Across Borders and Disciplines: 20 Years of Scientific Cooperation between Vienna and Litomyšl for the Sake of European Cultural Heritage

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Abstract

This contribution gives a short review of selected collaborative projects, which were undertaken jointly between the institutions to which the authors have been affiliated for over 20 years.When the restoration centre in Litomyšl was established in 1993, the already-existing professional contacts were continued and further developed on an institutional level. Since then the cooperation has been maintained continuously on several levels, ranging from student courses and lectures via practical conservation to scientific research.The aim of this paper is to illustrate with a few examples the importance of interdisciplinarity and internationality as a relevant factor to the preservation of monuments and related fields. It is felt that both the sides have profoundly profited from this multifaceted cooperation.

Keywords: conservation science, interdisciplinary, bilateral cooperation

Klíčová slova: výzkum v oblasti konzervování-restaurování, interdisciplinarita, bilaterální spolupráce

1. Introduction

When the School of Restoration and Conservation Techniques was established in Litomyšl in 1993 thanks to private initiatives, this opened a range of new possibilities for several Central European institutions active in the field of cultural heritage preservation for establishing various areas of exchange and collaboration. Amongst those who profited most from this new partner which is located in the charming Bohemian town of Litomyšl was certainly the University of Applied Arts in Vienna, whose Department of Conservation Sciences – at that time called the Institute of Technical Chemistry and Archaeometry – took the opportunity to start a steady series of joint projects. The cooperation between both sides has endured until this day, and will hopefully continue in the future.

Linked through their common past, historic regions share their heritage not only in terms of artistic and architectural styles, but also in respect to the techniques and materials employed. Though the exchange of information related to the preservation of the heritage on either side of the Iron Curtain had never been entirely interrupted, joint efforts to study and develop issues of artwork restoration across that border were the exception rather than the rule during those decades. Starting in 1990, the end of the Cold War opened many new avenues to join forces, to study the common past, to develop concepts for its preservation and to mutually disseminate knowledge to students and professionals.

As a matter of fact, personal contacts already developed prior to the1990s were the best entrance key for creating collaborative projects once the borders had been opened. Several funding schemes were soon available, starting from those such as the Central European University, leading via EUREKA to the EU-funded RD within their various cultural and scientific funding programmes, not to name the manifold bilateral, national and private sources of financing. But even where no financial support could be elicited, there was a certain extent of cooperation at any time. The present contribution aims to recall some of the activities undertaken jointly between the Vienna and Litomyšl centres of conservation sciences, more or less linked to practical object conservation and to student training programmes.

2. EU-Raphael project BUILDFRESC – Examination and Conservation of the Baroque Wallpaintings in the Charterhouse at Mauerbach

Coordinated by the Austrian Federal Office for the Care of Monuments/ Centre for Architectural Conservation, the Raphael project 96/B/A/1 BUILDFRESC (1996-98) dealt with problems connected to the conservation of Baroque mural paintings at the former Charterhouse of Mauerbach, in their various states of decay and with substantial later alterations. One of the highlights of this international project was the workshop "Technical Problems and Current Methods in the Conservation of Wallpaintings", held in 1998 at Mauerbach, which was based on a thorough technological study of the various paint layers undertaken by Tatjana Bayerová, implementing a number of analytical methods. These studies were conducted in close cooperation with Johannes Weber from what was then known as the Academy of Applied Arts Vienna who investigated the moisture and salt loads of the structures under consideration. Both studies involved an international group of workshop participants. All relevant aspects of this work were published in a special volume.[1]

1 *BAROQUE WALLPAINTINGS, Technical Problems and Current Conservation Methods*. EU-Buildresc. – Bundesdenkmalamt, Arbeitshefte zur Baudenkmalpflege/Kartause Mauerbach, Vienna, 1998.

3. ICCROM course ASC-98 in Mauerbach

In 1998, the 2-month ICCROM course "Examination and Conservation of Architectural Surfaces" was organised by members of the Austrian Federal Office for the Care of Monuments at Mauerbach near Vienna. 16 experts from 13 European countries participated in a programme which included the examination of renders, plasters and wall paintings, both in theoretical and practical terms on site and in the laboratory. These activities were scientifically coordinated by Tatjana Bayerová, then a chemist at the Department of Technology of the School of Restoration and Conservation Techniques Litomyšl, and Johannes Weber from the former Academy of Applied Arts Vienna. Their cooperation in research and lecturing under the guidance of the organiser Gabriela Krist provided a base upon which Tatjana Bayerová started her permanent lectureship at the Vienna University of Applied Arts two years later. The scientific aspects of this collaboration were published in a bilingual volume.[2]

Fig. 1 Barocque Rock Carvings near Kuks.

4. The Baroque Rock Carvings by M. Braun at Kuks

The Rescue of M. Braun's Area near Kuks. An Analysis of Damaging Causes and Suggestion of Conservation and Rehabilitation Possibilities was the title of a project supported by the Research Support Scheme of the Central European University in the period of 1992-94. Coordinated by Petr Kotlík and co-chaired by Jiři Kaše, the activities were focussed on a survey of the unique ensemble of sculptures, reliefs and caves arranged in the area of Betlehem in the forests of Kuks in Northern Bohemia, then CSFR.

The project was aimed to deliver a complex view on this exclusive ensemble including the historic background related to its original composition and appearance. Further aspects were

2 DECORATED RENDERS AROUND 1900 IN EUROPE. EU-Rendec. – Bundesdenkmalamt, Arbeitshefte zur Baudenkmalpflege/Kartause Mauerbach, Vienna, 1999.

to provide information on materials used, the current state of preservation, the sources and mechanisms of decay, and finally the formulation of concepts for alternative ways of long term prevention. These tasks required the collaboration of professionals from very different disciplines - from art history through biology, chemistry, conservation science to petrography or hydrogeology.

Petrographic analyses of the stone in its sound and weathered states respectively, and non-invasive investigations using ultrasound, or examination of paint layers were just a part of the major scientific investigations conducted by Johannes Weber, Vienna, Tatjana Bayerová and Karol Bayer, Litomyšl and in order to assess states of preservation, conclude on causes of deterioration, and find options of preventive conservation. The project results finally led to the development of a concept of protection of the area against the further impact of weathering agents. In this way the study contributed to a discussion across different disciplines focused on basic treatment concepts of such ensembles. In a parallel study, art historical research was undertaken and biographic traces of the statuary's creator Matthias Bernhard Braun, a famous Bohemian Baroque sculptor, originally from Tyrol, were researched, including through a joint excursion to Tyrol. The research results were published in a monograph.[3]

5. EUREKA project EU 496 EUROCARE-EUROMARBLE

Starting in 1990 and operating at least until 2001, the research initiative EUROMARBLE in which over eight countries participated officially and experts with various background and expertises from many more countries contributed actively, focussed on issues of decay and conservation of crystalline sculptural marble. Especially in the period of 1994–1995, when funding was provided by an Austrian research foundation, collaboration was intense between the University of Applied Arts Vienna, the University of Innsbruck and The School of Restoration and Conservation Techniques Litomyšl, aimed at investigating the ageing of marble, particularly that of South Tyrolese origin, exposed to different environments by means of ultrasound transmission, optical microscopy, scanning electron microscopy and colour measurements. The study contributed to the understanding of damage mechanisms of marble in the climatic conditions north of the Alps.

The outcome and the benefits of the EUROMARBLE initiative were not only the acquired scientific value, but also its action as a European platform for information exchange from diverse perspectives in the field of marble conservation. Among the numerous publications arising from the EUROMARBLE group, the Proceedings of the yearly EUROMARBLE meetings which attracted an increasing number of experts, became a greatly respected series of high-level scientific papers.[4]

6. The Castle in Moravská Třebová

In 1997-98, the School of Restoration and Conservation Techniques Litomyšl coordinated a collaborative project on the investigation and restoration of the tower of the castle in Moravská Třebová, Czech Republic, undertaken in co-operation with the Deutsches Zentrum

3 KOTLÍK, Petr; KAŠE, Jiří. *Braunův Betlém. Drama krajiny a umění v proměnách času*. Praha – Litomyšl : Paseka, 1999, ISBN:80-7185-233-3.

4 Proceedings of the Workshops EUROCARE-EUROMARBLE, Volume 1, 1990–11, 2000.

für Handwerk und Denkmalpflege, Fulda e. V., Aussenstelle Potsdam, and the University of Applied Arts Vienna. Activities included thorough research and subsequent linked restoration activities of the architectural stone elements of the castle. Many of the collaborating experts from Germany and Austria, and the University of Applied Arts Vienna contributed to the study with a variety of measurements, tests and analyses on-site and in the laboratory.

The two-year restoration project was designed as a model for similar sites and was divided into two basic phases. A multifaceted investigation was undertaken in the first period. It was largely focussed on tests related to the characterisation of the major decay phenomena, such as e.g. surface corrosion, impacts of alterations caused by a fire in the past, rising damp and distribution of water and soluble salts, detachment and decay of renders, etc. Simultaneous investigations provided information on the original appearance of the tower and the construction materials used. Trials of different restoration techniques and conservation materials were also part of the first period.

The second period saw the restoration based on the first stage, which included sensitive cleaning of the stone elements of the tower, desalination at controlled effectiveness, structural consolidation on damaged areas, grouting of detached renders, repair of missing stone pieces and renders, and also repair of the roof and the tower clock. The study and the practical works were documented in several reports.

7. Tombstones in the Cathedral of Saint Vitus in Prague

Financially supported by the World Monument Fund and the Prague Castle Administration, collaborative research was conducted to establish the state of preservation and the causes of decay of the tombstones of Princes Bořivoj II and Břetislav II in the Chapel of St. John the Baptist in the Cathedral of Saint Vitus in Prague. The stone condition was examined primarily from the point of view of its surface and in-depth degradation. The identification of natural binders formed part of the petrographic and geochemical exploration of the stone and joint materials, along with the determination of stone expansion due to moisture, determination of the sorption isotherm, climatic measurement in the chapel, salinity measurement, analysis of organic impurities, thermogravimetry of mortars, microbiology and microscopic examination of historic polychromy. The research and the results were presented and published, amongst others, at an international conference.[5]

8. EU project NAMO – Nabatean Mortars- Technology and Application

The international project NAMO – Nabatean Mortars - Technology and Application (ICA3-CT-2002-10017) focused on historical building techniques used in the Nabatean kingdom was carried out under the Fifth Framework Programme funded by the European Community 2003 to 2005.

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5 BAYER, Karol; JUSTA, Petr; KAČER, Jiří; KOTLÍK, Petr; ŠTROUF, Richard; WEBER, Johannes. Scientific Examination and the Restoration of Tombs of Princes Bořivoj II and Břetislav II in the Chapel of St. John the Baptist in the Cathedral of Saint Vitus in Prague, In *Proceedings of the 10th International Congress on Deterioration and Conservation of Stone*, Stockholm, 27 June - 2 July, 2004, ISBN 9163114585 p. 907–914.

Fig. 2 Nabatean Temple of Qasr al Bint, Petra.

The project consortium consisted of experts covering the variety of disciplines required by the project tasks e.g. restoration of historical architecture, geology, chemistry, architecture, building material engineering, care of historical monuments…etc. from four countries - the RSS/BRC from Jordan (Royal Scientific Society – Building Research Centre, Amman), DGAM from Syria (Directorate General of Antiquities and Museums, Damascus), IRCT from the Czech Republic (Institute of Restoration and Conservation Techniques, Litomyšl, in 2005 transformed to the Faculty of Restoration, University of Pardubice) and ARCS from Austria (Austrian Research Centres, Seibersdorf) as the project coordinator.

Research was aimed to investigate the ancient building materials with regard to the mortars of free-standing buildings used in the Nabatean kingdom in Jordan and Syria. The Nabatean people in the Middle East region are world famous for their carved rock facades in Petra, but the techniques they applied in the making of free-standing structures with regard to the mortars have received little attention in the past. The examination methodology was based on Archaeometry, which is also known as the application of scientific techniques and methodologies to archaeology. The interdisciplinary collaboration of different scientific disciplines is crucial.

Various mortars from the Nabatean period were studied at two reference sites, the Temple of Qasr al Bint in Petra, Jordan and the Great Cathedral area in Bosra, Syria. A detailed mapping of materials and damages was conducted at Qasr al Bint to learn about different types of materials and damages to understand the weathering conditions and the state of preservation.

Dependant on the function of the mortar, the Nabateans used various kinds of binding media (gypsum and/or lime) at Qasr al Bint and various kinds of aggregates and admixtures (limestone, basalt, pumice, fibres) at the Great Cathedral in Bosra. This information provided a more detailed impression of the advanced building technology in Nabatean times.

The composition of Nabatean mortars and their condition was also examined in order to develop suitable restoration materials for the preservation of these historical sites. Repair

materials suitable for the most important conservative needs (adhesion/repair mortar, sacrificial plaster, grouting mortar) were developed and modified in the laboratory, in the field and by on-site application.

Regarding the preservation of cultural heritage, the NAMO project represented an outstanding example of how an ideal restoration project with a step-by-step procedure should proceed to formulate the conservation-restoration concept.

The results of the project have been presented to the institutions concerned, to architects, engineers, representatives of industry and site owners by two workshops in Amman and Damascus. The Damascus workshop was organized with another EC project (PRODOMEA) under the topic "Compatibility and Mortars: Conservation Approaches for Archaeological Sites in the Mediterranean Area" in an international frame. The practical aspects of the results like mortar preparation and application, the use of on-site tests and the application of consolidants and poultices were demonstrated to engineers, local workers and local representatives of the cultural heritage administration by two practical workshops in Petra and Bosra. The research results were also presented at an international conference.[6]

9. EU project ROCEM - Roman Cement to restore built heritage effectively

In the years 2003–2006, the EU supported the research project EVK4-CT-2002-00084 ROCEM in its 5th Framework Programme. Focussed on the re-evaluation of the 19th century natural Roman cements, the project was coordinated by the Institute of Catalysis and Surface Chemistry of the Polish Academy of Sciences in Krakow.

ROCEM took the trouble to study historic Roman cements from several viewpoints, including their regional production and use in 19th century Europe, the raw materials and processes of manufacture, the cement composition and its path of hydration, the mortar formulations and their modes of application for the various tasks in building construction and façade decoration, the mortar properties, etc. Besides, limited quantities of Roman cement were produced by the project consortium in order to perform laboratory tests as well as trial applications on-site.

Members of the project team formed by ten partners from six European countries came from the University of Applied Arts Vienna and the School of Restoration and Conservation Techniques Litomyšl which became the Faculty of Restoration of the University Pardubice during the course of the project. Earlier collaboration on the topic of hydraulic binders between both centres provided the basis of their intense cooperation within the project: while Vienna performed microscopic analyses of the binder components and their microstructures and of the mortar petrography on samples from buildings, Litomyšl assessed physico-mechanical properties of historic and modern Roman cement mortars, participated in the studies of hydration mechanisms, and coordinated application trials - a doctoral thesis by R. Tišlova on the hydration of Roman cements emerged from the ROCEM project. Both partners actively conducted on-site surveys in their respective countries, and organised workshops and seminars to disseminate the concept.

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6 HAMID, R.; GAGGL W.; BAYER, K.; BAYEROVÁ, T.; JUSTA, P.; OMERI, I.; NABULSI, B. Archaeometry and the Nabatean mortars. In *Proc. the 7th European Conference "SAUVEUR"SAFEGUARDED CULTURAL HERITAGE Understanding & Viability for the Enlarged Europe, Prague 31May - 3 June, 2006*, ISBN 978–80-86246-29-1, p. 153–163 .

10. EU project ROCARE - Roman Cements for Architectural Restoration to New High Standards

Based on ROCEM, the EU funded a follow-up research project on Roman cement in its 7th Framework Programme: coordinated by the University of Applied Arts Vienna, the FP7-ENV-2008-1 project No. 226898 ROCARE (2009–2012) provided the platform for another 3years of intense collaboration between the centres in Vienna and Litomyšl, embedded in the joint efforts of a consortium of 14 partners from seven countries. Even if now the focus was more market-oriented than in the ROCEM project, there was still plenty of scientific research needed to assess the properties of various mortars produced from a number of Roman cements and other hydraulic binders. In this way, the Litomyšl Faculty was not just measuring the macro parameters related to the pore space of the mortars, but also the characteristic microstructures of the binders, the latter topic being researched in frame of a doctoral thesis. The new scanning electron microscope operating at Litomyšl provided an excellent methodical link to the Viennese partner, facilitating the exchange of know-how and numerous jointly performed studies with use of this instrument.

Additional joint activities within ROCARE were the creation of a façade inventory for relevant areas in the cities of Prague, Brno and Vienna as well as common efforts to disseminate the concept of the Roman cement technology in both countries. A considerable number of scientific papers have emerged from the project activities; they are listed and can be downloaded from the ROCARE project website www.rocare.eu. Additionally, the *Manual of Best Practice in the Application of Roman Cements* was edited to document the project results with open access.

11. EU project STONECORE - Stone Conservation for the Refurbishment of Buildings

The 7th FP EU project NMP-SE-2008-213651 STONECORE (2008-11) dealt with the development and application of nano-materials for the conservation of natural stone and mortar. The products – Calcium hydroxide and sulphate of varying particle size, suspended in different concentrations in organic solvents – were synthesised by the German project coordinator and tested by the project partners. The consortium consisted of 12 partners from seven European countries.

While the Litomyšl team contributed with laboratory and site trials of consolidation, focussing on the optimisation of formulations and application techniques and including assessment of the efficacy of treatments, the Vienna group used their expertise in microscopy to trace the consolidant in the pore space of the specimens. Thus, featured collaboration between Litomyšl and Vienna was very much about the correlation of microstructural phenomena with macro-properties of the untreated and treated specimens, an issue of interest for the field of conservation sciences. A number of presentations were given and several scientific papers were published.[7]

7 GHAFFARI, E., KÖBERLE, T., WEBER, J.: Methods of microscopy and SEM to assess the performance of nano-lime consolidants in porous solids, - in: *Proc. 12th International Congress on the Deterioration and Conservation of Stone,* New York, 22–26 Oct. 2012 (in press). BAYER, Karol; MACOUNOVÁ, Dana; MACHAČKO, Luboš. Calcium Hydroxide Nanosuspensions as Consolidants of Porous Limestone and Lime Plasters - from Laboratory Tests to Practical Application. In *Proceedings of the 4th ALMA interdisciplinary conference 2012 "Knowledge and experience in the fine art – from understanding materials to technological*

Resumé

Za hranice zemí a oborů: 20 let vědecké spolupráce mezi Vídní a Litomyšlí v zájmu evropského kulturního dědictví

Tento příspěvek krátce shrnuje vybrané společné aktivity a projekty institucí, v nichž autoři působí. Vzdělávací instituce v oblasti restaurování v Litomyšli již od založení využívá existující profesní síť odborníků působících v daném oboru. Tato spolupráce je vedena na několika úrovních současně – od specializovaných kurzů přes přednášky nebo praktickou výuku až po vědecký výzkum. Cílem tohoto příspěvku je ilustrovat na několika konkrétních případech důležitost interdisciplinarity a mezinárodního aspektu spolupráce jako významných faktorů přispívajících k ochraně památek a péči o kulturní dědictví. Na základě dlouhodobé zkušenosti lze konstatovat, že z této rozmanité spolupráce mají velký užitek obě strany.

Když byla v roce 1993 založena v Litomyšli Škola restaurování a konzervačních technik, Univerzita užitných umění ve Vídni této příležitosti využila a rozšířila svou spolupráci v zahraničí o další ze svých sousedních zemí. Od té doby obě instituce spolupracují na řadě společných vědeckých projektů týkajících se konzervování/restaurování. Spolupráce se rozvíjí také na poli mezioborového výzkumu, z něhož některé jsou aktivitami bilaterálními, naopak jiné jsou součástí velkých mezinárodních projektů.

applications", Prague, 21–23 November 2012, ISBN 8087108337 p. 326–346.

Rakousko a Česká republika, které spojuje společná historie, sdílejí i kulturní a architektonické dědictví. Po politických změnách v Evropě se v roce 1990 objevilo mnoho nových možností, jak spojit úsilí, prostudovat společnou minulost a rozvíjet koncept, jak tuto minulost uchovat a jak nabyté informace rozšiřovat mezi studenty a odborníky v obou zemích.

Tato studie představuje několik nejdůležitějších momentů této dvacetileté spolupráce. Za ni je jistě namístě vyjádřit uznání oběma zúčastněným institucím, především za jejich ochotu vyměňovat si informace, využít svých mezinárodních kontaktů ve společném úsilí přispět k lepším znalostem a ke zdokonalování postupů v restaurování a konzervování bohatého evropského dědictví.

Projekt EU-Raphael BUILDFRESC – Průzkum a konzervování/restaurování barokních nástěnných maleb v klášteře v Mauerbachu poblíž Vídně (1996-98) – se zabýval konzervováním/restaurováním barokních maleb v někdejším klášteře v Mauerbachu. Na technologickém průzkumu složení a technik barevných vrstev, jejich míry zachování a technických možností, jak je odkrýt, zpevnit a vyčistit, po celou dobu spolupracovali specialisté z obou institucí – z Vídně i Litomyšle.

Kurz ICCROM ASC-98, organizovaný v roce 1998 v Mauerbachu, se zaměřil na průzkum omítek a nástěnných maleb jak z teoretického, tak z praktického hlediska, ať už na místě, nebo v laboratoři. Tyto výzkumné činnosti byly koordinovány týmem vědců z obou partnerských institucí.

Barokní plastiky od M. Brauna ve východočeském Kuksu byly prozkoumány skupinou odborníků z několika oborů. V rámci komplexního výzkumu přispěli oba autoři především v oblasti prozkoumání a posouzení stavu plastik a následně v rámci hodnocení příčin poškození. Tyto informace sloužily zejména ke zpracování návrhu možností preventivní konzervace.

Projekt EUREKA EU 496 EUROCARE-EUROMARBLE poskytl autorům příležitost provést společný průzkum degradace mramoru v podmínkách středoevropského klimatu. Důraz byl kladen zejména na studium mechanizmů a rychlosti degradace různých druhů mramorů v závislosti na expozici v různých podmínkách.

Společným projektem restaurování významné památky byl rozsáhlý průzkum a následné restaurování vnějšího pláště rizalitu zámku Moravská Třebová. Na průzkumu se podílela mezinárodní skupina odborníků různého profesního zaměření. Na základě výsledků průzkumu byl připraven detailní návrh restaurátorských prací, které pak byly na rizalitu realizovány.

Podle podobného konceptu probíhala spolupráce na náhrobcích knížat v Kapli sv. Jana Křtitele v pražské Katedrále Sv. Víta. V rámci mnohostranné spolupráce byla zkoumána míra, rozsah a mechanismus degradace kamene. Výsledky byly opět podkladem pro formulování konceptu konzervace/restaurování.