4): 746-756.
- Charlier R.H., 2012 [in press], "Fisherman cavalry", *Journal of Coastal Research*.
- Charlier R.H. and Charlier C.C., 2013, "Calypso on the Mend." In: Groeben C. (ed.), *Places, People, Tools: Oceanography in the Mediterranean and Beyond*, Proceedings of the Eighth International Congress for the History of Oceanography (Naples, 2008), Napoli: Giannini Editore, 401-408.
- Charlier R.H., 2013 [in press], "*Crangon crangon's via dolorosa*", Address on the occasion of the installation on May 8th as a member of the Romanian Academy of Scientists, *Bulletin of the Academy*.

- Charlier R.H. and Leloup L.R., 1966, "Contributions belges à l'océanographie jusqu'en 1922", *Comptes-rendus du premier congrès international d'océanographie*, Monaco, 293-310.
- Charlier R.H. and Leloup L.R., 1998, "Brief panorama of the development of biological oceanography in Belgium", *Sixth International Congress on the History of Oceanography – Qingdao, PRC, Abstracts*, Qingdao, 28.
- Charlier R.H. and Senten J.R., 1992, "Use and harvesting of, and legislation pertaining to algae in food and feed in Belgium", *Cost-48 Aquatic Primary Biomass, Marine Macroalgae. Proceedings of 1st Workshop on food and feed from seaweeds*, March 1992, Sorrento, Paimpol, Sta. Res. CNRS-U. de Rennes-1, 37-39.
- Charlier R.H., Chaineux M.-C. and Thys A., 2005, "The tale of two inlets", *International Coastal Geology Symposium, Abstracts*, Hoefn, Iceland, The Symposium, 158-161 (full text on CD); id. *Proceedings of the 2nd Int. Congress of Coastal Geomorphology*, Hoefn, Iceland 38-46.
- Charlier R.H., Morand P. and Finkl C.W., 2008, "How Brittany and Florida cope with green tides", *International Journal of Environmental Studies*, 65(2): 197-214.
- Decler H., 1998, "The discoveries of the *Belgica* expedition", *Noesis*, XXIII: 34-46.
- Decler W., Podoor N. and Vanpaemel G., 1990, "Twee eeuwen mariene biologie in België", *Tijdschrift voor de geschiedenis der geneeskunde, natuurwetenschappen, wiskunde en techniek*, 13(1): 66-82.
- Degraer S., Wittoeck J., Appeltans W., Cooreman K., Deprez T., Hillewaert H., Hostens K., Mees J., Vanden Berghe E. and Vincx M., *De macrobenthos atlas van het Belgisch gedeelte van de Noordzee; Atlas du macrobenthos de la partie belge de la Mer du Nord; The macrobenthos atlas of the Belgian part of the North Sea* [included CD], Ghent: Universiteit Gent.
- Demeyer C.P., Charlier R.H., Devos K. and Malherbe B., 1997, "In situ bioremediation of contaminated sediments", *Sea Technology*, 38(1): 57-59
- De Pauw I. and Willemsen G., 1905, "Note sur les cétacés échoués dans l'Escaut en 1577", *Annales du Cercle d'Archéologie du Pays de Waes*, 23: 23-29.
- De Smet W.M.A., 1974, "Inventaris van de walvisachtigen (Cetacea) van de Vlaamse Kust en de Schelde", *Bulletin van het Koninklijk Belgisch Instituut voor Natuurwetenschappen*, 50, 1: 1-156.
- De Smet W.M.A. and Bultinck J., 1972, "A case of invasive acanthosis in the skin of the penis of a sperm whale (*Physeter catodon L.*)", *Acta Zoologica Pathologica Antverpiensis*, 55: 91-102.
- Gerlache B. de, 1998, "Les Belges dans l'Antarctique après l'expédition de la *Belgica*", *Noesis*, XXIII: 21-28.
- Gerlache G. de, 1998, "Emile Racovitza et le centenaire de l'expédition de la *Belgica*", *Noesis*, XXIII: 19-20.
- Goes J., 1986, *Methane extraction from marine algae in Kenitra*, Morocco: Antwerp, SOPEX (St Katelijnevest) [company publication].
- Goes J., 1988, "Methanization of algal residue after extraction of agar-agar from *Gelidium*", *Aquatic Primary Biomass (Marine Macroalgae: Biomass Conversion, Removal and Use of Nutrients)*, *Proceedings of the 1st Workshop of the Cost-48 Sub-group 3. Lhoumeau, France Feb. 1987*, Lhoumeau: Station de Biologie Marine, 111-113.
- Houvenaghel G.T., 1990, "The first international oceanographic conference (Brussels 1853)", *Deutsche Hydrographische Zeitschrift, Ergänzungsheft B*, 22: 330-336.

- Lancelot C., 1990, "Phaeocystis blooms in the continental coastal areas of the Channel and the North Sea." In: Lancelot C., Billen G. and Barth H. (eds), *Eutrophication and algal blooms in the North Sea coastal zones, the Baltic, and adjacent areas: prediction and assessment of preventive actions* (Water Pollution Research Report No 12), Luxembourg: European Community, 27-56.
- Marinescu A., 1998, "Correspondance des membres de l'État-Major de l'expédition *Belgica*: son importance pour l'histoire des Sciences", *Noesis*, XXIII: 61-78.
- Morand P., Charlier R.H. and Mazé J., 1990, "European bioconversion and realizations for macro algal biomass", Saint-Cast-le-Guildo, France experiment, *Hydrobiologia*, 204/205: 301-308.
- Proceedings 1998, *Noesis, Travaux du Comité roumain d'Histoire & de Philosophie des Sciences*, XXIII.
- Racovița G., 1998, "L'épopée antarctique d'Émile Racovița", *Noesis*, XXIII: 53-60.
- Schelfhout C.E., 1998, *de Gerlache*, Sint-Maartens Laethem: De Dyle.
- Van Beneden E., 1886, "Description des ossements fossiles de la région d'Anvers", *Annales du Musée Royal d'Histoire Naturelle de Belgique* (série Paléontologie), 13.
- Van Bladel G., 1930, "Le littoral belge de la mer du Nord: Brussels (the Belgian littoral of the North Sea)", *Bulletin de la Ligue Maritime Belge*, n° spécial.
- Xu Y., Nogi Y., Kato C., Liang Z., Rüger H.-J., De Kegel D. and Glansdorff N., 2003a, "Moritella profunda sp.nov. & Moritella abyssi sp.nov., new psychropiezophilic species from deep Atlantic sediments", *International Journal of Systematic and Evolutionary Microbiology*, 53: 533-538.
- Xu Y., Nogi Y., Kato C., Liang Z., Rüger H.-J., De Kegel D. and Glansdorff N., 2003b, "Characterization of *Psychromonas profunda* sp.nov., a psychropiezophilic bacterium isolated from deep Atlantic sediments", *International Journal of Systematic and Evolutionary Microbiology*, 53: 527-532.
- Xu Y., Sun Y., Huysveld N., Gigot D., Glansdorff N. and Charlier D., 2003c, *Regulation of arginine biosynthesis in the psychropiezophilic ichthyology*, Brussels: VUB Faculty of Sciences [biology].
- Xu Y., 2003d, *Bacterium Moritella profunda* in vivo repressibility and in vivo repressor-operator contact probing, Brussels: VUB Faculty of Sciences (biology).