A PLIOSAUR TRAVELS: THE PACKAGING OF A UNIQUE CRETACEOUS MARINE REPTILE, AND ITS TRANSPORT FROM COLOMBIA TO THE UNITED KINGDOM

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Noè, L.F, Gómez-Cruz, R., Gómez-Pérez, M. and Patarroyo, P. 2006. A pliosaur travels: the packaging of a unique Cretaceous marine reptile, and its transport from Colombia to the United Kingdom. *The Geological Curator* 8(6): 271–280.

As a result of a collaborative research effort between the Universidad Nacional de Colombia and the Sedgwick Museum (UK) the acid prepared skull and rock encased postcranial skeleton of a new Cretaceous marine reptile (a pliosaur) has been transported from Bogotá to the University of Cambridge. This contribution details the procedure from agreeing the loan, planning the transport, obtaining the funds, through the challenge of paperwork, innovative packing and labelling, to planning and managing the media, and the successful arrival of the specimen.

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Introduction

Following twelve months of demanding negotiations, challenging paperwork and intense discussion regarding the most suitable method of packaging, two wooden crates containing a large South American Cretaceous marine vertebrate travelled across the Atlantic Ocean early in 2004. The transport of this scientifically important vertebrate fossil was the result of collaborative research in vertebrate palaeontology between the Universidad Nacional de Colombia (Bogotá, Colombia) and the Sedgwick Museum (University of Cambridge, United Kingdom). As all fossils are considered Colombian National Heritage, and because this was the first time the Universidad Nacional de Colombia had lent a large vertebrate fossil for preparation, research and study outside Colombia, all policies and regulations, modes of transport, documentation, and methods of packaging had to be considered. It was clear from the outset that this ambitious project would be an "odyssey" from the very beginning. The purpose of this contribution is therefore to bring to a wider audience the trials and tribulations of bringing a large vertebrate fossil from South America to Europe, whilst adhering to all national and international regulations and laws, and ensuring this important specimen arrived in the U.K. in the best possible condition for detailed study.

The fossil

In 1967 a fossil was discovered by French hydrogeologists ('Cooperación Técnica Francesa'), near the Santo Ecce Homo Convent, close to the village of Villa de Leyva, north-east of Bogotá, Colombia (Acosta-A. 1979). The bones were encased in a very large (> 3 metres in length) calcareous concretion and covered in bituminous shale. The specimen was initially donated to the Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, but was later transferred to the palaeontological collections of the Departamento de Geociencias (UN-DG) where it remained in storage, and unstudied for more than 30 years (ETAYO-SERNA pers. comm. 1999). There are no records of the original fieldwork, or the date of, or reason for, the subsequent departmental transfer within the Universidad Nacional de Colombia.

Figure 1. The concretion containing the skull of UN-DG-R-1000 prior to preparation.

Figure 2. The acid prepared cranium of UN-DG-R-1000 viewed obliquely from the front; note the three-dimensional preservation.

In 1999 the fossil (registered as UN-DG-R-1000, formerly catalogued as UN-DG-R-287 *in errore*) was rediscovered. The specimen was in a number of blocks; presumably the original concretion had been broken up at the time of collection to aid recovery. Preliminary examination of the concretion indicated it contained a large vertebrate, including a skull, vertebral column, pectoral and pelvic girdles, ribs, and parts of two limbs (Figure 1), but its taxonomic affinities were unclear. The skull and anterior cervical vertebrae were selected for preparation, which was undertaken in the laboratories of the Museo Geológico José Royo y Gómez of INGEOMINAS (the Colombian Geological Survey), using standard mechanical and chemical techniques (Rutzky *et al*. 1994) modified to suit local conditions. During this work it became clear the animal was a pliosaur, a derived sauropterygian marine reptile.

Chemical preparation revealed an exceptionally well-preserved, wonderfully three-dimensional, and substantially complete skull (Figure 2), highlighting the importance of this exciting new specimen. UN-DG-R-1000 is a new genus and species of pliosaur and a full osteological description of the specimen will appear elsewhere. Extensive investigation, including new fieldwork at the original find site (Gómez Pérez 2001), indicated the specimen originated from the Lower Cretaceous (Barremian stage), Paja Formation (Etayo-Serna 1979), and can be dated at approximately 130 million years old (Gradstein *et al*. 2004). Barremian sauropterygian fossils are exceptionally rare worldwide (Persson 1963, Bardet 1995, Noè 2001); the new pliosaur is an important addition to global sauropterygian palaeontology, and an extremely valuable addition to the vertebrate palaeontological heritage of Colombia.

Preliminaries

The loan

Preliminary results from study of the new Colombian pliosaur were presented at the 50th Symposium of Vertebrate Palaeontology and Comparative Anatomy (SVPCA) held in Cambridge in September 2002. This led, in January 2003, to a research visit from the UK to establish links with the Colombian palaeontological community and see some of the rich vertebrate fossil fauna of Colombia. A series of vertebrate palaeontology seminars were presented in various academic institutions in Bogotá, which led to contact with Heads of Department, faculty members and interested students, as well as private collectors and members of the public. During this visit, the possibility of undertaking collaborative research on UN-DG-R-1000 was proposed, leading to a formal

loan request for the pliosaur from the Director of the Sedgwick Museum to the Head of the Departamento de Geociencias in the Universidad Nacional de Colombia.

Following exchange of correspondence, an outline cooperative agreement was made between the heads of department of the two universities; by the end of February, the conditions and length of the loan had been agreed and the responsibilities of each partner clarified. A formal loan document was issued in mid-March, which included the following points:

1. The loan period was to be three (3) years, with the possibility of extension by mutual agreement;
2. The Sedgwick Museum would guarantee the return of UN-DG-R-1000 according to the UNESCO (1970) and Unidroit (1995) conventions on the ownership of Cultural Heritage (see also Brodie *et al*. 2000);
3. All Colombian and U.K. laws and regulations relating to the export and import of fossils would be followed;
4. The Sedgwick Museum would pay the full return cost of the transport;
5. Preparation work was permitted, provided it was undertaken in the Sedgwick Museum's conservation and preparation facilities, but the specimen had to be left robust enough for safe return to, and display in, Colombia.

It was important that UN-DG-R-1000 was lent to an institution and not an individual researcher, to ensure return of the specimen, even if staff at the two institutions changed during the loan period. It was made clear that the Sedgwick Museum fully abided by all laws and regulations regarding the ownership of cultural heritage thereby ensuring return of the fossil. Although not part of the formal loan agreement, both sides recognised the importance of involving nationals of both countries at all stages of the project in order to share expertise, and transfer skills and knowledge in vertebrate palaeontological techniques between the institutions. This included an informal arrangement that all results would be published jointly between Colombian and U.K. colleagues, and that applications for funding for a PhD studentship to permit a suitably qualified Colombian student to study the fossil would be made. With the loan and other agreements in place, organisation of the transportation and packaging could begin, and the ongoing search for funds was given additional impetus.

Planning the transportion of the material

When the idea of transporting the pliosaur arose, there was no funding in place and there was no clear understanding of the procedures that would need to be followed. Preliminary investigations indicated that there were no laws in Colombia explicitly relating to the export of palaeontological material for study, however there were laws covering all archaeological artefacts that could potentially relate to fossil finds. In addition there were two fundamental questions that needed to be answered in order to proceed: How could the pliosaur be transported? And how much would it cost? As the full cost of the project was not known, this caused problems for finding sources of funds. However, in order to obtain an estimate for the cost of transport we needed to know the weight of the fossil and the possible transport routes.

The fossil consisted of two distinct sets of elements: the acid prepared skull and anterior cervical vertebrae were delicate, needed careful packing but were relatively light; and the postcranial skeleton which was still encased in 24 blocks of rock, relatively robust, but heavy. The skull was weighed in its existing storage container and was around 30 kg. The postcranial blocks had to be weighed individually giving an estimated weight of 200 kg, without packaging. We considered the most suitable way to transport the fossil and decided that a direct flight from Bogotá to the UK would minimise possible complications caused by passing though several airports in different countries, reduce handling and the number of customs inspections required, and thereby decrease the potential for damage. We also considered sending the fragile skull by a different route from the postcrania, but ultimately decided to send the fossil in two crates, but as a single consignment. Initially we approached the international couriers FedEx and DHL who offered transport rates of 13.30 US dollars (USD) and 8.11 USD per kg respectively: the total price using these services would have been in the order of 2000-3000 USD. However we had concerns about the amount of handling, the routes offered and the price seemed relatively high. Therefore a number of other options for transporting the fossil were considered.

Advice was sought from a wide range of individuals and companies in order to find transport direct to the United Kingdom, and this included asking at the British Embassy in Bogotá. British Airways Cargo was consulted, and they offered a transport rate of 1.78 USD per kg including fuel, which would amount to around 450 USD. However, British Airways Cargo were unable to negotiate directly with us as individuals or with the Universidad Nacional de Colombia because of the export laws and regulations in Colombia, although they suggested the names of three government authorised cargo agencies (Panalpina, DHL-Danzas, and Kuehne-Nagel) that

could help. All three were contacted, but the most helpful, interested and speedy response was received from Panalpina who offered a service which included collection from the Universidad Nacional de Colombia in Bogotá, a direct flight to London, and delivery to Cambridge. Panalpina were also able to deal with all the relevant taxes and handling fees (to give an estimated total cost of around 1200 USD), and were able to advise on the paperwork required.

Having chosen the transport company, and with an idea of the cost of moving the fossil, the next task was to obtain the funding. Various avenues were pursued, and in April the "Friends of the Sedgwick Museum", an organisation set up to support the work of the Museum, offered the possibility of funding for discrete research projects. A 'redevelopment fair' took place in mid-June with numerous projects proposed and the membership asked to vote on the schemes they considered most suitable for funding. The results were collated and the Friends committee made the final decision in late July, which included part funding (of approximately 1600 USD) towards the costs of packaging and transportation of the Colombia fossil. Additional funding was obtained by undertaking external consultancy work in the Sedgwick Museum Conservation Laboratory, and full funding was finally in place by August 2003. Meanwhile numerous applications for funding of the scientific work were completed and submitted.

The paper trail

In early September, and with the funding confirmed, the Sedgwick Museum contacted Panalpina who informed us where in Colombia all the required documents for the export of the fossil could be obtained; they also agreed to take care of all the necessary arrangements for transport from door-to-door between the Universities. They sent a checklist of the documents necessary for the transport to proceed:

1. A letter of agreement between the Universidad Nacional de Colombia and the Sedgwick Museum giving the originating and delivery addresses, a description of the items to be transported, the number of pieces the item consisted of, the insurance value in USD, the type of packaging, and the approximate weight;
2. The Universidad Nacional de Colombia official export codes required for airport clearance;
3. A letter for the 'Dirección de Impuestos y Aduanas Nacionales' (DIAN, the Colombian Customs) explaining the purpose of the export, indicating the commercial value of the shipment, the length of the loan, and an agreement that the fossil would be returned to Colombia;
4. A letter to the airport police guaranteeing that no dangerous materials or illegal substances were to be exported.

In Colombia, much time was spent attempting to secure the necessary paperwork. Initially, defining scientific value in commercial terms was problematic, and it proved extremely difficult to obtain a number of the details required by the cargo company, such as the official Universidad Nacional de Colombia export codes. At this point Panalpina advised us that the Universidad Nacional de Colombia had an 'Oficina de Comercio Exterior', effectively a trading office, that deals with exports and imports. The Oficina de Comercio Exterior agreed to use their expertise to obtain the necessary paperwork, although they had never had to export a large vertebrate fossil before. By early October 2003 all the documents listed above, plus some additional letters required by the cargo company, had been obtained and an order for the shipment was sent from Cambridge. However, due to a lack of experience with transporting palaeontological material, and to ensure all legal requirements were being fulfilled, the Oficina de Comercio Exterior considered it necessary to consult a lawyer. It transpired that the legal advice indicated special permission was needed from the Instituto Colombiano de Antropología (ICAN), the body responsible for the protection of Colombian archaeological National Heritage. This proved problematic, as it was not clear if the laws relating to archaeological artefacts also covered fossilised remains; however, ICAN agreed that the fossil could legally be exported for study, providing return was guaranteed. In addition, Universidad Nacional de Colombia regulations required the approval of the Rector (the Head of the University), which due to his high workload, took a great deal of time to be approved and signed. These clarifications and permissions delayed the transport by a further two months, and meant that two of the earlier documents (for DIAN and the airport police) were now out of date and, once again, we had to wait for these to arrive; fortunately this took just three weeks. It was now the end of November 2003, and it had taken almost five months to amass all the necessary documents to allow the pliosaur to travel.

Press Release

Early in our negotiations we realised there was considerable potential for publicity regarding the transport of this exceptional fossil. At the same time it was realised that should an event of national or global significance occur on the day the pliosaur arrived, any idea of media coverage would be in vain.

Preparation of the press release was started as soon as it was clear the pliosaur would travel, which gave us plenty of time to prepare, as we wanted as many of the interested parties as possible to have the opportunity to comment on a draft. The press release was intended to do a number of things:

1. To inform the media that the animal was due to arrive;
2. To give some idea of what a pliosaur was (and if possible make it clear it was not a 'dinosaur');
3. To make it clear the specimen was on loan from Colombia, that the work was collaborative between the Colombian and UK institutions, and that future work would involve nationals from both countries;
4. To acknowledge all those who had helped.

In addition, the press release had to make the story appealing to editors and news desk staff, to conform to the University of Cambridge Press and Publications Office house style, and be acceptable to the Sedgwick Museum, the Department of Earth Sciences, the Universidad Nacional de Colombia, and the Friends of the Sedgwick Museum. Early versions of the press release were circulated within the Museum, before being sent out to all interested parties early in October. The draft was modified in the light of the comments received, and agreed with the University Press and Publicity Office. Final details, such as the date of arrival and who would be able to attend on the day the fossil was due to arrive, were left open as long as possible.

In addition to the press release, we decided a model of the pliosaur would assist the media visualise the animal. As this was a totally new genus and species of pliosaur, no existing model would be suitable. Draft drawings of the head of the new animal were prepared and one of the Friends of the Sedgwick Museum kindly agreed to construct a model. To our amazement and delight two models were produced, one of which one was a life sized representation of the head of the living animal, and the other a smaller version of the skull.

Packing

Between September and November, whilst the transport arrangements were being organised, considerable discussion took place to agree the best method of packing the pliosaur. The critical factor at all times was the safety of the specimen: it is exceptionally important and there had to be no damage during transit. This meant ensuring the packaging was robust enough to guarantee no movement or contact between the fossil elements (especially the delicate cranial material), but equally it must be packed in such a way that the customs and police in Bogotá and London Airports could inspect it without difficulty. The fossil was assessed and possible damage considered: the most fragile elements were the acid prepared cranium, and early on it was decided to pack this separately from the rest of the rock-encased postcranial skeleton. However, it was also agreed that the most fragile parts of the specimen, such as the braincase elements, otic capsules and sclerotic plates (bones from within the eyes), would be carried by hand for safety.

Two timber crates were needed to transport the fossil: one crate already existed, which held the concretions containing the postcranial skeleton with internal dimensions (length: width: height) of 860 x 560 x 485 mm; and a new crate was constructed for the skull (internal dimensions 650 x 600 x 920 mm). In order to protect the skull, each bone was wrapped in three layers of bubble wrap, to act as a separator and shock absorber, and fixed with wide clear adhesive tape. One layer of bubble wrap was considered sufficient for the concretions, to protect the small pieces of bone visible within the matrix. Various options for packing the wrapped elements in the crates were considered, as plastazote and other museum grade materials commonly used in Europe were not available and importing such materials into Colombia would have led to considerable delays. Other solutions considered were: jacketing the specimen in plaster of Paris, using expanded polystyrene chips, or cutting up large sheets of flexible polyurethane foam. Plaster of Paris was rejected as it would have been too heavy, with insufficient ability to absorb shock and too difficult for customs officials to check. Expanded polystyrene chips, similar to those used for packing electrical equipment, were not readily available in Colombia, and although large sheets of polyurethane foam were available, cutting these to shape proved problematic, and the ability of the material to absorb sufficient shock was questionable.

At this point we sought the advice of one the foremost Chemistry laboratories in Colombia - the Departamento de Química of the Universidad de Los Andes. The head of the laboratory inspected the fossil and suggested using a rigid, expanded polyurethane foam formed from two liquid components. Polyurethane is a polymer (a plastic) produced when a polyol (an alcohol) reacts with an isocyanate. Polyurethane is not a spontaneously 'foamy' material, but as the chemical reaction is exothermic (heat producing), the energy liberated during the reaction can be used to evaporate a solvent with a low boiling point, which then acts as a 'blowing agent'. By carefully dosing the solvent, and the

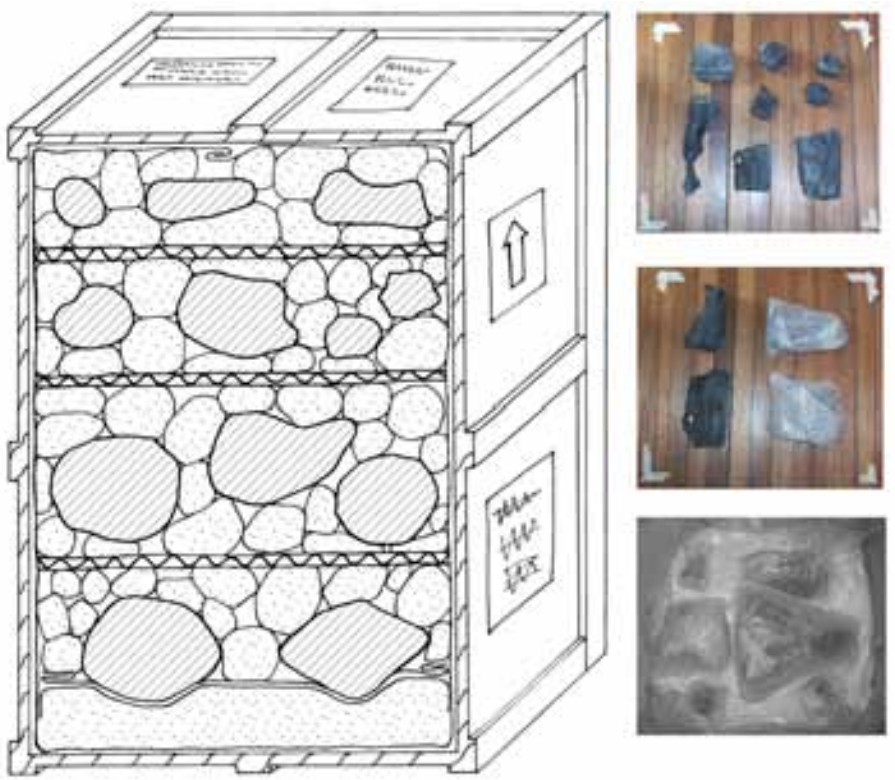

Figure 3. Packing UN-DG-R-1000. Left: illustration of the crate showing the fossils (hatched), foam (stippled) and cardboard separators (wavy lines). Right: photographs of three stages of packing; (top): the bones laid out as they are to be placed in the crate; (middle): covered in three layers of bubble wrap; (bottom): the lowermost layer laid in the polyurethane foam.

quantities of the reactants, it is possible to control bubble production and thus both the degree of porosity and the rigidity within the resulting polymer. The result of this reaction, under controlled conditions, can produce a spongy yet rigid material with an open cell structure. Thus, by carefully modifying the relative proportions of the two reactants and the amount of solvent, it is possible to develop a foam with material properties ideal for the purposes we required, which included: a low density, the ability to adapt to the shape of the bones and act as an infilling material, with a high capacity to absorb impacts, and a low curing temperature.

However, in order to ensure the polyurethane foam was completely suitable for our purposes, a series of experiments were undertaken. Different proportions of the two reactants were assessed in order to find the most suitable mixture to protect the bones. The reactants (polyol and isocyanate) were mixed in the following proportions: 1:1, 1:2 and 2:1. A proportion of 1:1 did not to generate sufficient heat to evaporate the solvent or produce the desired foamy material; proportions of 1:2, produced a vigorous reaction, but the blowing agent escaped from the foam, and the resulting polymer sagged under its own weight prior to setting, leaving a material with insufficient pore spaces; at 2:1 the foam produced a moderate reaction expanding to approximately five times the original volume of the reactants – ideal for our purposes. Once the desired proportions of reactants were established, the resulting polyurethane foam mixture was tested on delicate chemistry glass-wear to ensure the foam would not create so much heat, or internal pressure as to damage the bones. The glass-wear was wrapped in the same manner as proposed for the fossil, but in addition the manufacturers of the foam advised coating all items with a layer of very thin plastic sheet to avoid direct contact with the foam. Cutting the resultant foam also indicated good pore dispersal throughout the material, which provided sufficient support and shock absorbency.

The expanded polyurethane foam was perfect. However, completely encasing the bones would have meant that the fossil would not be easily available for inspection by customs authorities. Thus, each crate was lined with a thin plastic sheet and the polyurethane foam poured into the base. Prior to setting, the first layer of bones was gently placed onto the expanding foam. Further polyurethane was generated and broken into large pieces and tightly packed around the fossil. A thick cardboard separator layer was used to cover this first level of bones and foam, and subsequent levels were packed using large pieces of the broken polyurethane foam (Figure 3). To seal the crates, it was originally planned to use plastic or metal straps, but these proved difficult to obtain, and would not have been easy for customs to open. Eventually the crates were simply nailed shut for ease of opening in the airport. However, once checked in Bogotá, the customs tied the crates with 13 mm wide metal security straps that remained in place throughout transit.

Figure 4. Three examples of the labels used on the crates, and (bottom-right) the packed crates in the Universidad Nacional de Colombia in Bogotá awaiting transport.

Labels

Another aspect of the packaging that required considerable thought was the labelling to be attached to the outside of the crates. There were no labels available from the cargo agency or the University, so our own labels had to be designed and printed. We wanted them to be in both Spanish and English, and needed to give the originating and receiving addresses, the fragile condition of the material, and the orientation (way up) of the crates. The labels needed to be easily identifiable and ideally internationally recognised symbols. In addition, we wanted one of the labels to make it clear that the material was an important fossil, and that a palaeontologist should be present, if possible, should the crates be opened. We decided the most recognisable way to do this was to use an image of a dinosaur (Figure 4). All the labels were created ourselves, printed in colour, and attached to the crates with a complete covering of wide, clear adhesive tape for protection.

The crates could not be finally packed and sealed until all the paper work was completed, and representatives of both the Oficina de Comercio Exterior and Panalpina had inspected the specimens. The Panalpina security representative suggested that the airport police would undoubtedly break open the packaging, and estimated there was a 50% chance that the bones would be broken beyond recognition. Our immediate reaction was not to send the specimen at all, but following advice from various sources within the Universidad Nacional de Colombia, we decided the recommendation from Panalpina was exaggerated, as other delicate materials had previously been successfully transported. The crates were finally sealed on the 25th November and the fossil remained 'on hold' in the University. We were informed that the likely date of collection was the first week of December, allowing one of us (M.G.) to travel to the UK in order to assist with the unpacking, and to attend the Palaeontological Association (PalAss) annual conference in Leicester in December. With a date for the transport agreed, insurance was arranged through the University of Cambridge.

Transportation

Departure from Bogotá was originally booked for the 9th December, and we were told by Panalpina in Colombia that one of us might need to travel to London airport to oversee incoming customs clearance two days later. However, due to the proximity of Christmas, there was no space available on flights to Europe that day, as perishable goods such as flowers and fruit had priority. The two crates were finally picked up from the Universidad Nacional de Colombia on the 11th December and the fossil was seen through customs (by P.P.) at Bogotá airport immediately after a student viva in the University, and a hurried journey through the capital city's traffic. The two crates, with their valuable consignment were now in the hands of the cargo company awaiting x-ray prior to transit.

Figure 5. Unpacking the Colombian pliosaur in the Sedgwick Museum conservation laboratory whilst the television cameras looked on.

The week following collection of the fossil in Bogotá was frustrating due to further delays and a lack of communication with the cargo company. The London office of Panalpina did not know whether the cargo had travelled or not, and the situation was worse the following week during the PalAss conference. Whilst away from Cambridge, news of arrival the crates was eagerly awaited, and lack of information caused us a great deal of concern. There was uncertainty as to whether it would be necessary to rush down to London for customs clearance at a moments notice (although ultimately it transpired that Panalpina had a customs bonded warehouse rendering this unnecessary). The delays also meant our insurance lapsed and had to be extended. Finally the crates flew on 17th December and were unloaded in Amsterdam! Quite why the shipment went to Amsterdam, and was not booked on a flight direct to London as originally agreed, remains unclear.

Having been unloaded from the aircraft in Amsterdam, the crates were transported to London by lorry. This caused us considerable concern, as the specimen had not been packed with such a long road (and sea) journey in mind. Also the road transport took additional time, so the crates did not arrive in London until the 19th December. By this time Christmas was looming and many of the staff required to receive the crates in Cambridge had commenced their Christmas holidays. Also, the advice of the University Press Office was to wait until the New Year to announce the fossil's arrival, as this is usually a time with little news, and would therefore increase our chances of wide publicity. We discussed the options. The specimen could have been delivered immediately, but we now had no staff to unload it safely. Alternatively the crates could remain in a Panalpina bonded warehouse over the festive period, and, although we were assured the crates would be safe, we had no idea of the environmental conditions (temperature, relative humidity, etc.) under which they would be stored. After much discussion, and with no other real alternative, we agreed to fix the delivery date to Cambridge for the 6th January 2004.

The arrival

After the Christmas and New Year break it was necessary to confirm with Panalpina that the delivery was still due for the morning of the 6th January 2004, although they were unable to give us a definite time of arrival. We had to arrange with the various Museum staff, technicians, and representatives of the Friends of the Sedgwick Museum, to be available. The press release had the final details added and was circulated by the University Press and Publications Office the day before the planned arrival, using their existing network of contacts. In addition, direct contact was made with the local media to ensure they knew about the story, and this elicited a very enthusiastic response, including a preliminary television interview the evening before the specimen arrived. Preparations were also made to ensure the conservation laboratory was ready and additional items such as the models of the pliosaur were in place. By late in the evening everything was ready for the next day.

Figure 6. Examples of the printed and digital publicity generated; for the BBC news story see http://news.bbc.co.uk/1/hi/england/cambridgeshire/3373633.stm (accessed 05 October 2005).

Early in the morning of the 6th January we had interviews on the local radio, and Museum and technical staff were mobilised. Despite not knowing exactly what time the pliosaur would arrive, the first of the media, a BBC television crew, managed to turn up just five minutes prior to the lorry containing the pliosaur, and proceeded to film the unloading. The two crates were inspected for obvious external damage (none was apparent), although customs had drilled holes into the crates. The first crate was opened, whilst the television cameras rolled, and with great trepidation we lifted the lid and began to unpack the fossil (Figure 5). The specimen had travelled perfectly. The unpacking, much of which had to be undertaken multiple time for the cameras, was considerably facilitated by the person who had packed the specimen in Colombia (M.G.) being present.

Museum staff had a busy time as more photographers and another television crew arrived (requiring lots of cups of tea with biscuits!), whilst simultaneously attempting to keep a photographic record for the Museum archives. Ultimately two television crews, photographers from local and national newspapers, and an international news agency were accommodated, although, the arcane workings of information exchange between the various elements of the media remains a mystery. This number of busy journalists required some careful time management to ensure that all the various media deadlines were met. The day culminated with a live outside broadcast for the local Independent Television News. The press release had done a fantastic job of informing the media, and was well worth the effort, however several sources requested a line drawing or colour reconstruction of what the animal may have looked like in life. We tried to ensure that everybody was equally represented in the medial coverage, but ultimately we didn't have any say in how the information we provided was used (Figure 6). The media picked up on the important points we wanted to make, although each of them had their own slant on the story, and we considered it a considerable success that the pliosaur was at no time referred to as a 'dinosaur' during the press coverage.

Conclusions

The transport of the Colombian pliosaur was a complete success. This project has established a benchmark for future work in palaeontology between Colombia and the UK. It is anticipated this will become the first step in the development of a wider collaboration between the individuals and institutions involved. In summary, we conclude:

- The project was possible and was a complete success;
- Despite being a long-winded and sometimes frustrating process, it is essential to respect all national and international laws and regulations;
- The success of the project lay in the truly collaborative nature of the work, which would not have been possible without the direct involvement of colleagues in both countries, and at all stages of the project;
- Finding and using all existing sources of information and expertise can save considerable time and effort;
- Excellent results are possible by working as part of a creative multidisciplinary team;
- New techniques can be developed using available materials and with suitable research;
- Planning for and managing the media is essential.

A Ph.D. studentship has subsequently been obtained. Work has commenced on the long process of preparing the postcranial skeleton, and the scientific study of the specimen is underway. Now, the hard work really begins.

Acknowledgements

Our thanks go to the many people whose assistance made this project possible. Universidad Nacional de Colombia: Manuel Moreno (Director del Departamento de Geociencias) for agreeing to, and facilitating the loan of UN-DG-R-1000; Alejandro Lozano (Director, Oficina de Comercio Exterior). Universidad de Los Andes: Laboratorio de Análisis Químico, Departamento de Química for advice and materials testing. The University of Cambridge: Ekhard Salje (Head of Department, Earth Sciences); David Norman (Director) and all staff of The Sedgwick Museum; Simon Crowhurst (models); Andrew Pluck (forklift); Karen Dean and Nick Champion (Press and Publications Office). The Friends of the Sedgwick Museum: especially Peter Fuchs and Peter Friend for funding and support. Additionally M.G. thanks Fernando Etayo-Serna and María Páramo for supervision; INGEOMINAS Museo Geológico José Royo y Gómez for preparation facilities; the Universidad EAFIT, Medellín, Colombia for funding; and Carlos Padilla, Director, Fundación Colombiana de Geobiología for support and funding. This paper is dedicated to the memory of Muriel Agnes Arber (1913-2004; Friend 2004), Honorary Life President of the Friends of the Sedgwick Museum who died during preparation of this manuscript. This paper was first presented at the 14th Symposium of Palaeontological Preparators and Conservators (SPPC) 2005, held at the Natural History Museum, London.

References

ACOSTA-A., C.E. 1979. Noticia preliminar sobre el hallazgo de un presunto Kronosaurus (Reptilia: Dolichrorhynchopidae) en el Aptiano Superior de Villa de Leiva, Colombia. *Lozania (Acta Zoologica Colombiana)* **28**, 1–7.

BARDET, N. 1995. Evolution et extinction des reptiles marins au cours du Mesozoique. *PalaeoVertebrata* **24**, 177–283.

BRODIE, N., BOOLE, J. and WATSON, P. 2000. *Stealing history: the illicit trade in cultural material*. Cambridge. The McDonald Institute for Archaelological Research. Available at http://www.mcdonald.cam.ac.uk/IARC/iarc/illicit_trade.pdf (accessed 5th October 2005).

ETAYO-SERNA, F. 1979. Zonation of the Cretaceous of central Colombia by ammonites. *Geológicas Especiales del Ingeominas* **2**, 1–186.

FRIEND, P. 2004. Muriel Agnes Arber (1913–2004) *The Geological Curator* **8** (2), 47–48.

GRADSTEIN, F., OGG, J. and SMITH, A. 2004. *A geologic time scale 2004*. Cambridge University Press.

GÓMEZ PÉREZ, M. 2001. Estudio Morfológico y taxonómico del cráneo de un reptil marino proveniente de capas de la Formación Paja, quebrada Pavachoque, Municipio de Sutamarchán. Facultad de Ciencias, Departamento de Geociencias. Universidad Nacional de Colombia, Bogotá.

NOÈ, L.F. 2001. A taxomomic and functional study of the Callovian (Middle Jurassic) Pliosauroidea (Reptilia, Sauropterygia). School of Environmental and Applied Sciences. University of Derby, Derby.

PERSSON, P.O. 1963. A revision of the classification of the Plesiosauria with a synopsis of the stratigraphical and geographical distribution of the group. *Lunds Unveristets Arsskrift* **59**, 1–60.

UNESCO 1970 and Unidroit 1995 conventions: http://www.mcdonald.cam.ac.uk/IARC/Conventions/german.htm; http://www.mcdonald.cam.ac.uk/IARC/Conventions/english.htm; http://www.mcdonald.cam.ac.uk/IARC/Conventions/french.htm; or http://www.mcdonald.cam.ac.uk/IARC/Conventions/spanish.htm (accessed 5th October 2005).

RUTZKY, I.S., ELVERS, W.B., MAISEY, J.G. and KELLNER, A.W.A. 1994. Chemical preparation techniques. In LEGGI, P. and MAY, P. (eds). *Vertebrate paleontological techniques*, 155–186. Cambridge University Press.