

Characteristics of main research directions investigated at the institute and the achievements 2010–2014

Institute	Institute of Archaeology of the CAS, Prague, v. v. i.
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1) Basic Characteristics

Institute of Archaeology of the CAS, Prague, v.v.i. (ARUP) is mainly engaged in basic archaeological research in the period from Prehistory to the Middle Ages, alternatively Early Modern Times, on the basis of specific evidence of archaeological sources. Professional activity of ARUP reaches into all areas of study of the archaeological sources, i.e. from the field research phase, through the study of artefacts and ecofacts in the context of archaeological cultures to generalisation models of past societies. ARUP carries out archaeological research in the territory of Bohemia, but also in other places in Europe and beyond.

In the field research ARUP applies methods of various types of archaeological excavation and non-destructive techniques (e.g. aerial photography, geophysical survey, surface prospection), which is recently becoming of more and more importance. Over the last five years, ARUP has performed hundreds of field research. The largest and most contributive of them were for example: rescue excavations in Dolní Břežany (454,000 Euro) in Chrudim (447,000 Euro) in Prague-Bubeneč (140,000 Euro), as well as the long-term archaeological research (carried out since 1925) of the most important site of the national memory, the Prague Castle. Here excavation in 2010 during the reconstruction of the Golden Lane (178,000 Euro) is worth mentioning. These examples can well illustrate an essential feature of ARUP's fieldwork - an effort to closely interconnect the field research with the demands of theoretical knowledge. In the field of non-destructive terrain procedures we must mention the application of aerial archaeology that collected the largest available corpus of data in the Czech Republic on previously unknown archaeological sites. For research of both terrain and off-terrain context sources the ARUP has quality technical equipment (own aircraft, geophysical instruments, laboratories for radiocarbon dating, archaeogenetics, anthropology, archaeozoology, palaeobotany, preservation and restoration of artefacts or 3D laboratory - cf. below). The integration of these approaches and related disciplines is one of the main long-term trends in ARUP's activities.

Due to its specific history, ARUP (and its predecessor, the National Archaeological Institute, founded in 1919) contributes significantly to the protection of archaeological monuments as part of the national cultural heritage, legislative, practical, and informational (rescue excavations of sites endangered by construction or mining). Under the current Heritage Act ARUP is the main guarantor of the professional standards of archaeological research. This obligation implies a significant share of coordinating the care of the archaeological heritage (proposals to declare a site a Monument, giving statements on building activities, etc.). With this task it is related also the building of a central repository of field documentation (the Archive) and operation of an electronic registration system of field research for professional organisations.

It can be concluded that the specific social significance of ARUP lies mainly in:

- (1) the implementation of large project of the theoretical research (see the reports of the individual teams)
- (2) conducting extensive field excavations of endangered sites in relation to the theoretical research;
- (3) creating and managing both analogue and digital data files of the 'national' reach and making them accessible to experts and the wider public;
- (4) coordination of field research in archaeology, to the extent defined by the Heritage Act;
- (5) editorial and publishing activities and
- (6) the doctoral training and other educational activities.

2) International orientation

The priority in the field of basic research is integration of ARUP into the pan-European, possibly even broader international framework. In this regard probably the most influential work in the evaluation period was the completion of the most comprehensive English-written compendium of Czech prehistory "The Prehistory of Bohemia", which covers systematically individual periods from the Palaeolithic to the Migration Period in Bohemia. The seven volumes summarize current state-of-the-art knowledge, gives an overview of sources, asked questions and views on the interpretation of the archaeological data. After more than 50 years, a complex synthesis is once again available, now in a language that is understood by the international scientific community. At the same time by the ratio of ca 1300 pages of information to the area of interest it is a compendium of one of the most detailed surveys of prehistory dedicated to a specific territory in the world ever. The carrying out of this work was done with participation of several dozen specialists; the coordinating and editing role of each volume belonged exclusively to researchers of ARUP, who also constituted a decisive majority of the authors' collective.

As part of the strategies of international integration ARUP prefers specific initiatives versus formal ones. Therefore we do not support the formal cooperation agreements that lack very specific content; we on the other hand promote a cooperation built "from-the-bottom", based on personal contacts and jointly asked questions of our and foreign colleagues. A typical example of such cooperation is e.g. project "Scientific metallurgical-restoration survey and experiment in Czech and Ukrainian archaeology", where the member of the 2nd evaluated team is coordinating closely focused research in the field of experimental archaeometallurgy and restoration research, in which participate specialists from Ukraine and Russia.

Another achievement in this field is organising or co-organising of the international workshops, seminars and conferences, and thus natural support for creating a joint international research environment. Again, as one example a workshop titled "The Boii between Reality and Fiction", which was attended by 50 experts, including 40 foreigners, can be mentioned. And other meetings will follow.

3) Organisation of research

ARUP is managed by the Institute's Director together with two deputies (deputy for legislation and conservation and deputy for rescue research) and scientific secretary.

Professional activities of ARUP are structured into five specialised departments, four of which are identical with teams undergoing evaluation and one department performs tasks in the field of archaeological heritage care (Department of information sources). Departments fulfil several functions - professional (research coordination), educational (training of Ph.D. students, university engagements), organisational (department operation, evidence of research and findings), and administrative (personnel administration etc.).

The structure ARUP introduced already in 2007 proved well and management sees no reason for substantial changes in the near future. Distribution of staff in the individual departments is based on the logic of the subject of study, but also in the methods used and shared facilities.

4) External influences

Orientation of main scientific strategies of ARUP, however, is subject to external influences. State institutional funding allows beside basic operating costs and mandatory activities only limited coverage of smaller internal research projects that could independently respond immediately to the latest scientific trends, topics, and approaches. Research projects are therefore mainly financed from special-purpose funds from national (support from the Grant Agency of the Czech Republic, support of the program National Cultural Identity Ministry of Culture etc.) or foreign sources (mainly EU). Obtaining these funds, however, is dependent on adapting to the selection criteria of the relevant provider. This is particularly evident in the case of the Ministry of Culture, which allows getting quite interesting research funds, however, which has to be directed in the selected social sciences as applied research and the actual basic research is only lateral, less important component of successful projects.

Project objectives are therefore discussed in internal opponency within individual departments and in the Research council of ARUP in order to avoid major deviations from the main research directions. Only on the basis of the recommendations from the departments and by the Council the director approves the submission of project application.

It should be emphasized that the current model of research funding in the Czech Republic the research institutions are forced to raise funds for expensive projects especially this way that for reasons mentioned above, does not seem optimal. On the other hand, it is necessary to highlight the success of ARUP in this field. Within a team of 45 researchers who enter into the evaluation was during this period awarded 58 projects, of which 8 were financed by foreign providers. On several projects, several research teams of ARUP have participated. Of some importance is also a total sum of money, which was thus obtained for research. In absolute volume it increases by 43% the financial resources that have been allocated for the given period to ARUP from the institutional of the The Czech Academy of Sciences (CAS).

In 2014, ARUP registered for participation in the project CAS - Strategy AV21. In our case it means involvement in a research program no. 11 - "Europe and the State: between barbarism and civilisation" where we are involved through the main coordinator and will participate on the theme "Culture in a European state, the state in a European culture." We participate as well in the fulfilment of the research program no. 12 - "The memory of the digital age", namely the theme "Digital Humanities - disclosure, preservation and rescuing of sources in the digital age."

5) Research facilities

In terms of research priorities, as defined above, the one of the main tasks of ARUP is the acquisition and ensuring of the continued functioning of the necessary research instrumentation and laboratory capacity. In this respect, the position of archaeology is fundamentally different from other humanities disciplines, not only in terms of financial costs. In this view ARUP significantly outperforms other industry entities in the Czech Republic. The items that are directly related to scientific research in the ARUP, and all of which are high-class, if not unique equipment in the Czech Republic, in some cases reaching or exceeding even the European standard (e.g. Equipment for aerial archaeology, digital archives etc.) can be demonstrated. Those instruments and equipment we consider as crucial for successful comprehensively conceived research at ARUP, inevitably based on a multidisciplinary approach.

Laboratory of archaeogenetics

Standard molecular biology laboratory equipment worth about 40 thousand EUR. These are mainly cyclers (including qPCR), laminar boxes, centrifuges, a system of evaluation of gel images, but also many other items. A significant part of the ARUP's laboratories exceptional in the Czech environment. A unique thing in a Central European area is the collection of material samples from Africa (Cameroon, Chad, Nigeria, Niger, Burkina Faso, Mali, Egypt, Somalia, Ethiopia, Kenya, Senegal and Sudan), but also Asia (Yemen) and Europe (Czech Republic, Slovakia). It serves for projects related to population history, involving also international teams. Within the accreditation the laboratory also runs training of MA and Ph.D. students of the Department of Anthropology and Human Genetics, Faculty of Science, UK.

Radiocarbon laboratory

Radiocarbon dating laboratory, with international code CRL is a mutual workplace of ARUP and the Institute of Nuclear Physics AS CR. Laboratory performs dating based mainly on the conventional synthesis procedure of benzene and measurement low background liquid scintillation spectrometer. During 2014, it successfully completed the basic test procedures for processing of micro wood and weights units of micrograms of ^{14}C measurements using accelerator mass spectrometry (AMS - Accelerator Mass Spectrometry). Given the very high purchase price of equipment suitable for AMS measurement itself it is carried out in the framework of cooperation in foreign laboratories, especially ATOMKI HAS groaning in Debrecen.

CRL laboratory is equipped with two low-background liquid scintillation spectrometers Quantulus 1220, which is characterized by long-term stability and low measurement of background values. Furthermore, there is the liquid scintillation counter TriCarb 3170 TR / SL Omnistar quadrupole gas analyser and gamma spectrometric route with aHPGe detector on the relative efficacy around 20%. The workplace has standard laboratory equipment needed to process samples for dating, which annually handles around a hundred.

Aerial prospection

ARUP is the only archaeological institution in continental Europe with its own reconnaissance aircraft (Cessna 172, OK-EKD). With its help it was possible since 1997 to build an extensive archive of aerial photographs - before r. 1989 was not possible to operate aerial archaeology. In the following period for this activity it will be used the drone facility which will build upon the existing aerial prospecting while exerting much lower costs. It is because of the financial situation which does not allow further operation of the airplane.

Geophysics

ARUP has a five-channel fluxgate gradiometer (Sensys, Germany) and cesium magnetometer (SM-4g Scintrex, Canada), which is used sporadically, especially in complicated terrains. We also use GPR (WIFI equipment Cobra II-GPR, Radarteam, Sweden) with parallel monitoring of two depth levels. Also apparatus for shallow resistive geoelectric survey (RM-15, Geoscan Research, UK), electromagnetic survey (EM-38b, Geonics, Canada) device with a set of contact thermometry, a temperature sensor (GIM 1840-ST60, Greisinger, Germany) and a device for measuring the magnetic susceptibility in situ (SM-20, GF-instruments, CR) are available.

Geodetic machines and other equipment for field research

Professional GPS stations (4 pieces, for example. GeoXT Trimble, Pathfinder ProXS etc.), Total stations (2 pieces, for example. Topcon GTS 212), photogrammetry mobile tower with a height range of 4-6 m and a width of 4-9 m³ and UMPC (ultra-mobile personal computer) with

Leica total station, which allows you to efficiently create terrain documents in digital form (ArcGIS, AutoCAD, Microsoft Office and so on.) are available. Those devices and equipment are among the necessary equipment for field research and conform to international standards.

3D laboratory

During recent years, ARUP is developing methods of 3D visualization and documentation of archaeological situations using advanced technology. For artefacts virtualization technique is used optical 3D scanning, which captures perfectly true virtual surround of the object model and supports a variety of formats for the resulting records, thesaurization and presentation of objects in digital form. The department has an optical 3D scanner Breuckamnn SmartScan-3D and appropriate software (OPTOCAT, Rhinoceros, AutoDesk Infrastructure Design Suite). In the framework of the project 3D Virtual Museum of the Neolithic was through this technology converted into digital format a large set of key findings from the site of Bylany near Kutna Hora.

Especially during rescue excavations of ARUP there are applied 3D photogrammetry methods that enable rapid documentation of unearthed terrains only with the help of a digital camera. These data are processed in specialised software (eg. AgisoftPhotoscan) and the final output are generated 3D models of objects that retain spatial information of the situations of destroyed building.

In phase of preparations are now unmanned aerial acquisition vehicles (UAVs), whose main potential lies in the creation of high-rise and digital terrain models and larger landscapes. Operation is planned from July 2015.

Another possibility of applied dematerialisation of archaeological objects is computer modelling of 3D reconstruction according to the research results, including the model in a realistic environment geographic information systems (ESRI ArcGIS), allowing the subsequent spatial analysis.

These techniques of 3D scanning, 3D photogrammetry and 3D modelling for archaeology have a major impact, especially in terms of documentation and preservation of cultural and historical heritage. By extending standard presentation mechanisms of virtual space there are opening up of entirely new horizons of popularisation (e.g. Virtual and augmented reality).

Restoration laboratories

We have high quality equipment for major operations related to the preservation and restoration, as well as research, technology for manufacturing all kinds of archaeological finds. There are 2 ultrasonic lapping and polishing systems for mechanical cleaning of the surface; 2 abrasive polishing and milling systems for mechanical cleaning of the surface of the treated artefacts; stereomicroscope Meiji for technological analysis of textile relics; 4 stereomicroscopes Olympus for conservation and restoration activities; 1 stereo microscope Olympus traversing a movable arm for the exploration of larger artefacts or portable X RFA analyser (NITON XL3t GOLDD) for spectral analyses of canned items. Further there are e.g. 2 laboratory hoods; 2 cabins for pressure blasting through glass medium; mass air flow and air discharge equipment; tester for analysis of iron objects; dash assembly for making metallographic samples; 2 dryers; 5 Olympus cameras and software programs for microscopic documentation and measurement, dash kit for making metallographic samples; 2 dryers; 5 Olympus cameras and software programs for microscopic documentation and measurement, dash kit for making metallographic samples, 2 dryers; 5 Olympus cameras and software programs for microscopic documentation and measurements.

Software

The most important and most widely used systems are mainly GIS and especially ArcGIS 10.1 (8 licenses, incl. 6 concurrent operating on ARUP's intranet) and GeoMedia. For using the second of GIS programmes ARUP established the Registered Research Laboratory supported by Intergraph, which is used to develop GIS applications in archaeology. In recent years, ARUP acquired also software ArcGIS Server for presentation of the map projects in a web environment. Another important software is EMC Documentum, content management system used in a web application to access the Digital Archive ARUP (<http://www.arup.cas.cz/?cat=327>) and ALEPH, library program provided for institutes within the Czech Academy of Sciences. For the evidence of the archaeological excavations on the internet there is a special application "Internet database of archaeological field research" (<http://arup.smartgis.cz/page/0/>); a desktop application Archaeological Database of Bohemia (<http://www.arup.cas.cz/?cat=594>) is also used. Currently it is worked on the integration of these applications into one unified information system "the Archaeological Map of the Czech Republic", whose creation is realized by the programme NAKI. Of general use are in ARUP programmes as Photoshop, Surfer, SPSS, Statistica, Corel Draw and more.

Comparative archaeozoological collection

Thanks to the comparative collection ARUP is the best equipped place to study animal bones and Archaeozoological practice at all.

6) Evaluation of research activities

Research results of ARUP in the reporting period were also evaluated by the Czech Academy of Sciences as a founder. The most successful research results within the whole Czech Academy of Sciences was declared aforementioned publication of the compendium Prehistory of Bohemia or the results of research at one of the centres of Czech State - Vysehrad, as well as unique achievements in the research of an Iron Age hillfort settlement of Vladař in western Bohemia.

National and international awards for their research work were awarded also to the individual employees of ARUP. Among the most prestigious are European Union Price for Cultural Heritage / Europa Nostra Awards 2011 (T. Durdík), Reimar Lust Preis 2013 (V. Salač) NEURON Award 2014 for his contribution to world science in the social sciences (E. Neustupný) Price of the Minister of Education, Youth and Sports for outstanding research, experimental development and innovation in 2013 (P. Sommer).

Research Report of the team in the period 2010–2014

Institute	Institute of Archaeology of the CAS, Prague, v. v. i.
Scientific team	Department of prehistorical archaeology

The establishment and present existence of the Department of prehistorical archaeology (hereinafter DOP) is based on the need to join scholars who deal with prehistoric archaeology. The primary goal of the DOP is fundamental theoretical research. The research approaches of the individual scholars have been deliberately divergent since it enables flexible perspective on the interpretation of the particular prehistoric periods on one hand, and it allows reaction to changes in methodological and theoretical trends on the other. The topics studied significantly contribute to the enrichment of historical and cultural foundation bases on which the identity of the Czech populace rests.

The importance of the DOP consists in its unique focus: the department as a whole focuses in detail on the prehistoric period only (the Neolithic and later periods). This means that the department's staffers are able to engage in theoretical and fieldwork research of the earliest human culture. The knowledge of this period of human past is fully dependent on acquiring and correct interpretation of archaeological sources without the aid of written sources. The DOP structure is configured in a way that for each basic chronological period of prehistory (with the exception of Palaeolithic and Mesolithic) there is at least one expert. His or her task then is to study the given topic in detail and in European context, and become a national authority and arbiter in their field. The DOP successfully pursues this goal as it embodies the absolute cutting edge in the context of the national archaeological discourse. This is confirmed by the number of grants allocated to research projects, the amount of publications and the existing and planned cooperation abroad (for details see below).

The practical application of personnel staffing becomes evident at analysis, evaluation and publication of large-scale excavations that in the last ten years resulted exclusively from archaeological heritage management. The archaeological sources processed result from fieldwork activity of the Institute of Archaeology CAS, v.v.i., but also other professional institutions in the Czech Republic. Processing of the data to ensure protection of archaeological and historical heritage and minimisation of side effects of activities that could damage it belongs among core activities of the DOP. In view of this, DOP staffers produce surveys and expert assessments of particular sites on request. The DOP therefore strongly partakes in the process of protection and management of the cultural heritage of the Czech Republic.

The detached department in Kutná Hora, with origins in the nearby former archaeological fieldwork expedition at the Neolithic site in Bylany, forms part of the DOP. The detached DOP department in Kutná Hora is directly responsible for archaeological heritage protection in the Kutná Hora and Kolín region. Apart from this standardly oriented activity, new methodical and methodological approaches in fieldwork research are tested here. Also in view of this contribution was the Institute of Archaeology CAS, v.v.i., put in charge of its largest ever one-off fieldwork activity – the construction of the road bypass of the Kolín town. The archaeological data acquired in the course of the excavation phase of the research became constituent of grant projects and publication outputs of the DOP. This detached department of the DOP also manages the extensive and on European scale unique data set from one of the largest excavations of Neolithic settlement in Bylany near Kutná Hora. The management involves not only the deposition of the archaeological finds, but also maintenance of the data

stock comprising database and map GIS system (<http://gisbylany.arup.cas.cz/GIS-Bylany/>). All components of the data bank are accessible to international scholars.

Management of archaeological data acquired continuously through activities of the entire Institute of Archaeology CAS, v.v.i., and technically processed and scientifically evaluated by the same, before their handover to a museum, constitutes an important part of the DOP work.

The personnel composition of the DOP research team in Letenská st. is as follows:

- Scientific staffers: M. Dobeš, M. Ernée, M. Chytráček, L. Jiráň, P. Květina, P. Limburský, I. Pavlů, J. Řídký, V. Salač.
- Postgraduate students and other professional staffers: P. Burgert, K. Neumannová, J. Unger, J. Militký, P. Vavrečka, K. Smíšek, Z. Kalfusová, N. Dvořáková.
- Administrative staffers and laboratory technicians: B. Hrůzová, O. Trojánková.

The detached department in Kutná Hora comprises the following staff:

- Scientific staffers: R. Šumberová.
- Postgraduate students and other professional staffers: F. Velímský, M. Končelová, H. Brzobohatá.
- Administrative staffers and laboratory technicians: J. Poupová, O. Vlasák, J. Komberec, L. Kombercová.

Scientific staffers and postgraduate students of the DOP focus on three major thematic spheres, delimited chronologically, within which intermediate projects develop.

The first and chronologically earliest range of topics, demarcated by one period in prehistory, is the Neolithic. The following cooperate on projects: R. Šumberová (settlement archaeology, Kutná Hora region archaeology), H. Brzobohatá (anthropology of archaic populations, digital morphometry), I. Pavlů (Neolithic of Europe and origins of agriculture), P. Květina (Neolithic settlements, anthropological archaeology), M. Končelová (Neolithic settlement strategy), J. Řídký (later Neolithic, rondels, stone industry), P. Burgert (later Neolithic, obsidian in prehistory) and K. Neumannová (technology of Neolithic pottery).

The second wider topic is the archaeological problem of Late Aeneolithic and Early Bronze Age. The following cooperate on its research: M. Ernée (historical technologies and Early Bronze Age in central Europe), P. Limburský (end Aeneolithic and outset of Early Bronze Age), M. Dobeš (European Aeneolithic, copper artefacts), L. Jiráň (European Bronze Age, archaeometallurgy of copper and bronze, settlement archaeology), and J. Unger (cultural change in the Urnfield Period).

The third thematic horizon is the turn of prehistory and protohistory. The following cooperate on this topic: M. Chytráček (Hallstatt and La-Tène Period, settlement archaeology), V. Salač (La-Tène Period, early Roman Period, political economy in later prehistory) and J. Militký (Celtic minting, finds of ancient coins in the barbarian, ancient numismatics).

These wider thematic groups within the DOP focused, in the evaluated 2010-2014 period, on several research topics:

Research of Hallstatt and La-Tène Centres of Power.

The topic of centres of power in the late prehistory and outset of early history has been long studied at the DOP both at the practical level of fieldwork excavation (with the contribution of new natural science methods) as well as theoretically (i.e., systemic analysis of existing knowledge and its embedding into European interpretation framework). The practical level comprises fieldwork at the Vladař hillfort and above all the excavation of a prehistoric cistern

at its bailey. Dendrochronological dating of the oak beams from the timbered dam of the cistern places the construction in the 1st half of the 5th century BC. Interdisciplinary research at the site employs the widest spectrum of approaches and methods possible. Paleoenvironmental methods, for the use of which the site provides exceptionally suitable conditions, have played a key role in the research until present. The rare occurrence of stratified wet situations at the acropolis and bailey makes Vladař an archaeological site of international importance. The research was carried out in cooperation with the Department of Archaeology of the Faculty of Philosophy and Arts of the University of West Bohemia in Pilsen, Institute of Botany ASCR and the Musée cantonal d'archéologie et d'histoire, Lausanne, Switzerland. The topic became part of the grant project: The hillfort of Vladař. Revealing the potential of the suburbia and excavation of the uniquely preserved wooden constructions from 5th century BC within the waterlogged deposits (no. 1 in the List of grants) and subsequent projects: Burial monuments of the social elites of the Iron Age. Recording and preservation of disappearing movable and immovable archaeological monuments in South Bohemia (no. 2 in the List of grants); Bohemia and Central Europe between 400 BC and 100 AD (Celts, Germans and the Roman empire) – a synthesis and interpretation (no. 10 in the List of grants); Celtic coin production in Bohemia in the 3rd and 2nd centuries BC and its relationship to the oppida period (no. 11 in the List of grants).

Significant thematic publications:

Chytráček, M. – Pokorný, P. – Danielisová, A. – Kočár, P. – Kočárová, R. – Kyselý, R. – Kyncl, T. – Sádlo, J. – Šmejda, L. – Zavřel, P. 2011: Pády regionálního mocenského centra. Přehled současného stavu poznání pravěkého opevněného areálu na Vladaři v západních Čechách. *Památky archeologické* 103:273-338.

Chytráček, M. – Pokorný, P. – Danielisová, A. – Kyncl, T. 2012: Die Quellbecken des eisenzeitlichen Befestigungsareals auf dem Berg Vladař in Westböhmen. *Germania* 90, 27- 66.

Chytráček, M. 2013: Doklady přítomnosti elity 6.–5. století př. Kr. v regionu na soutoku Labe a Vltavy ve středních Čechách - Evidence of the presence of elite individuals in the fifth and sixth century BC in the region at the confluence of the Elbe and Vltava rivers in Central Bohemia. *Archeologické rozhledy* 65, 285–320.

Militký, J. 2010: Keltské a antické mince z oppida Hradiště u Stradonic v bývalé fürstenberské sbírce na hradě Křivoklát a v Donaueschingen. *Numismatický sborník* 24 (2009), 27-64.

Salač, V. 2012: *Les oppida et les processus d'urbanisation en Europe centrale*, In: S. Sievers, M. Schönfelder Hrsg., Die Frage der Protourbanisation in der Eisenzeit – La question de la proto-urbanisation à l'âge du Fer, Kolloquien zur Vor- und Frühgeschichte Bd. 16. Bonn, 319-345.

Neolithic rondels. Context, origin, purpose, decline.

Long-term research aims to gain in-depth contextualised knowledge of the origins of monumental architecture. The goal is also to verify possibilities of solution of some queries traditionally connected with rondel research, such as the relationship between the movable finds in the ditch infill and the supposed purpose, original shape and dating of the rondel.

The research purpose included excavations (Kolín – DOP Kutná Hora, Vchynice – in cooperation with the Centre for Archaeological Heritage Management Most). Several publications of brand new information about Neolithic rondels in Central Europe were of crucial importance in the European context.

The topic was studied in cooperation with the Institute of Geology CAS Prague, University of Hradec Králové, and Centre for Archaeological Heritage Management Most. Thematic session at EAA conference was organised in cooperation with the German Landesamt für

Archäologie Sachsen (Harald Stäuble, Jaroslav Řídký, Petr Květina. What Is Changing and When – Post LBK Life In Central Europe. Session at EAA 19th Annual Meeting, Pilsen, Czech Republic, 4-8 September 2013). The research formed part of the projects: Neolithic rondels from the perspective of micromorphologic and formative analysis (no. 7 in the List of grants); and Settlement area with rondel in Vchynice (Litoměřice district). Late Neolithic rondels in the Elbe River basin (no. 16 in the List of grants).

Significant thematic publications:

Řídký, J. 2011. Rondely a struktura sídelních areálů v mladoneolitickém období. Rondels and the Structure of Settlement Areas in the Late Neolithic Period. *Disertationes archaeologicae Brunenses/Pragensesque. Praha a Brno: Filozofická fakulta Univerzity Karlovy v Praze.*

Řídký, J., P. Květina, M. Půlpán, R. Brejcha, L. Kovačiková, D. Stolz, B. Šreinová, and V. Šrein. 2012. Analýza a interpretace nálezů z příkopu neolitického rondelu ve Vchynicích. *Archeologické rozhledy* 64 (4):628-694.

Lisá, L., A. Bajer, D. Válek, P. Květina, and R. Šumberová. 2013. Micromorphological evidence of Neolithic rondel like ditches infillings; case studies from Tešetice-Kyjovice and Kolín, Central Europe. *Interdisciplinariaarchaeologica. Natural Sciences in Archaeology* 4 (2):135-146.

Řídký, J., M. Končelová, R. Šumberová, P. Limburský, and P. Květina. 2014. How were the ditches filled in? Neolithic rondels from the perspective of formative analyses. *European Journal of Archaeology* 17 (4):579-601.

Řídký, J., M. Půlpán, B. Šreinová, V. Šrein, V. Drnovský, and P. Květina. 2014. „Životní cyklus“ mlecích nástrojů z mladoneolitického sídelního areálu s rondelem ve Vchynicích, okr. Litoměřice. *Archeologické rozhledy* 66:271-309.

Šumberová, R. a kol. 2012: *Cesta napříč časem a krajinou. Katalog k výstavě nálezů ze záchranného archeologického výzkumu v trase obchvatu Kolína 2008 – 2010.* Praha: Archeologický ústav AV ČR, Praha, v.v.i.

Evaluation and interpretation of finds from the long-term fieldwork research of the Neolithic site at Bylany

Activities connected with the assessment of one of the most outstanding European Neolithic sites form a very important long-term part of the scholarly portfolio of the DOP. Frequent bibliographic references, contacts and invited lectures (Germany, France, USA) advert to exceptionally excellent work.

In the period reviewed, the team focused on deciphering the relationship between the living material culture at the settlement and the refuse preserved in the form of archaeological finds. First, detailed spatial analysis of ceramic and non-ceramic refuse was accomplished. Three levels of questions were addressed: refuse management and its deposition in the vicinity of houses; distribution of refuse within the total of the residential area; quantity and structure of refuse from the perspective of long-term duration of the settlement. Negative correlation between the average density of non-ceramic finds in respect to a house, and the number of houses in a given chronological interval, revealed the possibility that abandoned households continued to be used e.g. to deposit refuse. Following the results obtained, new methodological reassessment of Neolithic pottery decoration at the settlement was undertaken. Several categories of linear decoration style were identified based on quantitative analysis of pottery decoration style at the level of individual archaeological features. The relevance of these categories was validated by means of spatial analysis of their incidence. The results of the analysis enabled formulation of an alternative theoretical model of Neolithic settlements and its confrontation with the existing model. The topic was included in projects: Archaeological contexts at a Neolithic site. Spatial analysis (no.4 in the List of grants); Archaeological 3D

virtual museum. New technologies in documentation and presentation of Neolithic settlement (no.13 in the List of grants); Neolithic pottery technology variability as a reflection of past social identities (no.15 in the List of grants).

Significant thematic publications:

Květina, P. 2010: The spatial analysis of non-ceramic refuse from the Neolithic site at Bylany, Czech Republic. *European Journal of Archaeology* 13/3, 1-31.

Pavlů, I. 2010. *Činnosti na neolitickém sídlišti Bylany / Activities on a Neolithic Site of Bylany*. Praha: Archeologický ústav.

Květina, P. – Končelová, M. 2011: Kategorie výzdobného stylu na lineární keramice z Bylan. *Archeologické rozhledy* 63/2, 195-219.

Květina, P., and M. Končelová. 2013. Neolithic LBK Intrasite Settlement Patterns: A Case Study from Bylany (Czech Republic). *Journal of Archaeology* 2013: <http://dx.doi.org/10.1155/2013/581607>.

Structure of prehistoric settlement areas. Processing and publication of Aeneolithic finds from the excavation in Vlněves

Long-term excavation at the sand quarry in Vlněves (Mělník distr.) yielded large amount of sources from different prehistoric periods, among others also from the Middle Aeneolithic Řivnáč Culture. Questions related to taphonomy of residential areas at flatland settlements of the Řivnáč Culture were examined following publication of the finds, including macrobotanical material, osteological material and charcoal. Spatial correlation of sunken features of the Řivnáč Culture with the similarly dated intrusions in later features received increased attention especially in view of the favourable conditions for such study at the site. Another topic studied at the site related to the Bell Beaker Culture burial site. This archaeological component enabled assessment of the complicated transition between the Aeneolithic and the Bronze Age. Comparative analysis of contemporary burial sites in Bohemia focused on the information potential of pottery style. Alternative processing of radiocarbon data emphasised the statistical nature of information obtained. Copper artefacts represent a specific section of the assessment of the Vlněves site in the context of the European Aeneolithic culture. They were treated complexly and published as a scholarly monograph. The topic formed part of the following projects: North-western Bohemia in Early Aeneolithic (no.6 in the List of grants); Aeneolithic Settlements and Burial Grounds at Vlněves. Formation of settlement and funerary ranges in the Aeneolithic (no.3 in the List of grants); Individual and Community. An insight into hierarchy of the Early Bronze Age society based on burial ranges (no.12 in the List of grants).

Significant thematic publications:

Dobeš, M. – Limburský, P. – Kyselý, R. – Novák, J. – Šálková, T. 2011: Příspěvek k prostorovému uspořádání obytných areálů z konce středního eneolitu. Řivnáčské osídlení ve Vlněvsi. [The contribution to the spatial structure of the residential area at the end of the Middle Eneolithic period. Řivnáč settlement in the Vlněves, Central Bohemia]. *Archeologické rozhledy* 63/3, 375-424. ISSN 0323-1267.

Limburský, P. 2012: *Pohřebišť kultury se zvoncovitými poháry ve Vlněvsi. K problematice a chronologii konce eneolitu a počátku doby bronzové*. Praha: Univerzita Karlova v Praze, Filozofická fakulta.

Dobeš, M. 2013: Měď v českém eneolitu. *Disertationes archaeologicae Brunenses/Pragensque* 16. Praha. ISBN: 978-80-87365- 65-6

State origins and pristine civilisations of the Old World

In a long-term project, P. Charvát, a former member of the DOP, focused on cultural history of the origins of state. He addressed particularly the issue of birth and stabilisation of pristine statehood in the primordial civilisation centres of the Old World – Egypt, Mesopotamia, India,

and China. The project's result consists in a publication that acquaints the reader with the primary economic, political and spiritual changes inducing birth and stabilisation of the first centrally managed power structures. The overviews are complemented with general insight into the matter that attempts a balanced consideration of the birth of pristine states of the Old World not only in correlation with economic, political or power aspects, but also in connection with crossing of a fundamental spiritual threshold. The publication represents the first extensive synthesis of the origins of primary and secondary states written by a Czech author. The topic was incorporated into the project Who was king? Who was not king? Elites and commoners in the ancient Near East (no.14 in the List of grants).

Significant thematic publications:

Charvát, P. 2011: *Zrození státu – Prvotní civilizace Starého světa* [Birth of the state. Pristine civilizations of the Old World]. Praha: Univerzita Karlova v Praze – Nakladatelství Karolinum, ISBN 978-80-246-1682-7, 333 str., 52 černobílých ilustrací.

Czech lands and Central Europe in the Bronze Age

Scholars focused on several partial topics within the broad theme. The first one concerns amber finds from early Bronze Age in Bohemia and interpretation of its distribution. The results point at the importance of the studied region in the given period, not only as a transit area, but also as end destination of long-distance distribution of amber. The Bohemian – and especially Central Bohemian – group of the Únětice Culture was economically much stronger than other neighbouring regions.

Another research stage aimed at a fundamental study of a unique site – a rich necropolis of the Únětice Culture located in Prague-Miškovice. Currently, it is one of the most-studied and most comprehensively analysed skeletal burial sites within the entire extended area of the Únětice culture. The significance of the work rests mainly in the results of the radiocarbon dating undertaken and in the analyses of metal items.

Significant thematic publications:

Erné, M. 2012: Jantar v české únětické kultuře - k počátkům jantarové stezky. *Památky archeologické* CIII, 71-172.

Erné, M. – Müller, J. – Rassmann, K. 2012: Ausgrabung des frühbronzezeitlichen Gräberfeldes der Aunjetitzer Kultur von Prag-Miškovice. Überblick über die Auswertung und die ersten Ergebnisse der naturwissenschaftlichen Untersuchungen – ¹⁴C-Daten und chemische Analysen der Metallfunde. *Germania* 87/2, 355–410.

Jiráň, L. (ed.) – Salaš, M. – Kreen-Leeb, A. 2013: The Czech Lands and Austria in the Bronze Age, In: *Oxford Handbook of the European Bronze Age*, 779-803. Oxford University Press.

Archaeological 3D virtual museum. New technologies in documentation and presentation of Neolithic settlement

The aim of the large project is to apply 3D scanning technology to create a virtual museum providing a picture of the Neolithic culture, based on the example of the settlement in Bylany near Kutná Hora.

The main parameter of the applied research is to set up a methodology for recording, assembling and presentation of archaeological finds digitally. The basic technology is optical 3D scanning of artefacts; its asset is the ability to capture the perfectly accurate virtual three-dimensional image of the object. GIS of the Bylany site and its virtual model showing different forms of immovable artefacts (houses, rondels, villages) constitutes an integral part of the project.

The project's most important output consists in a virtual museum of a Neolithic settlement area on the web (to be finished in 2015), which will integrate a display of 3D scans with a thematic GIS map.

The project aims at preservation and promotion of national particularities and strengthening their integrity in the context of the European and world culture in the 21st century. The submitted concept of the project will significantly contribute to closer presentation of a specific part of cultural heritage to a wider public at all education levels. The project's outputs will ensure a significant and systematic development of the general awareness about specific features of cultural heritage, and at the same time acknowledgement of national culture inland and abroad. The topic was part of the project Archaeological 3D virtual museum. New technologies in documentation and presentation of Neolithic settlement (no.13 in the List of grants).

Significant thematic publications:

Brzobohatá, H. - Prokop, J. - Horák, M. - Jančárek, A. - Velemínská, J. 2012: Accuracy and benefits of 3D bone surface modelling: a comparison of two methods of surface data acquisition reconstructed by laser scanning and computed tomography outputs. *Collegium Antropologicum* 36/3, 801-806.

Květina, P., J. Unger, and P. Vavrečka. 2015. Presenting the invisible and unfathomable: Virtual museum and augmented reality of the Neolithic site in Bylany, Czech Republic. *Archeologické rozhledy* 67 (1):3-22.

Applied output: Končelová, M. - Květina, P. Mapa neolitického sídelního areálu Bylany. 2013. <http://gisbylany.arup.cas.cz/GIS-Bylany/>

Members of the DOP are regularly involved in international cooperation, be it direct participation of individual researchers in fieldwork abroad (Turkey, Sudan, France), international cooperation (Slovakia), or scientific projects with theoretical content (Germany, Switzerland, France, USA). In the recent period, the following projects should be mentioned:

- **Associated Regional Chronologies of the ancient Near East (ARCANE).** Holders of the project were P. de Miroschedji (CNRS, Nanterre, France), M. Lebeau (Université Libre, Bruxelles, Belgium) and for the DOP P. Charvát, who acted as coordinator of the thematic group TG02 „Glyptic and Art History“.
- **Un observatoire rétrospectif d'une société archéologique: La trajectoire du néolithique Rubané (OBRESOC).** Holders of the project were J.-P. Bocquet Appel (CNRS France) and for the DOP P. Květina and M. Končelová, who took part in the preparation of the GIS map of Neolithic settlements in the Czech Republic.
- **Fortified area at the table-topped hill Vladař.** The researcher in charge of the project under the auspices of the internal support of international cooperation at the CAS is M. Chytráček (DOP) in collaboration with Musée Cantonal d'Archéologie et d'Histoire, Lausanne, Switzerland. The project thematically targets the evaluation of the potential of the bailey, and research connected with preservation of the uniquely preserved wooden architectonic elements from the 5th century BC.
- **Sabaloka site.** Agreement with the Czech Institute of Egyptology of the Faculty of Philosophy and Arts of the Charles University in Prague enables DOP staffer J. Řídký to participate at excavation in the Sabaloka region by the sixth Nile cataract in Sudan. This cooperation is possible owing to the staffer's recognised professional orientation, and it will be further reinforced by scientific processing of the finds.
- **Documentation and conservation of disappearing monuments in southern Bohemia.** The principal stakeholder is M. Chytráček (DOP), who cooperates with the Römisch-Germanisches Zentralmuseum Mainz (Prof. Dr. M. Egg). The project aims at fieldwork archaeological research connected with pollen and macro-residual analysis, geophysical survey and research.

- **The Celtic hillfort of Oberleiserberg.** Holder of the project FWF (Fonds zur Förderung der wissenschaftlichen Forschung, id. P22615) is the Institut für Ur- und Frühgeschichte, Universität Wien. The coordinator for the DOP is J. Militký, who also participates at the preparation of a monograph publication.
- **Tepecik–Çiftlik site and Güvercin kayası site.** A DOP staffer J. Řídký is member of the international research team, which carries out fieldwork, and evaluation of finds from Turkish Neolithic and Chalcolithic sites. The holder of the project is the Department of Prehistory of the Istanbul University.

DOP researchers attend and organise international conferences or thematic sessions at large congresses (European Association of Archaeologists, Society for American Archaeology). DOP is involved in education of interns – postgraduate students from foreign archaeological departments (Italy, France).

Research Report of the team in the period 2010–2014

Institute	Institute of Archaeology of the CAS, Prague, v. v. i.
Scientific team	Department of rescue excavations

The Department of rescue excavations was established – in its present shape – in 2007. In 2010 it was represented by a consolidated team of three divisions: Prague Castle, the Conservation Laboratories and a team of rescue archaeologists.

The scholarly team at Prague Castle is represented by Gabriela Blažková, Jana Maříková-Kubková (head of the division) and Kateřina Tomková. The other employees are graduate students (Iva Herichová, Katarína Mašterová, both planning to defend their dissertations in 2015, and Kateřina Vytejčková). Additional persons are engaged in archaeological documentation or are part of project teams (Miloslava Housková, Josef Matášek, Pavla Tomanová, Valérie Uramová and Katarína Válová).

The scientific team of the conservation laboratories consists of Helena Březinová (head) and Jiří Hošek, the PhD student Estelle Ottenwelter and the other employees are classified as conservators with licences from Ministry of Interior affairs to restore archaeological finds (Helena Brániková, Radka Černochová, Kamila Moravcová, Ljuba Svobodová). Ludmila Barčáková-Šejvlová was a team member, working on a specific project.

The group of the rescue excavations is guided directly by the head of the department and team member Jan Frolík and consists of PhD students (Roman Brejcha, Katarína Čuláková, Jiří Unger and Monika Pecinovská), of archaeologists and documentation workers (Drahomíra Frolíková, Michaela Mácalová, Drahomíra Malyková, Jana Minarčíková, Radek Moureček and Jana Vepřeková), who are members of teams for other projects as well.

All three divisions fulfil specific tasks and work on scientific and scholarly projects in their fields of action, but also tasks for the whole Institute of Archaeology (rescue excavations, conservation and restoration of finds). In 2010–14 we were also engaged in projects based on cooperation with other institutions.

A) Prague Castle Division

The Prague Castle division has been working at this site without interruption since 1925 and carries on excavations that have been taking place here since the 1870. It is responsible for the complete archaeological heritage care of the area of Prague Castle and other real estates operated by the Office of the President of the Czech Republic. The extent of possible fieldwork is given by the requirements of the presidential office and Prague Castle Administration and cannot be planned in advance. On the other hand, the division is taking part in decisions

concerning the preservation of archaeological heritage in these sites by the Heritage Division of the presidential office, and therefore it is able to correct the extent of the building projects. The Prague Castle teams carries out rescue excavations in the area of Prague Castle and its broader hinterland, including some rather vast long-term excavations (mainly Prague Castle, Hradčany, Střešovice and Levý Hradec). The archaeological heritage care of Prague Castle also includes the operation of vast repositories and the maintenance of archaeological areas (in cooperation with the conservation laboratories division). It operates and is currently digitalizing a large archive of archaeological documentation beginning with the excavations in 1925. The finds and corresponding documentation are processed in such a way, so as it then may be handed over to the Prague Castle Administration, Division of Artistic Collections for long-term storage. The Prague Castle Division of our department has been publishing the scientific series *CastrumPragense* (4 volumes were published in 2010–4).

The processing of important earlier finds has become the main scholarly aim of this division. In 2012–4 finds from the so far most important cemetery at Prague Castle was processed and evaluated (J. Frolík; Czech Science Foundation [GAČR] P405/12/2195 – ‘*Burial Group in Prague Castle’s Lumbe Garden: Analysis of Jewellery and Grave Goods Relating to the Beginnings of Prague Castle*’ – item **40** of the project list). The first volume of this monograph was published in 2014 (Frolík – Smetánka 2014), the second is in print. The project was subject to close cooperation with the Conservation laboratories division (E. Ottenwelter).

The project ‘*Archaeology, Archaeometry and Informatics: Prehistoric ad Medieval Glass in the Czech Republic*’ (K. Tomková as assistant project manager, a project of the Department of Landscape Archaeology and Archaeobiology, Czech Science Foundation [GAČR] – 14-25396S, 2012-2014, item **60** in the project list: Tomková – Venclová 2014) focused on the technology of Glass production.

The same team member was also engaged in a project entitled ‘*Opevněný areál na stolové hoře Vladař. Mapování potenciálu předhradí a unikátně dochovaných dřevěných architektonických prvků z 5. století před Kristem*’ (The fortified area on the Table Mountain Vladař: Mapping the Potential of the *Suburbium* and Preserved Unique Wooden Elements from the fifth Century BC), and studied the medieval settlement of this site (K. Tomková, Science Foundation of the Academy of Sciences – M3000209, project of the Department of Prehistoric Archaeology, item No. **3** in the project list: Chytráček – Tomková – Pokorný – Danielisová 2012). Similarly with the project ‘*Early Mediaeval Man in the Light of the Study of Selected Burial Grounds From central Bohemia*’ (K. Tomková, Czech Science Foundation 404/09/1135, a project of the Department of Medieval Archaeology – item **19** in the project list). The publication of a catalogue of the cemeteries of the fortified settlement at Levý Hradec and its close surroundings represents another basic contribution in connection with the Prague Castle division (Tomková a kol. 2012).

The project ‘*Church Architecture of Great Moravian Mikulčice*’ (J. Maříková-Kubková, Czech Science Foundation 404/07/1513, item **25** on the project list) was finished already in 2010. It was dedicated to a revision of the discoveries concerning Moravian Church architecture

in the fortified settlement of Mikulčice, combining a revision of the original documentation with the results of re-excavations of some key find situations (*Maříková-Kubková 2011*).

The processing of assemblages of early modern pottery from waste pits at Prague Castle (G. Blažková, Czech Science Foundation – 13-34374P) started in 2013 (*Blažková 2013; Blažková – Frolík - Žegklitzová 2012*). It will be finished in 2015; see 3.5.2, number **45** on the project list). Similar was the the project on the research of building technologies and building materials (J. Maříková-Kubková, project ‘*Národní kulturní identita [NAKI]*’ [National Cultural Identity] – DF11P01OVV010, number **50** on the project list), which started in 2011 and will be finished in 2015 – see 3.5.2).

The amount of participation of this division in international projects was immense. Prague Castle was included among sites that since 2010 have been studied within the project *Cradles of European Culture* (Francia Media, EU – Culture 2007–15, No. 2010-0653, J. Maříková-Kubková – item **55** on the project list). The *Culture Heritage Route* was realised as a component project of this and the Prague Castle team is cooperating in the concept and content of the exhibition *Legacy of Charlemagne*. Two scholarly research projects were also part of this project (LibicenadCidlinou, Kopčany [Slovakia]). Main aim was the presentation of the Early Middle Ages as a constitutional element of the formation of European cultural identity. The Prague Castle department has been taking part in the project of the *Corpus Architecturae Religione Europae* (CARE, J. Maříková-Kubková) by gradually processing individual sites (*Maříková-Kubková – Baxa 2012; Hradil –Hradilová -Kočí – Švarcová – Bezdička – Maříková-Kubková 2013*).

To a significant extent the Prague Castle division – in the course of its activities at Prague Castle and close vicinity (municipal quarters of Hradčany and Střešovice) – is also involved in contract archaeology, partially in vast and long-term rescue projects (e.g. Prague, construction of the Blanka Tunnel; Prague-Hradčany, Descriptive No. 108/IV, overall contribution see Tab. 3.9).

The find collections and contributive results have predetermined the Prague Castle Division to a considerable participation in the field of popularisation. Which is managed through lectures (e.g. in the lecture series accompanying the permanent exhibition ‘Story of Prague Castle’), exhibitions – either as authors and co-authors (e.g. Porcelain at Prague Castle in 2011) or negotiating loans (‘The Pernštejn Family and their Time’ Prague 2012) even for international exhibitions (Europa Jagellonica 2012–3, Kutná Hora, Warszawa; Legacy of Charlemagne 2014–5, Enamel [Belgium], Ravenna [Italy]) or popularising work (e.g. a tourist guide to Kostolany pod Trávkou; a guide to the Schwarzenberg Palace in Prague), presentations on Open days (e.g. Blanka Tunnel in 2011) or web pages (‘Heritage Route’ Project); a complete list is to be found in the appendix 3.10.3.

B) Conservation Laboratories Division

The laboratories restore and conserve archaeological finds from excavations led by the Institute of Archaeology or other archaeological institutions. They provide complete survey and documentation of the items, a broad range of specialized analysis, expertises and detailed conservation reports documenting all procedures and interventions. The following care of the archaeological artefacts is an integral part of the archaeological research; corresponding conservation is indispensable for the preservation of the items. The laboratories are equipped with modern facilities; the ceramics laboratory is situated in the main building of the Institute, the laboratory for metal and other artefacts on the premises of the Institute of Rock Structure and Mechanics of the Academy of Sciences of the Czech Republic in Prague 8.

Members of the team survey already conserved archaeological finds and within this field they are specialised in metallography, analysis of textile fragments discovered within corrosion, proofs of textile handicraft in archaeological finds and in the survey of tinned and silver artefacts. The aim of the conservation and restoration survey is to obtain a detailed description of the archaeological finds of metal and other materials which serves as basis for the archaeological and technological interpretation of the items as well as for the optimisation of the conservation and restoration, as to enable their long-term preservation. The laboratories handle about 1,300 metal objects and about 100 ceramic vessels yearly. A specific activity of this division is the maintenance and care for the archaeological areas at Prague Castle (e.g. in the underground of Court Yard III).

To the activities of this division belongs the preparation of objects kept in the Institute of Archaeology that are to be sent on loan to various exhibitions (Prague-National Museum, Prague-Prague Castle, Chrudim, Kolín, Pardubice, Ennema [Belgium]). The division also offers study trips for students and researchers in co-operation with the University of Chemistry and Technology in Prague, the Charles University in Prague, Faculty of Arts or foreign institutions (e.g. Escola Superior de Conservación e Restauración de Bens Culturais De Galicia, Spain).

One of the specialisations is represented by the research on metallurgy and metallographic surveys of archaeological metal objects. This sort of research is specific and requires a specialist with adequate specialisation and equipment (Jiří Hošek is the only specialist in this field in the Czech Republic, *Hošek–Cleere – Mihok [eds.] 2011*). Scholarly interest focuses on the technological survey of medieval knives that counted among the universal and most used tools of everyday life. Swords, being the most demanding forgings, represent their counterpart. (Czech Science Foundation – P405/12/2289; 2012–6; ‘*Meče středověké Evropy jako technologický, archeologický a kulturně historický pramen*’ (Swords of Medieval Europa as a Source for Technology, Archaeology and Cultural History) – item **41** on the project list, *Hošek – Košta–Bárta 2012; Košta – Hošek 2012; 2014*). This project aims at a synthesis of older and new information relating to the swords in the European Middle Ages that have appeared in archaeological contexts or collections.

Another rare specialisation is the study of archaeological finds relating to textile production from prehistoric times to the High Middle Ages (Helena Březinová). The systematic documentation and analyses of textiles in archaeology and other objects related to their

production is conducted according to the newest trends that are quickly developing in today's European research on the history of textiles (technological survey of individual textiles, raw materials and textile techniques).

The subject of textile in archaeology is connected with a number of funded projects, two of which were realized at the time in question. The first project brought a number of finds relating to the early medieval textile production from the Moravian settlement agglomeration of Mikulčice (Science Foundation of the Academy of Sciences – KJB800020901, 2009–11, '*Textile fragments preserved on metal item from the Early medieval archaeological findings – retrieval, processing, evaluation and specification of interpretational options*' – item **17** on the project list, Březinová 2014; Březinová – Přichystalová 2013).

The funded project (Czech Science Foundation - P405-14-06451S, 2014–6, '*Medieval Textile and dyeing technologies – archaeometry of textile finds*' – item **59** on the project list) focuses on high medieval textiles from waste layers in the historical centre of Prague, esp. on the analytical survey of textiles, including the morphology of fibres, used dyes and natural pigments, the study of textile production processes and dyeing.

The conservation laboratories participate in the research, analysis and conservation of objects in connection with funded projects (Czech Science Foundation P405/12/2195 – '*Burial Group in Prague Castle's Lumbe Garden: analysis of jewellery and grave goods relating to beginnings of Prague Castle*', 2012–4; see above, number **40** on the project list; Děd – Ottenwelter – Šejvlová 2015) or international projects (Academy of Sciences – M300021201 and Römisch-Germanisches Zentralmuseum Mainz; '*Pohřební ímonumenty společenských elit doby železné. Dokumentace a konzervace mizejících movitých a nemovitých archeologických památek v jižních Čechách*' (Burial Monuments of the Social Elite in the Iron Age: Documentation and Conservation of Vanishing Movable and Immovable Archaeological Monuments in South Bohemia), 2012–4; project manager Miloslav Chytráček, Department of Prehistoric Archaeology – item **6** on the project list, Estelle Ottenwelter and Helena Březinová as members of the Laboratories Division).

The Conservation Laboratories Division develops international cooperation on grounds of its specialisation. The above mentioned project on knives and metallography involved cooperation with the Institute of Archaeology of the National Academy of Sciences of Ukraine in Kiev on the subject '*Metalurgicko-restaurátorský průzkum a experiment v české a ukrajinské archeologii*' (Metallurgical and Conservation Survey and Experiments in Czech and Ukrainian Archaeology; 2011–3), together with the Institute of Archaeology of the Russian Academy of Sciences in Moscow on '*Techniky nožířské výroby ve středověké Evropě*' (Techniques of Knife Production in Medieval Europe; 2009–11) and '*Modelování středověkých metalurgických procesů*' (Modelling Medieval Metallurgical Processes 2012–4; all three by Jiří Hošek).

A very important component is represented by the international cooperation on the field of archaeological surveys of important sites in Central Asia (E. Ottenwelter), which aims at the conservation of finds as well as immovable archaeological features. The foundation of a specialised laboratory for the conservation of finds of various materials, instruction courses and the compilation of instruction sheets for local conservators (Ulug Depe project in Turkmenistan

in cooperation with the CNRS/France and the Institute of historical Monuments in Ashgabat/Turkmenistan; Mentesh Depe project in Azerbaijan in cooperation with the CNRS/France and the Institute of Archaeology and Ethnology in Baku/Azerbaijan; the project of the foundation of a laboratory in Dushak/Turkmenistan in cooperation with the Leon Levy Foundation/France).

The Conservation Laboratories cooperated with the Laboratoire de recherches des monuments historiques (LRMH, France) on a project of the tanning and identification of remains of tanning with the aid of voltammetry (VMP; Estelle Ottenwelter 2011–2).

Important was the cooperation with the Czech Institute of Egyptology of Charles University, Philosophical Faculty, where analyses of textile finds were carried out and a method of processing textiles from graves for the Czech Archaeological Concession in Egyptian Abusir was developed in 2010–2 (Helena Březinová).

The conservation laboratories take part in contract archaeology in the form of the conservation and analysis of finds and surveys of other archaeological organisation.

The activities of the conservation laboratories are a popular subject of popularisation activities, esp. in the form of visits on open days (in both laboratories) or workshops in schools (esp. on the history of textiles – e.g. in Louny or Prague 5). A complete overview is to be found in appendix 3.10.3.

C) Rescue Excavations Group

The rescue excavations group has gradually become in charge of the fieldwork of the Institute of Archaeology (almost completely since 2010). The group organises rescue excavations in a number of regions that have since long been in the focus of interest of the Archaeological Institute (districts of Slaný and Mělník, and the eastern border of Prague).

This way we get an overview of the settlement development in these areas for Prehistory and Middle Ages in the shape of a mosaic. This view is then combined with the excavations of vast multi-cultural sites, where we can study the inner structure and changes in shorter periods of time. In general, scholarly interest focuses on the cultivation of excavation methods and the research of more demanding fieldwork (e.g. prehistoric cultural layers, sites with complicated stratigraphy) and on the introduction of new documentation methods (3D modelling) and natural-scientific methods as the usual standard (floating, micromorphology). The archaeological material from vast researches contains a large information potential for other departments and teams and it is processed directly by team members (e.g. in PhD thesis as Dobrovíz[Kladno District] – M. Pecinovská). Some periods of prehistory are covered only by specialists in this group (Mesolithic – K. Čuláková).

In 2010–4 the group conducted a number of large-scale rescue excavations, which represent a shift at the evaluation and study especially of large Prehistoric sites. In view of the large extent, in some cases whole settlement and burial areas were explored (bypass road around

Kolín [in cooperation with the Department of Prehistoric Archaeology]; bypass road around Chrudim; Dolní Břežany [Distr. Prague-West] - ELI-HILASE area; Konárovice-Veletov [Distr. Kolín]), potentially rarer complicated stratigraphies of multi-cultural prehistoric sites (Prague-Bubeneč, Ve Struhách). Both types of settlement represent a new feature for processing and evaluation.

The team participated in a large international project (21 countries of Europe, mostly EU members were taking part) entitled '*Discovering the Archaeologist of Europe 2012-14*' (EU – Lifelong Learning – item **57** on the project list), in the evaluation of the position and composition of the archaeological community in the participating countries and of the influence of economic crisis (J. Frolík, M. Mácalová – *Cleary – Frolík – Krekovič – Parga-Dans - Prokopiou 2014; Frolík – Mácalová 2014a; 2014b*).

The rescue archaeology team is strongly engaged in contract archaeology, mainly at (dozens of) archaeological rescue excavation. A complete overview is to be found in appendix 3.9 (Contractual research).

The activities in the sphere of popularisation are closely linked to rescue archaeology, the results of which are usually interesting at the places they have been conducted. Mostly there are lectures held and articles appear in local print or other popularisation texts are written. More stable is the participation in exhibitions (Muzeum Chrudim, Muzeum Pardubice, Muzeum Slaný), the foundation of educational trails (Dolní Břežany, Prague–Dolní Chabry), information panels (Javoří Pila – Šumava) or children days (Obříství [Distr. Mělník], International Archaeology Day – Prague). A complete overview is to be found in appendix 3.10.3.

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- Frolík, J. – Mácalová, M. 2014b: Discovering the Archaeologists 2012-14. Zpráva za Českou republiku. Archeologický ústav AV ČR, Praha, v.v.i., ISBN 978-87-365-72-4.*
- Frolík, J. – Smetánka, Z. 2014: Pohřebiště v Lumbeho zahradě na Pražském hradě. Díl I. Katalog. Castrum Pragense 12. ISBN 978-80-87365-73-1.*
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Tomková, K. – Venclová, N. 2014: Glasschmuck in Böhmen von der Bronze Zeit bis Frühmittelalter: Archäologie und Archäometrie, in: Černá, E. – Stephun, P. (eds.), Glasarchäologie in Europa. Regionen – Produkte – Analysen. Beiträge zum 5. Internationalen Symposium zur Erforschung mittelalterlicher und frühneuzeitlicher Glashütten Europas, Seiffen/Erzgebirge 2012. Most, pp. 221–37.

Research Report of the team in the period 2010–2014

Institute	Institute of Archaeology of the CAS, Prague, v. v. i.
Scientific team	Department of Medieval Archaeology (DMA)

Members of the Department of Medieval Archaeology (afterwards DMA) of the IA CAS, Prague, v.v.i. focus on the following main types of scientific activities: 1) research; 2) systematic support and development of interdisciplinary research; 3) applied research in the field of methodology of the field work, data keeping as well as care for archaeological cultural heritage and 4) popularization of science. Results (publication outputs), cited below the individual paragraphs, represent only selected examples from the team's publication production (for a summary of bibliography, cf. the appendix). Generally said, activities of the team members dealing with applied research and popularization of science have increased in the observed time horizon.

2.1 Research

In the long term, the DMA team systematically deals with one priority issue – **the process of state formation in Early Middle Ages** and also with related issues of transformation of society organisation as well as **changes in economic and cultural phenomena**, their possible generalisation and involvement of results of archaeological field works into interdisciplinary research of the past. These issues are targeted while using not only extensive archaeological collections of sources originating from field works conducted by the team members but also complex re-examinations of earlier completely unevaluated collections from key sites or sources crucial for formulation of topical conclusions (from sites such as Prague Castle, Prague-Vyšehrad, Budeč, Klecany, Libice nad Cidlinou, Libušín, Sázava, Stará Boleslav). In many cases, this approach has brought several completely new and crucial pieces of knowledge that have had a more general impact on other branches of mediaeval history studies. Thus, the DMA team has significantly contributed to the effective treatment of archaeological sources as a part of system of their protection but also their relevant scientific evaluation. In many cases, moreover, the collections in question came from archaeological field works conducted by more generations of researchers and, thus, cannot be completely replaced.

Partially (with regard to the given personnel structure of the team), attention has been also paid to the issues of the formation processes of urban environment and settlement structures and to the issues of castellology.

In course of the observed time horizon, following thematic spheres of interest have been targeted:

- A. Reflection of the process of genesis as well as formation of state in archaeological sources (B, C and partially D and F as subtopics of A);**
- B. Church archaeology as a branch of studies of the process of Christianisation of the society and related material culture, including funeral rites transformation in the course of earlier as well as latter part of the Middle Ages;**
- C. Research into types and genesis of the church architecture;**
- D. Foundations of formation processes of Early Medieval Bohemia (settlement structure, formation of elites, cultural phenomena at the beginning of Early Middle Ages etc.);**
- E. Settlement forms and material culture of the High Middle Ages;**
- F. Other activities: participation of a team member in the interdisciplinary research in Sudan (Czech Institute of Egyptology, Faculty of Arts, Charles University in Prague and Institute of Geology of the Czech Academy of Sciences, v.v.i.).**

A. A working colloquium with international participation – *Czech State of the 10th century – beginnings, society and culture*, devoted to the theme of the **state formation processes** was held on October 7th – 9th 2013 in Saaz/Žatec (co-organisers: IA CAS, Prague and Centre of Medieval Studies, Institute of Philosophy; an output is scheduled for the year 2015). Several studies that are being prepared for a conference proceedings *Cyril-and-Methodius mission and Europe* and for an exhibition catalogue *Great Moravia and beginnings of Christianity* (requested by organiser: IA CAS, Brno, v.v.i.; Velehrad 2013) dealt with particular aspects, namely connections of Bohemia with the Great Moravian Empire etc. Among other things, current state of sources available for solving the issue of mutual relations and influences of the Great Moravian Empire on the Early Přemyslid state development was discussed there in great details. A key point represents an up-dating of the model describing the Přemyslid domain and specification of differences in state formation processes in broader Central European and/or European regions. In this respect, mainly the re-examination of earlier archaeological collections and critical re-evaluation of their interpretative possibilities has led not only to antiquation of previous and often not well founded pieces of knowledge but also to formulation of new hypotheses that form logically interconnected knowledge system. Several other studies dealing with this broad topic were requested and presented on a thematically orientated conference (Těšín 2011, organised by the IA CAS, Brno, v.v.i., also). The conference covered a broad range of questions regarding the Czech lands in Early Middle Ages ranging from settlement patterns and settlement types to social structure and everyday life material culture.

Results:

E.g. a series of studies as well as a monograph written by **A. Bartošková**;

- Basic horizons of development at the foregrounds of the Early Medieval hillfort of Budeč. *Archeologické rozhledy*. Roč. 64, č. 1 (2012), s. 59-88
- Budeč. Významné mocenské centrum prvních Přemyslovců. [Budeč - an important power centre of the first Přemyslids.] Praha: Nakladatelství Lidové noviny, 2014. 182 s. - (Archeologica).

- Budeč. Ein bedeutendes Machtzentrum des frühen böhmischen Staates. [Budeč. A centre of power of the early Bohemian state.] *Zeitschrift für Archäologie des Mittelalters*. Roč. 38, - (2010), s. 85-159.

further e.g.:

I. Boháčová:

- From the history of Czech medieval archaeology. The archaeological excavations of Ivan Borkovský in Loretánské Square in Prague-Hradčany. *Archeologia Polski*. Roč. 57, 1-2 (2012), s. 161-197.

- Počátky budování přemyslovského státu a jeho centra - synchronizace výpovědi archeologických pramenů a její interpretace. [The beginnings of the Přemyslid state and its centres: synchronization of archaeological sources and their interpretation.] *Archaeologia historica*. Roč. 38, č. 1 (2013), s. 7-25.

- Prague, Budeč and Boleslav. The reflection of state formation in Early Medieval archaeological sources. *Frühgeschichtliche Zentralorte in Mitteleuropa*. Bonn: Rudolf Habelt, 2011 - (Macháček, J.; Ungerman, Š.), s. 371-395

Boháčová, I. – Profantová, N. (2014): Čechy v době velkomoravské – *Bohemia in the Great Moravian Period*. In: P. Kouřil (ed.), *Cyrlometodějská misie a Evropa – 1150 let od příchodu soluňských bratří na Velkou Moravu*.

I. Boháčová – N. Profantová (2014): Čechy a Velká Morava – svědectví archeologie. In: P. Kouřil (ed.), *Velká Morava a počátky křesťanství*.

Profantová, Nad'a - Profant, Martin Modernizace moravské medievistiky? [The modernisation of Moravian medieval studies?]. *Archeologické rozhledy*. Roč. 66, č. 1 (2014), s. 127-140.

Varadzin, Ladislav: K vývoji hradišť v jádru Čech se zřetelem k přemyslovské doméně (příspěvek do diskuse). [On the development of strongholds in the heart of Bohemia in regard to the Přemyslid domain (a contribution to the discussion).] *Archeologické rozhledy*. Roč. 62, č. 3 (2010), s. 535-554.

- Raně středověké hradiště Libušín. Hlavní poznatky z revizního zpracování výzkumů. [The early medieval stronghold in Libušín. The main findings from a review of excavations.] *Archeologické rozhledy*. Roč. 64, č. 4 (2012), s. 723-774.

B: Specific topic of the **process of Christianisation** and its various aspects (such as e.g. general cultural framework of this phenomenon, different forms and purposes of **monastic communities** etc.) represents a long-term object of interest of the team member P. Sommer. Studies focusing on **funerary rites** also form an important part of the team's activities: significant cemeteries are being processed and evaluated that, on one side, corroborate the earliest visible traces of the process of Christianisation in the funerary rites and, on the other side, spread of this phenomenon (i.e. Christianisation) into the broadest social levels together with transformation of related cultural patterns such as e.g. change in the structure of funerary equipment that occurred at the end of Middle-Hillfort Period (i.e. in Central Bohemia at the end of 9th and in the first half of 10th centuries) or transfer of burial grounds from isolated places beyond the inhabited areas to the vicinity of settlement agglomerations where already from the mid-11th century began to appear church multi-levelled cemeteries (Prague-Gratschin, Stará Boleslav). The topic was supported especially by the projects nos. 34, 37, 38.

Results:

Sommer P. e.g.:

- Böhmen als Kultlandschaft. [Bohemia as a cult-land.] *Böhmen und seine Nachbarn in der Přemyslidenzeit*. Ostfildern: Jan Thorbecke, 2010 - (Hlaváček, I.; Patschovsky, A.), s. 289-316
- České křesťanství doby knížete Václava. [The Czech Christianity in the time of Duke Wenceslas.] *Svatý Václav. Na památku 1100. výročí narození knížete Václava svatého*. Praha : Togga, 2010 - (Kubín, P.), s. 65-80
- Der heilige Gunther und das frühe benediktinische Mönchtum. [Saint Gunther and early benedictine Monkhooood.] *1000 Jahre Rinchnach*. Rinchnach : Guntherverein Rinchnach, 2011 - (Dengler, J.), s. 43-50
- Der heilige Prokop und sein Kult im Mittelalter. [Saint Procopius and his cult in the Middle Ages.]

Die Heiligen und ihr Kult im Mittelalter. Praha : Filosofia, 2010, s. 275-29

- Die gegenwärtige tschechische kirchliche Archäologie. [The contemporary Czech church archaeology.]

Kirchenarchäologie heute. Fragestellungen - Methoden - Ergebnisse. Darmstadt : Wissenschaftliche Buchgesellschaft, 2010 - (Krohn, N.), s. 544-560

- Christianity, archaeology and building sacrifice. *The creation of medieval northern Europe. Christianisation, social transformations, and historiography*. Oslo : Dreyer, 2012 - (Melve, L.; Sønnesyn, S.), s. 90-102

- Stát, světec a raný středověk (Opat Prokop očima recenzentů). [The state, the saint and the Early Middle Ages (Abbot Prokop as seen through the eyes of review writers).] *Český časopis historický*. Roč. 108, č. 2 (2010), s. 287-305

further e.g.:

Klápště, Jan

Boemia plena est ecclesiis et religione divina. [Bohemia is filled with churches and divine religion.]

Čechy jsou plné kostelů. Boemia plena est ecclesiis. Kniha k počtě PhDr. Anežky Merhautové, DrSc. Praha : Nakladatelství Lidové noviny, 2010 - (Studničková, M.), s. 217-227

Štefan, I. - Varadzin, L. Super altare in ecclesia tua. Die Anfänge der Pfarrorganisation in den böhmischen Ländern aus archäologischer Sicht. [Super altare in ecclesia tua. The beginnings of parish organisation in the Czech lands from an archaeological perspective.] *Praehistorica*. Roč. 31, č. 2 (2014), s. 357-372

Boháčová, I.

- Stará Boleslav a odraz duchovní kultury v archeologických pramenech. [Stará Boleslav and reflection of spiritual culture in archaeological evidence.] *Svatý Václav. Na památku 1100. výročí narození knížete Václava svatého*. Praha : Togga, 2010 - (Kubín, P.), s. 167-172

Boháčová, I.- Blažková, G.: Pohřebiště na Loretánském náměstí v Praze - Hradčanech. Archeologický výzkum Ivana Borkovského a jeho výsledky. [Burial grounds at Loretánské Square in Prague - Hradčany. The archaeological excavation of Ivan Borkovský and results thereof.] Praha : Archeologický ústav AV ČR, Praha, 2011. 348 s

Profantová, N.

- New evidence concerning the dating, importance and hinterland of the early medieval hillfort of Klecany (District Prague-East). *Frühgeschichtliche Zentralorte in Mitteleuropa*. Bonn : Rudolf Habelt, 2011 - (Macháček, J.; Ungerman, Š.), s. 355-370

- Ke změnám ve vývoji hmotné kultury 10. století v Čechách. [Changes in the development of material culture in 10th-century Bohemia.] *Archaeologia historica*. Roč. 38, č. 1 (2013), s. 27-44

Profantová, Nad'a - Stránská, Petra - Hájek, Martin - Likovský, Jakub - Kyselý, René - Kočárová, R. - Kočár, P. - Březinová, Helena - Hošek, Jiří - Ottenwelter, Estelle - Kloužková, A. - Hanykýř, V. - Bartuška, M. - Lisá, Lenka Klecany. Raně středověká pohřebiště. [Klecany. Early medieval burial grounds.] Praha: Archeologický ústav AV ČR, Praha : Epocha, 2010. 220 s.

Klápště, J. – Šmolíková, M. eds., 2013, Raně středověké pohřebiště v Praze-Lahovicích, Praha.

C: Members of the team have significantly contributed also to a shift in the sphere of research of the earliest Early Medieval **church architecture** in Central European region. The research is based not only on sources obtained by rescue archaeological field work but also, in some cases, on re-examination of excavations conducted by previous generations of scholars and has already led to several completely new and unexpected significant findings. A complex evaluation of results of rescue archaeological field works conducted in the area of the chapter basilica of St Wenceslas and St Clement church in Stará Boleslav clearly corroborated our assumptions regarding the state of preservation of the overall ground-plan of the original basilica established by the Duke Bretislaus I (1039–1046) as well as the later dating of the St Clement church (approximately to the first half of 12th century). Discoveries of Early Medieval architecture obtained in rescue excavations in Saaz (Žatec) were published. Archaeological as well as architectural circumstances of the church discovered on acropolis of the stronghold at Libice nad Cidlinou were verified in the course of re-examination in order to gain new pieces of evidence regarding its construction and character (Mařík 2011). However, the most important piece of knowledge in the field of the earliest Bohemian church architecture represents the discovery of previously not quite identified monumental building of central disposition that was attested beneath the St Laurentius Basilica at Prague's stronghold Vyšehrad. First, new and important knowledge had been obtained in the course of revision and consecutively rescue archaeological field work conducted in connection with rehabilitation (2011) of the local archaeological area (existed since 1934) that was later on followed by an intentional research field work (Varadzin 2014). Taking into consideration the dating of the Basilica the newly identified construction can date back to the second half of 10th – first half of 11th century and, thus, as far as authenticity of its ground-plan is concerned, belongs among the best preserved buildings of that particular period of time. Moreover, ground-plan of this type has not been so far attested in Bohemia. Evaluation of this discovery as well as its setting into the general development of Prague in the Early Middle Ages will probably lead towards re-evaluation of significance and role of the site of Vyšehrad in the earliest phases of the Czech state development.

Results:

E.g..

Boháčová, I. - Die Kirchen auf dem Burgwall von Stará Boleslav. Ein Beitrag der Archäologie zur Erforschung der frühmittelalterlichen Sakralarchitektur in Böhmen. [Churches in the stronghold of Stará Boleslav. The contribution of archaeology to understanding early medieval sacral architecture in Bohemia.] *Frühmittelalterliche Kirchen als archäologische und historische Quelle*. Brno : Archeologický ústav AV ČR Brno, 2010 - (Poláček, L.; Maříková-Kubková, J.), s. 243-261, 420-421

Čech, Petr - Chludíková, Katarína: Die frühmittelalterliche Sakralarchitektur von Saaz/Žatec. [Early medieval sacral architecture of Žatec (Saaz).] *Frühmittelalterliche Kirchen als archäologische und historische Quelle*. Brno : Archeologický ústav AV ČR Brno, 2010 - (Poláček, L.; Maříková-Kubková, J.), s. 275-288, 422 ISBN 978-80-86023-92-2.

Mařík, J. Libické kostely v době svatého Vojtěcha. [The churches at Libice in the time of Saint Adalbert.] *Antiqua Cuthna*. Roč. 2007, č. 3 (2014), s. 161-173

Varadzin, Ladislav - Nechvátal, Bořivoj Nové poznatky o předrománském kostele centrální dispozice na Vyšehradě (Předběžná zpráva). [New evidence on pre-Romanesque church of central disposition at Vyšehrad (Preliminary report).] *Průzkumy památek*. Roč. 19, č. 2 (2012), s. 170-176

Sommer, Petr - Stecker, M. The churches of the Sedlčany Region. Sedlčany: Městské muzeum Sedlčany, 2011. 165 s.

Sommer, Petr Die St. Veits-Kirche und das Frauenstift St. Georg auf der Prager Burg zu Beginn des böhmischen Staates und Christentums. [The Church of St. Veit and the Monastery of St. George on Prague castle on the Beginning of the Czech State and Christianity.] *Der Magdeburger Dom im Europäischen Kontext*. Regensburg : Regensburg : Schnell + Steiner, 2012 - (Schenkluhn, W.; Waschbüsch, A.), s. 85-94

Internet sources: <http://www.arup.cas.cz/?p=11713>; <http://www.arup.cas.cz/?p=24898>

D: Among long-term as well as internationally lively discussed scientific topics of N. Profantová belongs cultural discontinuity and foundations of formation processes in Bohemia as a part of the Central Europe in 6th – 9th centuries. Her work oscillates between methodological studies and partial analyses of rare items of small material culture. Their studies represent an extremely topical theme with regard to the current significant increase in number of finds as well as necessity of preventive survey while using metal detectors. Often enough, the number and occurrence of finds has provided foundations for completely radical transformation of previous concepts regarding settlement structure as well as economy of the period in question in particular regions of the Czech Republic. The topic was supported especially by the project no. 41.

Results e. g.:

Profantová, Nad'a Cultural discontinuity and the migration hypothesis. The 6th-century Slavic migration in the light of new archaeological finds from Bohemia. *The very beginning of Europe? Cultural and social dimensions of early-medieval migration and colonisation (5th-8th century)*. Brussels : Flanders Heritage Agency, 2012 - (Annaert, R.), s. 255-264

- Karolinské importy a jejich napodobování v Čechách, případně na Moravě (konec 8. - 10. století). [Carolingian imports and their copies in Bohemia and Moravia respectively (end of 8th - 10th century).] *Zborník Slovenského národného múzea*. Suppl. 4, - (2011), s. 71-104.
- Awarische Funde in der Tschechischen Republik. Forschungsstand und neue Erkenntnisse. [Finds from Avar Khaganat Period from Czech Republic. State of research and new discoveries.] *Acta archaeologica Carpathica*. Roč. 45, - (2010), s. 203-270.

For small material culture see Profantová, N. cf. publication outputs.

E: In the long-term perspective, issues of High Medieval archaeology have been underevaluated within the Department's scientific framework and their extent has been greatly influenced by personnel structure of the team (J. Klápště, 0.1 work load). Moreover, in the course of the observed time horizon the leading specialist in castellology T. Durdík prematurely died.

Crucial and, with regard to the impending anniversary of John Hus' burning, exceedingly topical issue of Archaeology of every-day life in the Pre-Hussite Bohemia that had been formulated while taking into consideration the so-far unevaluated and unique collections obtained during archaeological excavations of the city of Sezimovo Ústí and its significance for the High Medieval Bohemia was repeatedly submitted to the Grant Agency of the Czech Republic as a grant project application; however, always unsuccessfully. Besides, some partial issues related to more general problems of Medieval history and cities were also targeted; namely, one comprehensive and one analytical paper dealt with evaluation of results of field work conducted in the destroyed historical core of the city of Most.

In years 2010–2012 the issue of castellology was systematically focusing on observing construction elements of the castle architecture. The author – T. Durdík also partially contributed to the issues of conception of cultural heritage protection of this type of archaeological evidence (castles) and presentation of their material culture (coins, tiles etc.).

Results:

Ježek, M. - Der přemyslidische Jagdforst im 10.-13. Jahrhundert. Das Zusammenspiel von repräsentativen und wirtschaftlichen Ansprüchen. [Přemyslid hunting forest in the 10th-13th centuries. Compromise of the representative and economic demands.] *Křivoklát - Pürglitz. Jagd, Wald, Herrscherrepräsentation*. Ostfildern : Jan Thorbecke, 2014 - (Fajt, J.; Hörsch, M.; Razím, V.), s. 209-216

Klápště, Jan - Muk, J. - Bubeník, J. Klášter minoritů v Mostě. [The Minorite monastery in Most.] *Archeologické rozhledy*. Roč. 62, č. 3 (2010), s. 429-468.

Klápště, Jan Počátky Markvarticů a jejich sídelní souvislosti v Pojizeří. [The beginnings of the Markvartici kin-group and their settlement contexts in the Jizera River region.] *Archeologické rozhledy*. Roč. 65, č. 2 (2013), s. 321-372

Bičík, I. et al. (Klápště, Jan) Historický atlas měst České republiky, svazek č. 26 – Most. [Historical Town's Atlas of the Czech Republic. Vol. 26 - Most.] Praha Historický ústav AV ČR, 2014. 129 s

In the years 2010–2012 T. Durdík published on this subject 27 articles in scientific journals and another 22 items represent smaller monographs or chapters in books;

F: Specific aspect of the team's activities represents the participation of L. Varadzin on expedition to Sabaloka Gorge in Sudan. L. Varadzin is the field director of the expedition and applies excavation methods characteristic for medieval archaeology on significant Mesolithic site in order to identify its stratigraphy. On the other hand, due to precisely documented natural processes he obtains methodical experiences that can be applied also in general archaeology.

2.2 Interdisciplinary research

The growth of exact methods has also caused increase in cognition possibilities in traditional spheres of archaeological studies that are targeted in the long-term scientific orientation of the DMA such as e.g. the issues of a) chronometry; b) material culture studies; c) GIS applications.

A: Sources that can be used for verification and particularization of the current dating standards of archaeological chronology are methodically and systematically sought after by the DMA team. This represents a continuous topic with results visible only in a long-term perspective. Due to the fact that we are lacking new samples used for dendrochronological dating, members of the team currently focus on verification of interpretative possibilities of radio-carbon dating in relation to the archaeological dating or dating by application of sequence of burials in multi-levelled stratigraphy (Prague, Loretánské Square; Stará Boleslav – the last will be published after verification of its results by ASM dating). Separation of selected elements of mortar binder represents a newly tested method (Prague- Vyšehrad) and its results now wait for verification by other samples. Members of the team are ensuring selection as well as taking of samples while exact measurements are done by specialized experts both in co-operation with the Radio-Carbon Laboratory CRL (operated by the Nuclear Physics Institute CAS and the Institute of Archaeology CAS, Prague, v. v. i.) or with commercial organisations.

B: Newly studied category of finds represents items – touchstones, whose importance was recognized only with the development of exact microscopic analyses and their interpretative possibilities have not been completely evaluated so-far. Previous results of research done by M. Ježek based on studies of these items (touchstones) from a series of European sites corroborate their significance as social position tokens in funerary equipment across space and time and will lead to an overall re-evaluation of this phenomenon's occurrence. Discovery of this supra-regional as well as timeless phenomenon has led toward dynamic entry of the author into prestigious European specialized journals.

New possibilities provided by exact methods represent an important impulse for development of interdisciplinary research as well as for formulating of specific issues from the field of natural environment and technology research. Participation of the team members is, in these cases, given partly by their authorship of archaeological field works during which samples used for the exact analyses were obtained mostly by intentional sampling (or by selection of items obtained from already existing archaeological collections) and partly by their participation in

formulating of specific questions of interdisciplinary research and in some cases also in evaluation of the obtained results. The topic was supported especially by the projects nos. 33, 35).

Results:

e. g. Ježek, M. :- Touchstones from early medieval burials in Tuna in Alsike, Sweden. *Journal of Archaeological Science*. Roč. 42, February (2014), s. 422-429.

- Touchstones of archaeology. *Journal of Anthropological Archaeology*. Roč. 32, č. 4 (2013), s. 713-731.

- Prubířský kámen raně středověké společnosti. [Touchstones of early medieval society.] *Archeologické rozhledy*. Roč. 64, č. 1 (2012), s. 26-58.

Ježek, M. - Holub, M. Touchstones and mercury at Hedeby. *Praehistorische Zeitschrift*. Roč. 89, č. 1 (2014), s. 193-204.

Ježek, M - Zavřel, J.

- Probiersteine als Prüfstein der Archäologie. Nachweis und Kontexte eines Hilfsmittels zur Metallanalyse im Mittelalter. [Touchstones of the Archaeology. Verification and possible interpretations of an instrument to determine the composition of metals.] *Zeitschrift für Archäologie des Mittelalters*. Roč. 39, - (2011), s. 125-160

- Prubířské kameny mezi archeologickými nálezy. [Touchstones among archaeological finds.] *Archeologické rozhledy*. Roč. 62, č. 4 (2010), s. 608-628.

further e.g.:

Boháčová, I. Dřevěné konstrukce a využití dřeva v raně středověké opevněné centrální lokalitě. Příklady z Pražského hradu. [Wooden structures and the use of wood at an early medieval fortified central site. Examples from Prague Castle.] *Památky archeologické*. Roč. 102, - (2011), s. 355-400.

Boháčová, I. - Hošek, J. Archeologie středověkých konstrukčních technologií - sbíjená rakev s panty a kruhovými úchyty z pohřebiště při kostele sv. Klimenta ve Staré Boleslavi. [Archaeology of medieval construction technologies: coffin with hinges and circular handles from a burial ground by the Church of St. Kliment, Stará Boleslav.] *Archaeologia historica*. Roč. 39, č. 1 (2014), s. 241-255

Hošek, Jiří - Košta, J. - Mařík, Jan Nálezy raně středověkých mečů v aglomeraci raně středověkého hradiště v Libici nad Cidlinou. [Finds of Early Medieval swords in the agglomeration of Early Medieval stronghold at Libice nad Cidlinou.] *Sborník Národního muzea v Praze = Acta Musei nationalis Pragae. Series A, Historia. Řada A, Historie*. Roč. 66, 1-2 (2012), 71-87,91-96.

Zavřel, J. - Mařík, Jan Nové doklady zpracování drahých kovů v raném středověku (předběžné sdělení). [New evidence of precious metal processing in the Early Middle Ages (preliminary advise).] *Acta rerum naturalium*. Roč. 12, prosinec (2012), s. 99-105

Kozáková, R. - Pokorný, P. - Mařík, J. - Čulíková, V. - Boháčová, I. - Pokorná, A. Early to high medieval colonization and alluvial landscape transformation of the Labe valley (Czech Republic): evaluation of archaeological, pollen and macrofossil evidence. *Vegetation History and Archaeobotany*. Roč. 23, č. 6 (2014), s. 701-718.

Kočár, P. - Čech, Petr - Kozáková, Radka - Kočárová, R. Environment and Economy of the Early Medieval Settlement in Žatec. *Interdisciplinaria Archaeologica. Natural Sciences in Archaeology*. Roč. 1, 1-2 (2010), s. 45-60.

C: With the help of geographic information systems and new documentation devices specific forms of non-destructive survey and its methodology has been systematically developed by the team members. The non-destructive survey has often had preventive or even rescue character, mainly in connection with frequent damage of archaeological sites by illegal activities of metal-detector users. The non-destructive survey is ensured either by the team members or in the case of application of specific methods (e.g. geophysics) by appropriate specialists. The topic was supported especially by the project no. 36.

Results:

E. g.

Mařík, Jan

Archeologický výzkum raně středověkého hradiště a GIS. [GIS and the archaeological excavation of an Early Medieval fortified settlement.] *Rekonstrukce a experiment v archeologii : živá archeologie*. Roč. 11, - (2010), s. 80-83

Křivánek, Roman - Mařík, Jan Nedestruktivní výzkum akropole libického hradiště. [Non-destructive research on the inner bailey of the Libice nad Cidlinou stronghold.] *Sborník Národního muzea v Praze = Acta Musei nationalis Pragae. Series A, Historia. Řada A, Historie*. Roč. 66, 1-2 (2012), s. 67-70

Mařík, Jan - Košta, J. Archeologická mapa raně středověké Libice, výzkumy Rudolfa Turka na akropoli hradiště. [Archaeological map of Early Medieval Libice, excavations of Rudolf Turek in the inner bailey.]

2.3 Research for practice

Decreasing support of basic research in the Czech Republic and programme orientation of grant agencies as well as other subsidy subjects has led in the DMA to formulation of applied research projects focusing on research methodology, evidence and database systems etc. These activities have focused on creation of instruments that can be used for not only evidence but also protection as well as effective future evaluation of national cultural heritage including archaeological monuments.

Traditionally, castellological topics have been highly involved in this sphere of activities. In the year 2011, the project *Czech castles – rescue of sources* (project no. 43)) focused on research, documentation and evaluation of one of the most endangered type of monuments of national cultural heritage underwent its final phase. Work on similarly oriented European project *Ex Oriente* (project no. 45) has also continued.

Newly (in the year 2012), a NAKI project *Integrate Information System of Prague Archaeological Sources* (abbreviated as IIS_APP, project no. 44 with the National Heritage Board, Prague, 2013–2017) succeeded in competition announced by the Ministry of Culture of the Czech Republic. Its main objective is on-line publishing of a unique and so-far only minimally evaluated archaeological collection and its presentation to scientific as well as broad

public. The project will enable scientific evaluation of archaeological evidence in Prague in as broadest context as possible and will present the broad public to not only the history of Prague but also irreplaceability of commonly invisible and, thus, generally less known unique sources for understanding the city of Prague in Middle Ages (including interdisciplinary issues). Currently, the project is in the phase of creating of databases and technical solutions; general information regarding this project will be published (is already in print) in the 2015 volume of *Archeologia Historica* 40/1.

Partially, the team members are also involved in the project of *Archaeological map of the Czech Republic* (abbreviated as AMČR in Czech, M. Kuna, project no. 62). The key aspect represents the systematic interconnection of both systems: while the AMČR has a more general nature, the IIS_APP system was created specifically for field work conducted in urban zones. Furthermore, team members have cooperated on creation of the *Archaeological atlas of Bohemia* (J. Mařík) and on revision of data for some selected areas (I. Boháčová, Stará Boleslav).

Partially, these activities have completed activities conducted at the Institute of Archaeology of the AS CR, Prague in the previous period within the *Registered Research Laboratory* project (Intergraph, USA) supervised by J. Mařík (sites of Libice n. Cidlinou, Prague-Gratschin, Loretánské Square, Stará Boleslav). Besides the above-mentioned results, including those in connection with the basic research, an archaeological map was created also for the site of Libice nad Cidlinou (1949–1953, 1967–1973; participation of the other co-author J. Košta has stemmed from the historical genesis of the field work for it was partly conducted as a National Museum's project). Experiences of J. Mařík have also been utilised in the process of creation of Vitrea databases (<http://www.arup.cas.cz/VITREA/Index.htm>).

Specific part of the applied research represents care and protection of archaeological sites with presented monuments *in situ* – a unique part of Prague archaeological heritage with roots dating back to 1920s and 1930s. It is a source of exceptionally important evidence for current as well as future research and, simultaneously, it documents the development of archaeological heritage care and its methodology. In the year 2011, financial support (Prague Municipality and the endowment fund of Prague archaeology) was gathered and a long-term project of rehabilitation of the area including St Laurentius Basilica at Prague-Vyšehrad (protected as a National culture monument and administered by the Vyšehrad chapter) was implemented (defined by I. Boháčová). The project not only provided unexpected results in the field of the earliest Czech church architecture (cf. part 2.1 C) but also has had an impact on other branches of research and presentation of its results (cf. parts 2.3 and 2.4 B).

Results:

esp. **Durdík, T.** – cf. publication outputs;

generaly: Mařík, Jan - Prášek, K. Management of archaeological excavations and control in the Czech and Slovak Republic. *The Valletta Convention: twenty years after - benefits, problems, challenges*. Brussel : Europae Archaeologiae Consilium, 2014 - (van der Hass, V.; Schut, P.), s. 113-117 ISBN 978-963-9911-49-9

- Amateurs and professional archaeologists. Legal models for their cooperation in the Czech Republic. *Who cares? Perspectives on public awareness, participation and protection in archaeological heritage management*. Namur : Archaeolingua, 2013 - (Lagerlöf, A.), s. 105-108

Boháčová, Ivana - Nechvátal, Bořivoj Historie a současná obnova archeologického areálu s bazilikou sv. Vavřince v prostoru NKP Praha-Vyšehrad. [History and current renovation of the archaeological complex of the St Lawrence Basilica in Prague's Vyšehrad.] *Zprávy památkové péče = Journal of Historical Heritage Preservation : časopis státní památkové péče*. Roč. 74, č. 1 (2014), s. 3-11

Boháčová, Ivana Replika dlažby vyšehradského typu v bazilice sv. Vavřince na Vyšehradě. Vícegenerační archeologický výzkum a současná prezentace archeologické památky. [Replica of Vyšehrad type tiles in the basilica of St. Lawrence at Vyšehrad. Multigenerational archaeological excavation and current presentation of an archaeological monument.] *Staletá Praha*. Roč. 29, č. 1 (2013), s. 114-125

Research Report of the team in the period 2010–2014

Institute	Institute of Archaeology of the CAS, Prague, v. v. i.
Scientific team	Department of the archaeology of landscape and archaeobiology (DoLA)

Introduction

DoLA was established in 2007 by merging the Departments of Spatial Archaeology and Environmental Department IAP. The team engages in studying the biological variability of a man, his environment in the past, the human subsistence and the process of creating cultural landscape as a framework of the life of society. The team consists of the specialists of anthropology, archeogenetics, environmental archaeology (archaeozoology, archaeobotany) and landscape archaeology using non-destructive methods (including geophysics and airspace industry), as well as Geographic Information System (GIS). The common feature of DoLA is the targeted interdisciplinary cooperation, the research carried out predominantly outside the traditional chronological periods as well as specialized cooperation with other teams. DoLA manages the Airspace Archive of the Czech Republic, the English language database of chemical analyses of Prehistoric and Medieval glass Vitrea and its on-line access on web-sites of the Institute. It is also the guarantor of the national database of plant macro-remains Arbodat. The integral part of DoLA is also the common workplace of UJF CAS - Czech radiocarbon laboratory (Česká radiokarbonová laboratoř, two of its lab workers are also the DoLA members). The main goal of DoLA is strengthening interdisciplinary and international cooperation, deepening the theory of archaeology and finding new methods and procedures for dealing with pursued topics.

For the evaluation of the team, it is important to highlight the fact that many members work only part-time: P. Kočár, R. Kozáková, A. Pokorná, J. Likovský, P. Stránská and N. Venclová - 50%, E. Neustupný - 10%, M. Gojda – 10, respectively 50% , E. Podgorná 50%, respectively 100% in the last year. This (involuntary) restriction greatly reduces the possibility of further team development and more significant involvement into the cooperation among respective teams. At present, the inability to achieve an increase in fixed-time jobs is the biggest problem and a major obstacle to the growth of the scientific team.

Teamwork can be loosely divided according to the methods and approaches towards work into three segments; the issues and specialists dealing with them, however, constantly intertwine. They are Non-destructive and spatial archaeology (A. Danielisová, D. Dreslerová, M. Gojda, R. Křivánek, M. Kuna, E. Neustupný, N. Venclová and Č. Čišecký); Environmental Archaeology (P. Pokorný (till the year 2011), V. Čulíková (till the year 2013), P. Kočár (since 2012), R. Kozáková, R. Kyselý, A. Pokorná (since 2014), a new collaborator B. Vysloužilová (from 2015) and laboratory O. Trojánková); Anthropology (J. Likovský, P. Stránská) and Archaeogenetics (V. Černý, E. Podgorná) with an Archaeogenetic laboratories (PhD students E. Priehodová and M. Čížková).

Non-destructive Archaeology

In the team, large space is devoted to the development and the use of non-destructive methods of archeology, mainly aerial reconnaissance and geophysical survey. By geophysics the team is associated with the economic activities of the Institute; R. Křivánek worked out within the reporting period over 50 excavations in the contract research (ca. 2000 hours), and he was also involved in numerous projects of other teams, where he conducted geophysical measurements.

He published their results in dozens of professional articles and studies and presented them successfully at both local and international conferences. In 2013 he was awarded a prize for the best poster at the conference Archaeological Prospection in Vienna (Poster Award). Aerial archeology in the reporting period focused, beside finding new locations, primarily on processing possibilities of the results of aerial survey. Within the project *From the findings to the structure. Information system for remote sensing and the potential of aerial photographs for creating archaeological maps* (GA CR, GA13-19041S, M. Gojda, 2013-2015, **60**), a new methodology for extracting information potential of the Fund of Archives of aerial photos of the IA is produced. The aim is to create a digital archive of aerial photographs and the model processing of selected regions of so called traditional settlement region. The resulting structured data will be available to a large range of users: archaeologists, historical geographers, architects, urban planners and naturalists.

Through Mr M. Kuna who is also the head of the Department of Information Sources (until 2007 a part of the Dept. of Spatial archeology together with the predecessor of DoLA) the team is integrally connected with the work of the department, especially with the analysis and the scientific use of the Archaeological database and the Archaeological map of Bohemia, on the creation of which both departments work together (*Archaeological Map of the Czech Republic. The System for Collecting, Managing and Presenting Data. NAKI, DF12P01OVV003, M. Kuna, from 2012 to 2015, 62*). Collaboration resulted in 2014 in releasing a key publication Archaeological atlas of Bohemia. On the selected sites from prehistory to the 20th century participated 12 authors from both departments. The book describes 105 archaeological sites of Bohemia selected as typical examples of monuments from prehistory up to the 20th century. The book creates a standard for the best practice in the given area of archeology. By creating an interactive website (www.archeologickyatlas.cz), the Atlas has also become an important popularization achievement.

M. Kuna is also a co-investigator of an international project *ARIADNE - Advanced Research Infrastructure for Archaeological Dataset Networking In Europe* (EU Grant, FP7 - *INFRASTRUCTURES-2012-1 No. 313193, M. Kuna, 2013 - 2017, 64*). The project aims at integrating existing archaeological datasets and at creating the tools to enable data access for researchers. The project addresses European access to, and integration of: excavation and monument record data (building on the work done in ARENA and ARENA2); specialized datasets used for dating, analysing and interpreting, such as dendrochronology, pollen analysis, or other digital reference collections.

Similar focus is also put on two applied results. The first one is an on-line database of chemical analyzes of archaeological glasses, conducted in the Czech Republic, VITREA (the projects: *Glassmaking in prehistoric times and the Middle Ages: cultural and technological transformations*, AV ČR, IAA800020903, N. Venclová, 2009-2011, **49** and "Archaeology, Archaeometry and informatics: prehistoric ad medieval glass in the Czech Republic ", GA - GA14-25396S, N. Venclová, 2012 to 2014, **65**). The database includes glasses from the Bronze Age to the Middle Ages and the post-medieval periods. Besides Bohemia and Moravia, the analyzed samples also come from archaeological finds in other countries - Slovakia, the Netherlands, Sweden and the Mediterranean area. Recorded are data gained by various analytical methods such as SEM-EDS and NAA. <http://en.arup.cas.cz/cz/VITREA/Index.htm>.

The second applied research is the on-line database CZAD - Archaeobotanical database of the Czech Republic. It is a database of archaeobotanical data obtained by the analysis of plant macro-remains from archaeological contexts. The database is currently administrated by the IAP. It was created as a result of the project *Archeobotanical database of ArboDat: The involvement of Archeological Institute of AVČR into the European network of workplaces sharing the database program ArboDat and its use for the scientific purposes*", (AVČR M300020902, D. Dreslerová, 2009-2011, **67**). <http://www.arup.cas.cz/czad/>.

Complex processing of the results of significant archaeological excavations

One of the team themes is processing the results of both older large excavations and the ones created by the members of the department. The first group includes the critical evaluation, processing and the publication of the research of Oppidum České Lhotice and its residential facilities (Danielisová 2011). The main object of the research was the *oppidum*, in the past systematically surveyed by the workers of IAP. The site was newly monitored in the context of its natural and economic background; attention was also paid to the wider region around the oppidum with La Tène sites. Here was examined their natural environment and the conditions for agricultural production reflected in the landscape.

Another similarly significant step was the publication of the research of the sites belonging to the most significant Iron Age central places in Europe - Oppidum Stradonice (Venclová – Valentová 2012). Natural science expert analyses, namely the magnetometric survey data, contribute substantially to the interpretation of the site. Geophysical survey of other *oppida* in the Czech Republic was assessed for the first time ever in a separate publication (Křivánek et al. 2013) which demonstrates the necessity to involve non-destructive methods of archaeology into archaeological research. Geophysical results provide large-scale information about the settled area, fortifications, working activities, roads or even the state of subsurface preservation of archaeological situations in a number of examples.

A significant contribution to the theory of archeology represents the processing of finds from the Late Bronze Age site in Roztoky near Prague. In their analysis, there was a search for new evaluation procedures of archaeological finds and basic concepts from the area of so-called depositional analysis were defined. (Kuna et al. 2012). Also, the evaluation of the research of

the Early Medieval finds from the same site was innovative in terms of massive involvement of environmental sciences which was meant to help to form the interpretation of this exceptional area. The joint effort of 17 authors, both nature scientists and archaeologists is unprecedented in the Czech archaeology (Kuna et al. 2013).

The team members (P. Pokorný, A. Danielisová, P. Kočár, R. Kyselý) got strongly involved in the research of the unique prehistoric cistern at the hillfort Vladař near Žlutice and into the survey its surroundings. Exceptional incidence of stratified waterlogged situations on the acropolis and bailey make Vladař an archaeological site of international importance. Paleoenvironmental methods played a key role in the research (Chytráček et al. 2012).

Prehistoric and Early Medieval subsistence strategies and the natural environment research

The economic research of agglomeration of ancient Slavs in Roztoky (see the previous paragraph) continuously transferred us to the next topic solved within the department, which is the research of the subsistence strategy of hunters and gatherers and of farmers in particular. Kočár and Dreslerová (2010) brought the first comprehensive survey of crops of Czech prehistory and the possible scenario of five phases of prehistoric agriculture. In 2013, the same authors published an overview of cultivated cereals (Dreslerová - Kočár 2013) and of the relationship between the agricultural production and natural conditions (Dreslerová et al. 2013). The character of the farming system of the Late Bronze Age and the Early Middle Ages was widely discussed in Roztoky research publications (Kuna et.al. 2012 and 2013).

A fundamental change in the agricultural system in the Middle Ages was discussed in the publication dealing with the research of the Early Medieval town of Žatec (Kočár in Čech et al. 2013). It was V. Čulíková who systematically contributed to the solution of nutrition in the Middle Ages and Early Modern Times by carrying out her numerous studies. The comprehensive archaeozoological view of the Czech and Moravian Eneolithic was written up, based on a multi-year study, by R. Kyselý (2012). He also deals with issues of hunting, fishing and animal breeding in other parts of prehistory as well as medieval times.

With research subsistence strategies is closely linked the research of natural environment. This category includes the research projects of the “*Long-term development of cultural landscape of Central Bohemia as a co-evolution of human impacts and natural processes (AV ČR, IAAX00020701, P. Pokorný, 2007-2011, 50)*” or the project of the Botanical Institute “*Vegetation continuity and landscape dynamics. Present state and historical causes of diversity hotspot in a region with vacillating colonization. (GAAP, IAAX00050801, J. Sádlo, 2008-2012, 35)*”; the team members participated in the research (Dreslerová et al. 2013b). The team created a number of important articles on vegetation development in the Holocene and human impact on the vegetation (Kozáková et. al. 2010, Pokorný - van der Knaap 2011, Kozáková et al. 2014, Kozáková et al. subm.).

The knowledge of prehistoric farming and other economic strategy is also worked out as complex models, currently predominantly by the author A. Danielisová (*Social modeling as a tool for understanding the structure of Celtic society and cultural changes at the end of the Iron Age. GA ČR, P405/12/0926, A. Danielisová, 2012–2014, 57*). The novelty is the introduction of “agent modeling” into archeology by utilizing the authentic archaeological resources and data. Modeling is used to solve the issues related to demographic estimates, limits and sustainability of agricultural production under various conditions or to model landscape changes (eg. Danielisová et al. 2013).

Prehistory of Bohemia

Another important event was the publication of the English version of the compendium Czech prehistory “Prehistory of Bohemia”. The seven volumes represent the most extensive outline published until now of Czech prehistory from the Palaeolithic to the Migration period. N. Venclová was the co-editor (together with L. Jiráň) of all volumes and the editor of the Early Iron Age and the Hallstatt Period (no. 5) and the La Tène Period (no. 6) volumes. E. Neustupný was the editor of the Eneolithic volume (no.3). For more information see <http://www.arup.cas.cz/?p=24750&lang=en>

Anthropology and Archeogenetics

These disciplines investigate taphonomic processes, study paleodemography and health status of prehistoric and Early Medieval populations (within paleopathological evaluation they collaborate with clinical disciplines), deal with the application and development of molecular genetics methods for the study of human development, society and culture.

The team is connected with anthropologists especially through their common interest in prehistoric and medieval food and its impact on human health and development (e.g. Stránská 2013). In the evaluation period anthropologists (J. Likovský, P. Stránská) assessed particularly large skeletal sets from prehistoric and early medieval cemeteries in Vliněves, Klecany, Lahovice, Levý Hradec or Praha – Střešovice (Stránská 2012, Stránská 2013b, Stránská et al. 2013, Likovský et al. 2013). Currently P. Stránská is involved in the project *Medieval population in the city and in the countryside - Středověká populace v centru a na venkově* (GA 2014 - 36938G - S, J. Frolík, 66). Anthropologists closely cooperate with experts from other teams, both within the institution and outside (e.g. National Museum, ÚAPPSC, Institute of Experimental Biology Science MU Brno).

The archaeogenetic laboratory was founded in 2000 and has since maintained a high standard of research and results. As the only team segment, it works systematically with students in the lab who address the issues of their doctoral theses (J. Nováčková, E. Priehodová). In the given period archeogenetics (V. Černý, E. Podgorná) focused on the research of genetic structure of current human populations. A number of published outputs is oriented towards phylogeography, which indicates the potential of spreading individual genetic lines (especially

mitochondrial DNA, but also the non-recombinant parts of the Y chromosome) in a wider geographic area (e.g. the project *The first steps out of Africa – looking for the genetic traces of Late Pleistocene human dispersal through South Arabian Peninsula*, ME 917, MEYS, V. Černý, 2007-2011, **61**). During the project significant results were achieved and published in a number of impact journals (random: Black et al. 2011, Soares et al. 2012, Al Abri et al. 2012, Podgorná et al. 2013).

At present the team study of new food-producing lifestyles during the Neolithic facilitated the spread of some specific genetic traits (*Genetic imprints of food-production systems in human populations*, GA ČR, GA13-37998S, V. Černý, 2013 – 2016, **59**). The project examines whether, and to which extent, the archaeologically documented differences in the subsistence pattern are reflected in human genetic structure of the populations living today in Africa, Southern Arabia and Central Europe. Population dynamics of Eurasian uniparental haplotypes in Africa are compared with the introduction of domestic animals into the region. First research results of the lactase persistence have been already published (Priehodová et al. 2014).

Radiocarbon dating laboratory (CRL)

The department's activities also include the co-operation with radiocarbon dating laboratory, which was established in 2005 as a joint work place of Nuclear Physics Institute of the CAS and IAP (Head ing. Ivo Světlík Ph.D.). Laboratory performs dating based on the conventional method; during 2014 the lab successfully completed the basic test procedures for processing of micro wood and charcoal for ^{14}C measurements using accelerator mass spectrometry (AMS). The actual measurement is done with the collaboration of foreign laboratories, especially v HEKAL ATOMKI HAS in Debrecen. Annually the laboratory handles around hundred of samples for dating purposes as well as the control of analytical procedures. The laboratory also provides consulting support both for professionals and for general public and is involved in the interpretation of results of determination of ^{14}C from other departments.

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