

The 'Dutch approach', or how to achieve a second life for abandoned geological collections

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Resumo

Este artigo descreve em linhas gerais o ciclo de vida das colecções de geologia das universidades holandesas, tendo como pano de fundo a evolução das políticas de investigação e de ensino superior. A passagem do 'trabalho de campo' para o 'trabalho em laboratório', combinado com a massificação do ensino superior, conduziu a inúmeras 'colecções órfãs' totalizando mais de dois milhões de espécimens. Recentemente, e com o apoio do governo holandês, as cinco universidades mais antigas (Amsterdão, Utrecht, Delft, Groningen e Leiden) iniciaram um projecto de colaboração com o fim de intensificar utilizações presentes e futuras e, de uma forma geral, melhorar a acessibilidade das colecções, através de um rigoroso e selectivo processo de inventário, transferências e desincorporações. O artigo descreve a experiência, salientando altos e baixos e apresentando recomendações para futuros projectos semelhantes.

Abstract

The 'life-cycle' of geological collections from Dutch universities is described against the background of developments in education and research. The shift from the field to the laboratory in both education and research, combined with massive reorganisations, led to many orphaned collections, totalling some two million objects. Sponsored by the government, the five oldest Dutch universities engaged in a collaborative action to tackle this problem with the aim to improve the overall quality and accessibility of the collections, as well as to intensify their present and future use through selection, de-accession, collection mobility, or even disposal. Some experiences, pitfalls and recommendations will be discussed.

Introduction

From the late Renaissance onwards, natural history, including geological, palaeontological and mineralogical samples, can be found in cabinets of curiosities all over Europe. Until the late eighteenth century, most universities in the Netherlands and elsewhere did not own natural history collections of any significance apart from their botanical gardens and anatomical cabinets. During the early seventeenth century, a number of 'fossils' was kept in the *Ambulacrum* of the botanical garden and in

the anatomical cabinet of Leiden University. Most anatomical and natural history collections were the private property of professors¹ whose appointment often depended on the quality of their collections. To some extent, these collections – often containing both minerals and fossils – survive up to the present day in the collections of universities. The close connection between mineralogy and pharmacy is evident in the *materia medica* and fossils were often included in the comparative anatomy collections. Today, probably the most important surviving early natural history collection in the Netherlands is kept

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¹ For example Petrus Camper (1722-1789, Groningen), Jan Bleuland (1756-1838, Utrecht), Sebald Brugmans (1763-1819, Leiden) and Gerard Vrolik (1775-1857, Amsterdam).

at the Geological and Mineralogical Cabinet of Teylers Museum, Haarlem. In the years 1782-1826, its first keeper, Martinus van Marum (1750-1837), devoted much time and money in amassing a considerable collection *fossilia*, including crystal models by Romé de l'Isle and the Abbé Haüy, as well as the famous *Homo diluvii testis*, a fossil found and described by Scheuchzer (1726) as the sinner that was rightfully drowned by the biblical flood. Only in 1812 Georges Cuvier correctly identified it as a specimen of *Andrias scheuchzeri*, a giant salamander.

The first ever geological map of a country² (England, Wales, part of Scotland) was published in 1815 by William Smith (1769-1835). He was also the first to discover that fossils were not just beautiful and curious stones, but that they could be used for the identification and relative dating of strata. His collection is now at the Natural History Museum, London. Although such collections were instrumental in the birth of geology as an independent discipline, a university degree in geology was not possible until the second part of the nineteenth century. In fact, the word 'geology' is first mentioned in the fourth edition of the *Encyclopaedia Britannica* (1810).

The emergence of geological university collections in the Netherlands³

The first formal reference to geological collections for educational purposes in the Netherlands is to be found in the post-Napoleonic law on higher education (1815). This law prescribes the establishment of a 'geological cabinet' and hence heralds systematic collecting of palaeontological, mineralogical and

geological samples and of casts and crystallographic models for educational purposes. Many, if not most, of the objects in these collections were in some way or another related to research. However, research as such was not formalised until the 1876 Law on Higher Education, when it was recognised as one of the two academic core-tasks.

As a result of this law, chairs in geology were established at the universities of Groningen (1877), Leiden (1878)⁴, Utrecht (1879), and Delft (1847). During its first decades, the number of students was small, but there were funds for the formation of collections. Gradually two types of collections emerged:

- a) Systematic collections for education in specific subjects (mineralogy, petrology, geology, palaeontology, stratigraphy)⁵. Objects were often purchased from renowned houses like Kranz and Stürtz, which flourished in the second half of the nineteenth century, or they were obtained during field trips or through exchange;
- b) Regional collections for research. Material was usually collected in the field during field trips to classical locations or as a result of participation in exploratory expeditions.

Around 1900, some major scientific expeditions to the colonies were organised, aiming at surveying the natural treasures (flora, fauna, geography, geology and minerals) of the hitherto unknown interior of these territories. The *Rijks Geologische Dienst* (Geological Survey of the State) was often charged with the organisation and logistics in the field. On some occasions, a duplicate collection was made to be kept overseas in the colony of origin. On their return to

² W. SMITH 1815. *A delineation of the strata of England and Wales with part of Scotland; exhibiting the colleries and mines; the marshes and fen lands originally overflowed by the sea; and the varieties of soil according to the variations in the sub strata; illustrated by the most descriptive names.* John Cary, London.

³ For a more general review of the history of university collections, see LOURENÇO (this issue); also CLERCQ & LOURENÇO (in press).

⁴ Naturalis, the National Museum of Natural History, Leiden, was founded in 1820. In 1878, when Dr Karl Martin became Professor of Geology, the geological collections (both palaeontology and mineralogy) were given into his care and the *Rijksmuseum van Geologie en Mineralogie* came into being as part of the University of Leiden. In 1989, after the Geological Institute of the university was discontinued, the two museums were reunited.

⁵ Photographs and architectural drawings show that these collections were kept in the museum and were organised in cabinets according to the method used at the time. The Systematic Palaeontological Museum in Utrecht, for example, was kept in drawers, which were organised in taxonomic order.

Europe, collections were sometimes divided among universities for further research according to the distribution of specialists on specific subjects. Illustrating the international character of research, this was not necessarily restricted to Dutch universities.

As a result of the growing demand for geologists and mining engineers, the number of students gradually increased. These students would participate in the expeditions mentioned above and subsequently contribute to the study of the material as part of their master's or PhD degrees. In this way, each student would make his 'own' (student) collection as a result of field training, which would be added to the collections of the faculty when the student left the university. The growing demand for geologists and mining engineers was reflected in the increasing number of professors and staff and in the establishment at the University of Amsterdam of the fourth fully equipped geological institute in 1929.

Professors continued to organise expeditions and extended field campaigns to areas of their specific scholarly interest. The character of these expeditions, however, changed as a result of a more active participation of students. This, combined with the increasing involvement of students in the research programme of the department, led to numerous collection-based publications and PhD theses. Over the years, the number of collections grew considerably.

The roaring sixties

This practice continued more or less unaltered until the 1960s. By then, the Netherlands had four fully equipped geological institutes (Amsterdam, Groningen, Leiden, Utrecht) for not more than some 50 first-year students, and one school for mining engineering (Delft) with some 15 new students each year.

In 1965 this already luxurious situation became untenable when the Free University of Amsterdam claimed – and got – the right to establish its own geological institute. The four older universities felt that they could not stay behind and claimed more

funds for modern equipment and extra chairs. This more or less coincided with a number of rather independent developments that had an enormous impact on the universities as a whole: i) an explosive growth of students and, consequently, of staff and housing; ii) budget cuts for higher education; iii) democratisation and management reform; iv) reorientation on research and education; and v) new expensive and voluminous laboratory equipment.

In the earth sciences this led to the introduction of new fields like geophysics and geochemistry and a marked shift in research and education from the field to the laboratory, from macro to micro, from description to experiment. In the wake of this process it became fashionable to play down the status and importance of collections: 'we have by now sufficiently mapped the world and descriptive sciences are from now on out of date'. Moreover, driven by a dip in economic growth, these developments brought the Government to initiate the 'Earth Sciences Reorganisation'. This was the first initiative for the reorganisation on the national level of an entire discipline. As a student in geology at the University of Amsterdam, I have witnessed this process and in fact actively participated in it.

In this paper I will discuss the consequences these developments had for the collections. Generally speaking these were disastrous, as there was no general plan for the collections and they were hardly if at all mentioned during the entire process. In other words, the fate of the collections was entirely left to the personal engagement of a handful of dedicated individuals. The entire process lasted from 1967 to 1979 and resulted in the following situation:

- a) Amsterdam: the faculty of the University of Amsterdam was forced to merge with the new faculty at the Free University, which only accepted a marginal part of the collections. The remainder (well over 1,000,000 objects) was stored in a basement of which about half was given on loan to the Geological Museum of the Amsterdam Zoo (Artis);
- b) Groningen: the faculty was closed down and

gradually most collections were disposed of. Thanks to the efforts of an emeritus Professor, a core-collection of about 30,000 objects was kept, including historical objects from the eighteenth century (Petrus Camper);

- c) Leiden: the faculty was closed down and staff split up, some moving to Utrecht (together with their collections), while others were transferred to the National Museum of Natural History (now Naturalis), also in Leiden. The collections were saved due to the long-standing and close link between the faculty and the museum;
- d) Utrecht: a new building on campus was necessary to house the new faculty, which grew considerably due to the merger with part of the former Leiden staff. From the beginning, however, it was too small for all collections and as a result many collections had to be left behind in the former building. (The initial plan was that they would become the nucleus for a regional natural history museum, together with the orphaned collections of the department of zoology. This plan never materialised.) A decade later, part of the collections was handed over to the Utrecht University Museum, whereas the remainder was offered to local museums or disposed of after Naturalis had made a selection;
- e) Delft: survived this round of reorganisations unharmed.

After the dust of the reorganisation had more or less settled, well over two million geological samples were left as orphans, some still in the odd corners of their institute, others in abandoned laboratories or temporary storages. Although the reasons why such collections became 'orphaned' vary, the results are always the same: gradually the interest, attention and care diminish, the collections are moved to the

cellar or a remote corner of the attic, or just left behind. Sometimes, a collection is split into different parts and the documentation becomes separated from the collection. Apart from 'psychological' (who wants to continue the work of his predecessor?) and political reasons (the abolition of the subject due to reorganisation and budget cuts), the most important factor was probably the change in research methodologies and techniques – a shift from the field to the laboratory, from description to experiment. This shift was also echoed in a decrease in the use of teaching collections.

A quarter century of despair

Most staff members were happy to survive this upheaval and to get back to work. They had lost interest in the collections and struggled to survive as there were more changes and reorganisations to come.

Nevertheless, there were a few initiatives, like the above mentioned establishment of a geological museum at the Amsterdam Zoo and the failed attempt in Utrecht to transform the former Geological Institute into a regional natural history museum. Although the latter never materialised, it did cause pressure on the Board of the University. Today, both collections are housed at the Utrecht University Museum, while parts have been transferred to Naturalis.

In 1984, the keepers of collections of most Dutch universities joined forces and established LOCUC⁶. LOCUC's first and most effective action was to compile the first comprehensive inventory of existing university collections. The Ministry of Culture sponsored the initiative and published a report⁷. A total of 224 collections was identified, ranging from huge ones of well over a million objects to small ones consisting of just a handful of items. Collection keepers were asked to assess the future of their

⁶ LOCUC stands for *Landelijk Overleg Contactfunctionarissen Universitaire Collecties* (National Consultation Contact-persons University Collections).

⁷ LOCUC 1985. *Rapport Landelijke Inventarisatie Universitaire Collecties*.

collections. Eighteen were reported to be 'threatened', among them the geological collections from the five old universities. Embarrassed by the outcome of this report, the Ministry of Culture asked the State Advisory Committee on Museums to look into the matter and to come forward with suggestions. Their report⁸ confirmed the situation and made recommendations for the future of each of the collections.

The result of these activities was that both Government and universities felt uncomfortable with the situation. Although massive loss of the collections was prevented, there was still no real solution. It is interesting to further explore the reasons why these efforts had little effect. Apart from familiar arguments such as 'low priority' and 'lack of money', etc., two things really seemed to matter. First of all, although the Minister of Education and Science was responsible for the universities and hence for their collections, the Minister of Culture claimed the overall responsibility for cultural heritage. However, the latter refused to pay for collections that belonged to the other ministry. In turn, the Minister of Education and Science argued that he could not do anything either, because the responsibility had been claimed by the Ministry of Culture. A more practical reason was that the geological collections were too big, there being just too many objects – it was impossible to find a single solution for all collections and objects.

A change in climate

Funding of Dutch universities is based on output in research and teaching. This system does not take into account the responsibility of the classical universities to maintain their museums and collections, old libraries, botanical gardens, and monumental buildings up to the best standards. Furthermore, the so-called classical universities are also responsible for a range of small (and therefore costly) disciplines, like Icelandic language, history of science and ethnomusicology (i.e. 'small' subjects with just a handful of students per year, whereas we all agree that there should be a place to study them). As a result, these universities find it increasingly difficult to cope with pressures to invest in modern equipment in order to keep up the competition with more recently established universities, which are not faced with such traditional responsibilities.

The cultural responsibilities of universities are explicitly mentioned in the *Magna Charta* of Universities⁹. These include the care for academic heritage, both tangible and intangible. At the international level, three initiatives focusing on academic heritage have recently been taken: 1) in 1999, the Council of Europe initiated the project 'Heritage of European Universities', aiming at creating a *route* of historical universities in Europe¹⁰; 2) in 2000, 12 of the oldest and most renowned European universities established the network 'Academic Heritage and European Universities'¹¹ –

⁸ RIJKSCOMMISSIE VOOR DE MUSEA EN COMMISSIE VAN ADVIES VOOR DE NATUURHISTORISCHE MUSEA 1986. *Advies betreffende de bedreigde universitaire collecties*.

⁹ The *Magna Charta* of Universities was signed by more than 250 rectors of European universities in Bologna in 1988. See http://www.unige.ch/cre/activities/Magna%20Charta/magna_charta.html

¹⁰ See N. SANZ & S. BERGAN (eds.) 2002. *The Heritage of European Universities*. Council of Europe Publishing, Strasbourg. For further information on the 'Heritage of European Universities' project, see http://www.coe.int/T/E/Cultural_Co-operation/education/Higher_education/.

¹¹ The 'Declaration of Halle' was signed by representatives of the following universities: University of Amsterdam, Humboldt University (Berlin), University of Bologna, University of Cambridge, University of Groningen, Martin Luther University of Halle-Wittenberg, University of Leipzig, Royal College of Surgeons of England (London), University of Oxford, University of Pavia, University of Uppsala, and University of Utrecht. The main text reads: "Universities must acknowledge their wide cultural roles. Academic collections and museums provide special opportunities for experiencing and participating in the life of the University. These collections serve as active resources for teaching and research as well as unique and irreplaceable historical records. In particular, the collections of the oldest European universities provide windows for the public on the role of the university in helping to define and interpret our cultural identity. By valuing and promoting this shared academic heritage, our institutions demonstrate a commitment to the continued use of these resources by a broad public". *Universeum* aims at stimulating public awareness and access to European academic heritage. See T. BREMER & P. WEGENER (eds.) 2001. *Alligators and Astrolabes: Treasures of University Collections in Europe*. Druckwerk, Halle), and <http://www.universeum.de>

now known as *Universeum* – and signed the 'Declaration of Halle'; 3) in 2001, the International Council of Museums (ICOM) established an international committee on university museums and collections, UMAC.

In the Netherlands, the Ministries of Education and Science and that of Culture were merged in 1995, thereby placing the responsibility for academic heritage at the national level in one hand. The classical universities seized the opportunity and drafted a rescue plan¹² in which they claimed funds for their endangered collections. In reply, the Ministry ordered a detailed inventory of academic heritage under the care of Dutch universities and related scientific institutions¹³. This survey confirmed that the five old universities (together with the national museums in Leiden) keep the large majority of Dutch academic heritage. Many of these collections still serve as active resources for teaching and research and will likely continue to do so. Furthermore, they act as unique and irreplaceable historical, cultural and scientific records and contain material of national and international importance. In many cases, this material, which we may call our 'scientific heritage', is kept under poor conditions and conservation is urgent. The survey made two additional points: i) not all collections are worth keeping; and ii) 'orphaned collections' have ceased to serve the primary functions of the faculty due to changes in research activities or teaching programmes. The fact that such collections have lost their direct meaning for the faculty is no measure of their intrinsic significance. These observations, in combination with the accumulation of problems around collections, political pressure, the growing awareness of the unique and often irreplaceable resources they contain

and of the cultural role and responsibility of universities towards their heritage, led to the conviction that action had become inevitable and subsequently to the establishment by the five old universities of the *Stichting Academisch Erfgoed* (Foundation for Academic Heritage)¹⁴.

In 1996, the Ministry of Education, Culture and Science decided to sponsor this initiative with a once-off budget of •6,000,000 for the years 1997-2000¹⁵. One million euros were allotted to each of the five participating universities for the improvement of their most important or endangered collections, while the remaining one million was divided among three national projects: botanical gardens, geological collections and medical collections. In each case all relevant university collections in the Netherlands were involved in the project.

Procedures

All involved were thoroughly aware of the fact that the sheer number of objects was such that it was impossible to take care of all of them in a proper way. There were also many duplicates, for example in the mass-produced medical instruments of the nineteenth and twentieth century. In addition, there were collections of little or no use for ongoing research and teaching in the faculties, in particular the geological student collections and the 'orphaned collections', left behind after discontinuity of specific fields of research (vertebrate palaeontology), the ceasing of the use of specimens in teaching (anatomy, pathology), or even the closing down of entire faculties (dentistry, geology). Against this background, the aim of the project was twofold: i) to improve the overall quality of the collections through specialisation, the

¹² *Universitaire collecties en cultuurschatten* 1995. An initiative of Rijksuniversiteit Groningen, Rijksuniversiteit Leiden, Universiteit Utrecht and Universiteit van Amsterdam.

¹³ *Om het Academisch Erfgoed* 1996. Report and inventory on Dutch academic heritage made on behalf of the Ministry of Education, Culture and Science. A summary in English can be found at UMAC's website.

¹⁴ This Foundation has an independent chair and each university is represented by two members: a museum professional and someone close to the Board of the University. The first activities came under the name *Landelijke Coördinatie Groep Academisch Erfgoed* (National Coordinating Group for Academic Heritage).

¹⁵ This grant (administered by the Mondriaan Foundation) covered 40% of the total cost. The remaining 60% was paid by the universities, giving a total budget of • 15,000,000.

development of 'collection profiles', selection and disposal (a possible reduction of 35-50% was estimated); and ii) to enhance the use of the collections or to give them a 'second life' by physically handing over the collection to a new user ('collection mobility') and the use of ICT.

For each of the three national projects – geological collections, medical collections and botanical gardens – more or less the same lines were followed. Because of the complexity of the matter and the size and novelty of the projects, two phases were envisaged: i) inventory and decision-making, and ii) execution.

1. A working group composed of the keepers of collections was set up, with an independent chair, who understood both the subject and the role of collections. For the geology project, the project coordinator did most of the work and was in charge of communication, development, etc;
2. In order to be able to cope with the enormous number of objects, it was decided to work on a higher level of abstraction and the concept 'sub-collection'¹⁶ was introduced;
3. An inventory of the sub-collections, including general information, type, origin, a valuation of quality¹⁷, and suggestions for possible future use and action, was entered into a database;
4. Legal status was carefully checked. Sub-collections on loan, but no longer used, were returned;
5. A 'protocol of de-accessioning' was developed, outlining the conditions under which collections should be offered to new owners and how to decide in case more than one candidate would be interested. Institutions that intended to keep the collection together and use it for future research were given a higher priority than those that only looked

for exhibition material for local museums, even if this meant that the collection would go abroad;

6. Second opinions by consulting specialists from the national museums, the Mondriaan Foundation, the Netherlands Institute for Cultural Heritage, among others were sought;
7. The Boards of universities were asked to approve these lines and procedures and to act accordingly.

Deciding on the future of the collections: the outcome

Together, the universities of Amsterdam, Delft, Groningen, and Utrecht held about two million geological objects, which had been grouped into 842 sub-collections. Roughly, three categories of sub-collections could be distinguished:

- 1) those which remained in use by the faculty for education and research;
- 2) those which no longer played a role in present-day education or research, but were considered of high scientific and/or cultural importance and should therefore be kept as 'academic geological heritage' (the 'orphaned collections');
- 3) those which were considered to be of none or insufficient relevance.

Sub-collections mentioned under 2) and 3) were put on the website of the Museum of the Technical University Delft and subsequently offered to a broad range of universities, museums and geological surveys, both in the Netherlands and abroad. These institutions were selected according to the origin and composition of the material and the characteristics of the receiving institute.

Although some reactions were received, the final result was not impressive. Nevertheless it was

¹⁶ A sub-collection can be any group (between 10 and several 1000s) of objects with an internal logic, which is readily understood by the professional field. In the case of geology, sub-collections are identified by the name of the collector, the year, a geographical site or a subject, usually a combination, for example 'Subbetic Zone, Sierra de Maria (Spain), de Clercq, student-collection, 1968'.

¹⁷ Four categories (A-D), earlier developed by the Ministry of Culture, were used for valuation. For further details, see KRIKKE (1997).

encouraging that the Geological Surveys of Indonesia, France and Spain expressed interest for material collected during field campaigns in their respective countries and it is hoped that part of this material will indeed get a second life in its country of origin. We should, however, face the fact that only a small number of collections will in the end gain a second life in this way. This left the question of what to do with the remainder, mainly at the University of Amsterdam, where the faculty had been closed 25 years ago. The easiest part were of course the collections which remained in use by the faculty (category 1) and the collections judged of little importance (category 3), notably those with poor or no documentation and the so-called 'student collections'. It was decided that these could be disposed of. Before disposal, a rather superficial selection of objects that could be used for exhibitions or for educational purposes in schools etc. was carried out.

Academic geological heritage

The orphaned collections belonging to the 'academic geological heritage' (category 2), however, were a serious matter of concern. These collections were regarded to be of national and even international quality because they had been extensively studied and the results published, often in internationally renowned journals. Many of these collections can be regarded as reference collections in their own right and quite a few may contain type specimens – they embody our scientific heritage. Although decline in interest in the collections is no measure for their current and potential value, the question remained whether such collections should be kept and, if so, by whom. A frequently voiced, but rather superficial and unsatisfactory answer to this question is: 'a collection is only worth keeping if someone is willing to pay for it'. However, we must acknowledge that as museum professionals we have not produced a more satisfactory

answer so far, nor the necessary tools to tackle this archival function, and therefore, we lack the necessary funds. It was a fortunate circumstance that Naturalis agreed to participate intensively in discussions leading to the final outcome. The loan of about half of the Amsterdam collection to the geological museum of the Amsterdam Zoo was converted into a gift and Naturalis decided to store all remaining orphaned collections of national importance for which we did not find a new owner (aiming at a future 'National Geological Archive'). Selection criteria were set up in close collaboration with the staff of Naturalis. Some collections will be kept in their entirety given their provenance, while removing bulky objects and concentrating on thin-sections will reduce other collections. In other cases keeping only a representative selection was deemed satisfactory.

This exercise, which led to an overall reduction in volume of around 30-35%, is evidently both expensive and time-consuming and can only be carried out by well-trained geologists. The job was cleared within the fixed budget by 31 December 2002. Formal handing over of the collections to their new owners¹⁸ and users is scheduled for 28 April 2003. Naturalis will take care of registration and access to the collections according to its own standards. Most material will be described as sub-collection or coherent unit and only type material will be described at the object level. The results will be published in order to inform the international geological community on the whereabouts of these collections.

Experience, pitfalls and recommendations

Thinking about selection and de-accessioning is a neglected aspect of the museum profession. Disposal¹⁹ is generally considered not done in any well-managed 'normal' museum, where collection policies aim at

¹⁸ The institutions include Naturalis, the natural history museums of Maastricht and Nijmegen and the museum of the Geological Research and Development Centre of the Department of Energy and Mineral Resources, Bandung, Indonesia.

¹⁹ 'Disposal' is probably best defined as the permanent removal of an object from a museum's permanent collection, involving the intentional termination of ownership vested in the governing body. 'De-accession' is the process that leads to the decision.

adding objects felt to be missing. This is – and should be – fundamentally different in many university museums and collections which gather objects primarily as 'tools' for learning and research (CLERCQ & LOURENÇO in press). However, this does not legitimate the disposal of all collections after they cease to be used. On the contrary, many objects derive their significance from the fact that they have been studied and the results published, whereas others have become useless (e.g. demagnetised palaeomagnetic samples). In other words, thinking about selection and disposal ought to be a natural part of the professional practice in university museums and collections. In fact, curators are continuously faced with the question as to which objects or collections should be kept for future use, because scientists' inquisitiveness is driven to new 'hunting grounds' once their questions have been solved. Ideally, selection and subsequent de-accessioning should be the final stage of each research programme and what is kept is to be regarded as scientific heritage. This implies an archival function, but this function has not yet been thoroughly defined. We can learn tremendously from the experience of professional archivists in this respect. Archives are meant to be kept and used. We must therefore also think clearly about the potential use of the collections that we want to keep. In the case of type collections (and, to a lesser extent, reference collections), this is evident because of international conventions on the matter. But what about the potential use for new fields yet unexplored? These can be purely scientific (e.g. the discovery of a new species), commercial (e.g. ore reserves), but also highly practical – for example, samples from abandoned Cornish coal mines were used for comparison in a study of present day contamination of groundwater. Finally, collections also have a historical dimension and they can tell us about the history of research and teaching. Potential users of our collections are therefore scholars, students, historians of science, and the industry. Ideally, these considerations have to be taken into account whilst performing an exercise such as the *Stichting Academisch Erfgoed* did. This should not only be true for the participating universities, but also for potential new owners.

Generally speaking, all involved agreed that this major operation worked out well and can perhaps serve as an example. It is satisfactory that new owners are willing to take care of such a significant number of orphaned collections, pay for their maintenance and are eager to use them – in other words, to give them a second life.

However, there are pitfalls. The most important relates to the consequences of the division into sub-collections. For 20 years, we had failed to find a solution for collections as a whole and it is obviously impossible to take one unique decision on some two million individual objects. Therefore reducing the total to 842 sub-collections was an essential step in tackling and solving the problem. However, it turned out that we did not always pay sufficient attention to the collection as a whole, to its context, or to the added value of the sum of collections. For example, due to reorganisations at one university, a small specialist group was closed down and its vertebrate palaeontology collections orphaned. The evolution of island faunas being one of their specialisations (for which the group was known worldwide), collections contained material from all over the world. Registration and organisation of these collections was based on the location of origin. However, the unique quality of the collection was that it enabled comparison of identical anatomical components from different sites, which in turn allowed investigation into the functional adaptation to a variety of environments. Splitting up such a collection according to the locations of origin evidently destroys its internal logic and relevance. In hindsight, we must acknowledge that insufficient attention was paid to such situations. The example illustrates that it is not at all evident who should raise such questions, neither in which stage of the process that should have been done, nor what action was required and who would have been in the position to take decisions.

As the project now has come to an end, some general reflections are due:

- The project served its purposes relatively well because:
 - the working group in charge of co-ordination

- included representatives of all the relevant collections involved;
 - had an independent chair and an efficient project coordinator;
 - obtained a mandate to take decisions;
 - achieved commitment by faculties and keepers;
 - sought second opinions;
 - obtained crucial involvement of national museums and other relevant institutions;
 - worked on the basis of an agreed 'protocol of de-accessioning'.
- The concept of sub-collections proved essential to break a 20 year deadlock.
 - Decision making takes much time.
 - Approaching potential new owners and reaching agreement on the conditions of transfer takes even more time.
 - 40% government sponsoring triggered > 60% own input.

The willingness to look at one's own collections against the background of the national (and indeed international) academic geological heritage is the essence of the Dutch approach's success. This is neither self-evident nor philanthropic, but signals a pragmatic approach: how can we do more with less? After all, we all have to cope with the same basic problems: shortage of time, staff, money, space, etc. Collaboration and a division of tasks is one possible solution, allowing us to specialise and – as outlined above – has proven to be quite successful. Specialisation raises the profile, but is only possible if clear choices are made regarding the identity of the institution. This requires an engagement, not only by one's own institution, but also by the professional community at large. Although there remains much to be improved, looking back we all realise that we would not have achieved these results without this collaborative effort and initial governmental funding.

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