COMITÉ POUR LA SIDÉRURGIE ANCIENNE
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ANNOUNCEMENT: This communication 67 and following issues will be available in internet pages of the Institute of Archaeology, Prague:

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NEW MEMBERS: *J. Navasaitis*, Kaunas; *J. Petrík*, Košice.

CONFERENCES:

THE INTRODUCTION OF IRON IN EURASIA was the title of the international symposium, organized by the Riksantikvarieämbetet – Geoarcheologiskt Laboratorium, Uppsala (Eva Hjärthner–Holdar, Christina Risberg) at Uppsala, 4–8 October 2001. The meeting was supported by other Swedish institutions as well, and ran under the auspices of the Comité pour la sidérurgie ancienne de l'UISPP. Programme: *Ch. Risberg* (Mrs) and *E. Hjärthner–Holdar* (Mrs), Welcome. *O. Kyhlberg*: Opening lecture. Session I (Scandinavia). *E. Hjärthner–Holdar* (Mrs): Bronze Age Iron Production in Sweden. *L.–E. Englund*, Uppsala: Bloomery Iron Working in Gästrikland. *L. F. Stenvik*, Trondheim: The Introduction of Iron in Mid–Norway. *A. Espelund*, Trondheim: A Critical Examination of Successful Bloomery Iron Making in the Past, With Emphasis on Metallurgical Theory and Find Material. Session II. (Britain and Central Europe). *G. McDonnell*, *S. Dockrill* and *J. Bond* (Mrs), Bradford: The Evidence of for the Adoption and Use of Iron in the Northern Isles, With Particular Reference to Old Scatness Broch, Shetlands. *P.* and *S.* (Mrs) *Crew*, Maentwrog: Laxton, Northants – Large Scale Iron Production in the Early Roman Period. *M. van Nie*, Amsterdam: Iron Production in a Clay Envelope (Hengelo, The Netherlands). *G. Gassmann*, Tübingen: Actual Excavation in an Early Celtic Smelting Settlement in the Swabian Mountains, Southern Germany. *A. Schäfer* and *T. Stöllner*, Marburg: Early Metal Production in the Central Lahn Valley, Hesse, Germany. Poster Session. *P.* and *S. Crew*: Innovation in Furnace Design and Technology – The Refractory Materials from Laxton. *P.* and *S. Crew*: Woodland Management and Charcoal Processing in a Late 14th Century Ironworks. *E. Godfrey* (Mrs), *M. van Nie* and *G. McDonnell*: Early Evidence of Ultra–high Carbon Steel in Europe. *H. Lyngstrøm*, Copenhagen: Early Iron Forging in Denmark. *D. B. Wagner*, Copenhagen: The earliest Use of Iron in China. *M. Goodway*, Washington: Wrought Iron Bridge Cable. Session III (Eastern Europe and Eurasia). *T. A. Pushkina* (Mrs) and *L. S. Rozanova* (Mrs), Moscow: Black Metal Processing in the Dnieper Basin, Smolensk Region, in the 1st Millennium AD. *L. Koryakova* (Mrs), *G. Beltikova* (Mrs), Ekaterinburg, and *S. V. Kuzminykh*, Moscow: The Introduction of Iron Technology in Central Northern Eurasia. *N. Terekhova* (Mrs), Moscow: The Earliest Tools of Meteorite Iron in the Territory of Russia. *Ľ. Mihok*, Košice: Beginnings of Iron Production in the Central Carpathian Region. *J. Navasaitis*, *A. Sveikausaike*, *E. Matulionis*, Kaunas: Examination of Pig Iron Lump Smelted in Bloomery Furnace. *M. Gurin*, Minsk:

The Introduction of Iron and the Development of Blacksmith's Work in Belorussian Polesye. Session IV. (Mediterranean Area). *E. Jarva*, Oulu: Early Iron Working in Latium: the Case of Ficana. *Chr. Risberg* (Mrs), Uppsala: Traces of Early Iron Production and Iron Working in Mainland and Aegean Greece. *M. Kostoglou* (Mrs), Glasgow: Iron Production in Ancient Greece: a re–evaluation based on new evidence from Aegean Thrace. *Y. Bassiakos*, Athens: A Late Geometric Metal Working Centre in Asine, Argolid, Greece: Analysis and Provenance. Session V. (The Introduction of Iron in Eurasia). *R. Pleiner*, Prague: Iron in Eurasian Bronze Ages. *V. Pigott*, London, *M. Goodway* (Mrs), Washington: Conclusion.

The conference was excellently organized and the discussions were fruitful. Especially the meeting of scholars from Baltic countries and Russia was valuable. An excursion was organized to visit sites in the environment of Uppsala: Härnevi, a 15th century church; Rickeby, Bronze Age rock carvings; Hällby, a Bronze Age smelting site; Håga, a Bronze Age burial mound ('king Björn's mound'); Valsgärde, early medieval boat graves; Gamla Uppsala, church and giant early nedieval burial mounds. The participants (about 60 in number, from 14 countries) have had the possibility to visit the Geoarcheologiskt Laboratorium at Uppsala, producing analyses of different find materials (incl. slags etc.), being published in *Activity Reports*, referred to on pages of our Communications. *R. Pleiner*, Prague

ORFÈVRES ET FORGERONS. L'approche expérimental en Archéologie minière et métallurgique. Colloque international et démonstrations expérimentales. Launaguet, France, 17–20 Octobre 2001. Organized by CNRS (UMR 528), U.T.A.H. (B. Cauuet). The ancient metallurgy of iron concerns following contributions: *C. Dubois* and *J.–P. Metailie*: Archéologie et expérimentation des pratiques anciennes de charbonnage en meule et de réduction de minerai de fer dans les Pyrénées ariègoises. *C. Domergue*, *P. M. Decombeix*, *J.–M. Fabre*, *C. Rico*, *F. Tollon* and *J.–P. Arcens*: Dernières données fournies par les expérimentations dans les bas fourneaux romains type 'Martys' (plate forme de Lastours, Aude). *P. M. Decombeix*, *J.–M. Fabre*, *C. Rico*: La prospection des ferriers du versant sud de la Montagne Noire: Modélisation du volume des résidus métallurgiques et estimation du fer produit et du bois utilisé (5 grand ensambles, 80 000 tonnes du fer pendant 3 siècles). *S. Orzechowski*: Donnée sur post–reduction dans le centre de sidérurgie ancienne de la Montagnes Saint–Croix (Kielce, Petite Pologne). *P. Crew* and *H. Cole*: From bloom to knife: experimental smelting, refining and forging of phosphoric iron and steel. *L. Eschenlohr*: Bilan des expérimentations sur les bas fourneaux mérovingiennes, type Boècourt avec soufflerie, et médievales, type Quiquerez, à tirage naturel. *M. Urteaga* (Mrs): El programma del investigación, rehabilitación y recuperación de los modos de productión en la ferrería hidráulica de Agoregi (Gipuskoa, Pais Vasco). Demonstrations: *H. Cole*: Travail de forgeage à l'ancienne du fer produit par expérimentation et démonstration des techniques et d'objects forgés. *Tiégué Jo*, forgeron Dogon (Mali): Forgeage d'outils agricoles traditionels en fer. *S. Cabboi* (Mrs) and *C. Dunikowski*: Réalisation d'un bas fourneau (type de La Tène moyenne) et opération de fusion et coulée. *D. Morin*, *J.–M. Brun*, *L. Colchen*, *P. Merluzzo*, *M. Leroy*, *R. Herbach*, *M. Aubert*, *A. Ploquin*, *P. Fluzin*: Expérimentation de réduction type indirecte sur les bases d'un fourneau type Huang Jiguang (Blast furnace) Partie sud de la Province de Henan. Opération de fusion et coulée. Papers: *S. Cabboi* and *C. Dunikowski*: La sidérurgie chez les Celtes du Nord de la France: expérimentation sur les bas fourneaux de La Tène moyenne et finale. *D. Morin*, *P. Rosenthal* and *A. Ploquin*: La métallurgie des Chartreux de Durbon (Hautes Alpes): essai de réduction à partir des minerais de fer sédimentaire. *M. Leroy*, *P. Merluzzo*, *M. Aubert*, *R. Herbach*, *P. Fluzin*, *A. Ploquin*: L'apport des expérimentations de réduction en bas fourneau pour l'étude comparée des conditions de réduction d'un minerai calcique (la minette de Lorraine) et d'un minerai siliceux (le fer forte). *V. Serneels*: Qu'est–ce qu'une expérimentation réussie? Reflection sur la réduction du fer. *E. Huysecom*: La réduction traditionelle du fer en Afrique: techniques, croyances et maitrise – l'exemple de forgerons Dogon (Mali). *P. Andrieux*: Expérimentation: archéohistoire ou label technologique?

The conference involved film projections (H. Cole on Saxon sword forging, E. Huysecom on the Inagina project). An exhibition was inaugurated consecrated to gold, and an excursion lead to sites of iron metallurgy in the Montagne Noire, connected with the iron smelting demonstrations in Gallo–Roman furnaces (C. Domergue, P. M. Decombeix, J.–M. Fabre, C. Rico, F. Tollon and J.–P. Arcens). The Programme distributed includes abstracts of all of the communications.

BIBLIOGRAPHY 1994, 1995, 1997, 1998

(Supplements)

S. PAZDA: Brzeski rejon starożytnego hutnictwa żelaza (IV–V. w.n.e.). Summary: Zone de sidérurgie antique (IVe–Ve siècle après J.–C.) dans les environs de Brzeg (précis de problematique). In: Kultura Przeworska I, Lublin 1994, 241–261. An iron smelting region (63) sites in the territory of Nysa (Kłodska) and Odra rivers is discussed. Baszyce – a site with reheating hearths.

S. SCHREYER and M. GRAF: Rheinau ZH. Archäologie der Schweiz 18/1 1995, 33. Traces of smithies in a Celtic *oppidum* on the upper Rhine river.

R. KRAJÍC, Z. KUKLA and R. NEKUDA: Středověký meč ze Mstěnic. Summary in German: Das mittelalterliche Schwert von der Wüstung Mstěnice [A medieval sword from the abandoned village Mstěnice, Moravia]. In: Z pravěku do středověku. Brno 1997, 250–258. In homestead XV a long gothic thrusting sword or rapier (15th century AD) was found. It was made of a carburized iron rod; the point was martquenched. A brass inlay appears in the upper part of the blade.

A. KRONZ: Phasenbeziehungen und Kristallisationsmechanismen in fayalitischen Schmelzsystemen. Untersuchungen an Eisen– und Buntmetallschlacken. [In German: Phase interrelations and crystallization mechanisms in the fayalitic melting systems. Investigation into iron and non–ferrous slags]. Thesis at Johannes–Guttenberg–Universität in Mainz. Mainz 1997. 275 pp. Figures, tables, microphotographs. A detailed treatise on chemical and mineralogical analyses of metallurgical waste products. Contents (abridged and paraphrased): 1 The goals of the study, 6. 2 Fayalitic melts and the theoretical outline of the bloomery process, 7–14. 3. The sample basis, 15–26. A: Analytical methods. 4 Chemical bulk analysis, 28–42. 5. Phase analysis (polarization, EMS, electron microscopy), 44–59. B: Melting systems. 6. Bulk chemistry, trace elements, 60–67. 7. Phase relations in fayalitic slags (olivine, wustite, spinels etc., glass, trace elements in the matrix), 68–118. 8. Cristallization and stability, 119–153. 9. Thermodynamics of the reduction process, 154–169. 10. Distribution in the melting systems, 170–178. C: Technological interpretation. 11. Smelting technology in the Dietzhölztal (the role of the furnace wall), 179–180. 13. Slag as process indicators. Selected examples (Dietzhölztal), 181–199. 14. Summary, 200–203. 15. Bibliography, 204–213. Appendixes (tables), 214–270. Abbreviations, 271. The samples analysed originate in the research activity in the production in the Dietz valley, W Germany. The book may serve as a helpful manual for all those who are interested in the smelting processse and for those who use analyse of slags appearing in the literature.

Z DĚJIN HUTNICTVÍ 27 [Contributions to the history of metallurgy]. Rozpravy Národního technického muzea v Praze, vol. 156. Praha 1998. Ancient and early technology of iron. *Ľ. Mihok*, *A. Pribulová* (Mrs) and *D. Bialeková* (Mrs): Sposob výroby slovanského meča zo Závady. Produktionsweise des slawischen Schwerts von Závada, 5–14. A carburized sword dated to the 9th century. *J. Hošek*: Metalografický rozbor středověkých hrotů šípů do kuší. Metallographic analysis of the set of arrowheads, 15–25. 52 cross–bow bolts were investigated from sites in NE Bohemia. Mostly wrought iron bundles. *M. Púpala*, *V. Magula*, *Z. Kukla* and *J. Hošek*: Rozbor kroužků užívaných při výrobě kroužkové zbroje. Analysis of rings of mail coats, 26–34. One Roman and nine medieval rings, riveted and welded, made of an annealed iron wire. One example was heat–treated (martensite, bainite). *K. Stránský*, *R. Štěpán* and *A. Rek*: Analýzy železářských strusek z oblasti Železných hor. Analyse der Eisenschlacken aus dem Gebiet Železné Hory, 35–46. Slags from medieval hammer–mills, as well as fining slags of the 18th century analysed.

BIBLIOGRAPHY 1999

A. Specialized items

ACTIVITY REPORT 1999. Geoarchaeological Laboratory. National Heritage Board (Riksantikvarieämbet). Uppsala. From the contents: *L.–E. Englund* and *L. Larsson* (Mrs): Iron production at Stomskil during Roman Iron Age – an archaeologic and analytic study. Lillkyrka parish, RAÄ 219, Närke, 10–12.

A rescue dig a clay–and–stone walled slag–pit furnace with a slag block inside (103 kg). Air–inlets traced, induced draught, supposed prints of a horizontal layer of reeds as traces of the original slag–pit blocking. Also a smithing area with an anvil stone, slag, flakes of hammer–scale. Chemical analyses of the furnace slag. *E. Hjärthner–Holdar* (Mrs), *L. Larsson* and *L.–E. Englund*: Iron and metal working at a manor during Late Iron Age and Early Middle Ages, Husby, Glanshammar parish, Närke, 13–16. *L. Larsson*, *L.–E. Englund*, *E. Hjärthner–Holdar* and *O. Stillborg*: Archaeometallurgic analysis of slag and iron from the iron production site at Binga, Hassmo parish, Småland, 17. Four Vendel period furnaces and a smithing hearth. Slags and iron analysed. *L. Larsson*: Currency bars from a 17th century AD smithy in a Dalkarlen block – a metallographic analysis, Norköping, Östergotland, 18. Corroded 17th century AD bars. *L.–E. Englund*, *L. Grandin* (Mrs), *E. Hjärthner–Holdar*, *P. Kresten*, *O. Stillborg*: Pre–Roman iron production at Södeåkra – an archaeometallurgic investigation, 21–23. A large slag–pit furnace with stone slabs, said to be pre–Roman, is discussed. The site comprises two slag heaps, yielding hearth bottoms with some metallic iron, low carbon metal, steel and phosphoric iron. Short abstract concerning iron making and working: *L. Grandin* and *L.–E. Englund*: Iron and copper working in the Skatan block – an archaeometallurgic analysis, Skåne, 24. *L.–E. Englund* and *E. Hjärthner–Holdar*: A currency bar from Arninge, Täby parish, Uppland, 25. *L.–E. Englund* and *E. Hjärthner–Holdar*: Items of iron from Gröndal, Lunda parish, Uppland, 25. *L.–E. Englund*, *P. Kresten* and *L. Grandin*: Slag from village site at Odensvi, Visby socken, Närke, 26. *L. Grandin* and *L.–E. Englund*: Smithing residues from Kräggesta, Kolsva parish, Västmanland, 26. *L. Grandin* and *L.–E. Englund*: Archaeometallurgic material from Vittene – archeaometallurgic analysis, 26–27. *E. Hjärthner–Holdar*, *L. Grandin* and *L.–E. Englund*: Cast iron and wrought iron. Material from the smithy in Vantinge, Scania, 28–29. Medieval and post–medieval samples. *P. Kresten*: Slag and metal from Kyrkesviken, Ängermanland, 29. *L. Grandin* and *L.–E. Englund*: Smithing residues from Stora Ullevi, Linköping, 30. No dating mentioned. *P. Kresten*: Ralby iron works. Magnetometry. Dannemora, Uppland, 31. Late medieval features, surveying. *P. Kresten*: Analysis of a smithing slag from Develier–Courtetelle, Central Jura, Switzerland, 31. Mineralogy of 6th – 7th centuries AD smithing waste.

H. JÖNS: Schuby und Süderschmedeby. Zwei spätkaiserzeitliche Eisengewinnungszentren am Heerweg. [In German: Schuby and Süderschmedeby. Two Late Romano–Barbarian iron production centres at the Heerweg, Schleswig–Holstein. N. Germany]. Offa 56 (Festschrift Ole Harck) 1999, 67–80. Schuby site LA 233: 7 lower parts of furnace slag pits, slag block with prints of brushwood and straw; Süderschmedeby: H. Hingst's excavation of a smelting and smithing area with stone anvil and slag.

H. JÖNS and B. WOLLSCHLÄGER: Frühe Eisengewinnung in Südwestmecklenburg – Ergebnisse einer interdisziplinären Forschungsprojektes 'Archäometallurgie'. [In German: Early iron production in south––west Mecklenburg, Germany – results of interdisciplinary research project] In: Bodendenkmalpflege in Mecklenburg–Vorpommern, Jahrbuch 1998/46, Lübstoff 1999, 93–125. The research pointed to the archaeometallurgy in Joldelund, Süderschmedeby, Weser valley, Harz, Oberlausitz, Märkisches Sauerland, Dill–Gebiet and Schwäbisch Alb. In Südwestmecklenburg 140 sites with iron production traces were registered, with the floruit in the Romano–Barbarian period. The most important of these is Göhlen; the excavations in this locality with its slag–pit furnace clusters have been already several times presented.

„... UND SIE FORMTEN DAS EISEN". Ur– frühgeschichtliche und mittelalterliche Eisengewinnung und –verarbeitung {„... they forged iron". Prehistoric, early and medieval iron making and working]. Internationasles ÖGUF–Symposion in Linz–Feinberg, 27–30 October 1998. Archaeologia Austriaca (Wien) 82–83 1998–1999, 482–541. The contributions presented were not, in fact, read in the symposium, they concern new discoveries and finds. *G. Henneberg* and *J.–P. Guillaumet*: Die Eisenwerkzeuge der Hallstatt– und frühen Latènezeit in Mitteleuropa, 493–497. Survey of Early Iron Age iron and wood working tools from Central Europe. *B. Kríž*: Iron smelting furnaces at Cvinger near Dolnjsk Toplice, 498–500. A short account of 12 features held for iron smelting furnaces (not properly documented). Large quantities of slag observed in an area of 100x50m. *F. Moosleitner*: Eisendepotfunde aus Salzburg, 500–511. Hoards of iron objects from the Nikolausberg near Golling (blacksmith's tools), Hainbach–Nussdorf

(Scythe, scythe ring, plough–share, axehead), Kaiserbrunn am Attersee (domestic and agricultural implements). Fig. 8 shoes, in addition, a large hoard from the Römerschanze near Grünwald, Bavaria (not commented). *H. Presslinger*: Keltischer Stahl aus Linz. Metallkundliche Voruntersuchungen des Depotfunds on Gründberg, Stadtgemeinde Linz, Oberösterreich, 511–515. Preliminary metallographic examinations of a kettle–hook, a tyre, tongs handle and a sword from the Celtic hoard at the Gründberg rempart (low carbon steels). *Z. Czajlik*: Quellen zur prähistorischen Eisengewinnung in Ostungarn, 515–519. Remark on the La Tène period and medieval sites with traces of ironmakimg inm the Aggtelek region in southern Hungary. *A. Gaspari*: Römische Schmiedewerkstätten auf der Hügel Ulaka in Innerkrain, Slowenien. Die Ausgrabungen von W. Schmid (1936–1948), 519–523. Unpublished smithies added. *K. Bielenin*: Einige Bemerkungen zu den Rennofeschlacken der Schlackengrubenöfen, 523–528. The slag blocks from the Holy Cross Mountains furnaces represent an evidence of a perfectly mastered process. *A. Espelund*: Luppenstudien in Norwegen, 528–536. *T. Abdinghoff* and *M. Overbeck*: Die Hüttenstandorte Kerspetalsperre (Märkisches Sauerland) und Oberes Wippertal (Bergisches Land). Ein Beitrag zur Archäologie früher Hochöfen in Mitteleuropa, 536–541.

D. B. WAGNER: The earliest use of iron in China. In: Metals in Antiquity (S. M. M. Young, A. M. Pollard, P. Budd and R. A. Ixer eds.), BAR Int. ser. 792 (Oxford) 1999, 1–9. In the light of new finds it seems that the technology of iron smelting diffused to China by the 8th century BC from the West via Scythian nomads in central Asia. The earliest weapons made of iron were probably display and prestige objects.

B. Early iron as in other publications (1999)

LIETUVOS ARCHEOLOGIJA 18 1999. The volume contains three papers dealing with early iron technology: *J. Stankus*, *A. Sveiskauskaité*, *A. Selskis*, *E. Matulionis*: Geležis dirbniu cheminés analizés duomenis, Summary: The data of chemical analyses of some iron artefacts of the 2nd – 13th centuries, 101–109. Chemical analyses as supplement to former metallographic examination on ancient and medieval irons. Carbon, phosphorus and manganese are discussed. *Z. Malisauskas* and *A. Linčius*: Pelkiu (limonitiné) geležias ruda Lietuvoje. Summary: The marsh iron ore (limonite) in Lithuania, 111–120. Topography of bog ore deposits, analyses. *J. Navasaitis*, *A. Sveiskauskaité* and *A. Selskis*: Lietuvos rudniu šlaka sudétis ir savibés. Summary: The composition and the features of bloomery slags in Lithuania, 121–133. Chemical and mineralogical composition of Lithuanian iron slags from the 3rd – 4th centuries AD and from the 16th – 19th centuries.

Z DĚJIN HUTNICTVÍ 28 [Contributions to the history of metallurgy]. Rozpravy Národního technického muzea v Praze 161, Praha 1999. Early metallurgy of iron is concerned in the following contributions: *L'. Mihok*, *A. Pribulová* (Mrs) and *K. Pieta*: Spracovanie železa z nálezísk púchovskej kultúry: Liptovská Mara. Eisenbearbeitung nach den auf der Fundstelle Liptovská Mara gemachten Funde der Púchov–Kultur [sic], 5–12. Analysis of smithing slags (sample 23 showed traces of tin bronze, accidentally received by manipulation with non–ferrous metal in the workshop). *J. Hošek* and *J. Prostředník*: Rozbory středověkých železných předmětů a strusek z hradu Dolní Štěpanice. A metallographic examination of medieval iron tools and slags from the castle Dolní Štěpanice, 13–24. Analyses of smithing slags from a medieval castle. An iron sheet with a rivet coated with brass and soldered by Sn–Pb solder. Metallography of horse–shoes and fittings. *J. Hošek*, *J. Prostředník* and *J. Benešová* (Mrs): Kovářská dílna na hradě Trosky. The smithy workshop in the castle Trosky, 25–35. A smithy equipped with a hearth yielded PCB slags (analysed) and some artefacts (arrowheads, a knifes. horse–shoes etc.) which were investigated metallographically (mostly ferritic and pearlitic metal). *K. Stránský*, *A. Rek* and *A. Drechsler*: K otázce hmotnostní bilance pochodu přímé výroby železa z rud z laténských redukčních pecí. Beitrag zur Massebilanz des Verfahrens der Herstellung von Eisen aus Erzen in den Latène–Kultur Öfen [sic],36–42. Microanalytic and mineralogical investigations of a bloomery slag and magnetite ore from the Celtic oppidum at Staré Hradisko, Moravia. *A. Harničár*, *Ľ. Mihok*, *D. Mlynárčiková* (Mrs) and *P. Roth*: Baníctvo medzi Hranovicou a Vernárom. Bergbau zwischen Hranovica und Vernár, 47–53. Mining of iron ores at Starý Vernár, 5 bloomery slags analysed.

J. UNGER: Život na lelekovickém hradě ve 14. století. Antropologická a sociokulturní studie. Summary: Das Leben auf der Burg Lelekovice im 14. Jahrhundert. Anthropologische und socio–kulturelle Studie [The life in the 14th century AD castle of Lelekovice]. Brno 1999. During excavation of the ruin of the castle at Lelekovice near Brno traces of a sheltered smithy were discovered at the eastern rampart. Destruction of the hearth stone substructure, traces of the anvil position and smithing slags have to be mentioned.

BIBLIOGRAPHY 2000 (as in February 2002)

A. Specialized items

P. DRDA: Les arts du feu sur les oppida celtiques [In French: Pyrotechnological crafts in the Celtic oppida]. In: Les Celtes et les arts du feu. Dossier d'archéologie No 258, 2000, 18–23. The work in iron is presented by the abstract dealing with a smithy discovered in the oppidum of Závist near Prague, Bohemia, dated to the early phase of the site (2nd century BC). Later (1st century BC), another smithy operated at gate B of the oppidum. The oppidum of Hrazany upon the Vltava river yielded traces of smithing activities at the northern gate (PCB slgas, block tuyeres).

J. GÖMÖRI: Az avar kori és Árpád–kori vas kohászat réfészeti emlékes Pannoniában. [Summary: The Archaeometallurgical sites in Pannonia in the Avar and early Árpád periods. Register of industrial archaeometallurgical sites in Hungary]. Ironworking. Sopron 2000, 273 pp incl. 31 plates, 166 figures. The monograph is an extended version of the study by the same author (2000, cf. Comm. 66) but is completed by a historical survey of the iron making and working on the territory of modern Hungary. The contents presented are based on the English summary, 315–340. The wording follows the printed preservation. I Introduction, 315. II Archaeometallurgical sites of Hungary. Collection of data [iron], 315–326. The beginning of the iron production in the territory of Hungary, 326–329. Celtic iron production, Roman iron production and blacksmiths working in Pannonia, 800–900–1000: Avar–Onogur (7th – 9th century) and Frank–Bavarian–Slavic, (9th century) antecendents of the Hungarian iron production in Pannonia. Furnace typology, iron production in the conquest period, Somogyfajz type workshops. Period of the Hungarian state foundation. Pit–workshops in the Árpád period. Imola type furnaces. Bloomery sites of Alpine origin in the Árpád period. IV. From the ore until the bloom, 329–334. Mines, ore, ore roasting, fuel, furnace building material, blowing. Experimental smelts. Reheating hearths. Blooms and bars. Smithy workshops. Metallography of iron objects. Conclusion, 333–334. List of figures, 335–339. List of tables [plates], 339–340. Added a booklet with drawings an *errata*. Bibliography appears on pages 287–313.

D. GRIFFITHS and A. FEUERBACH (Mrs): Early Islamic manufacture of crucible steel at Merv, Turkmenistan. Archaeology international. Inst. of Archaeology, University College, London 1999/2000, 36–38. Clay crucibles (up to 20 cm high) for steelmaking at Erk Kala and Gyaur Kala at city of Merv. Wrought iron pieces and fuel were charged and heated in a presumably domed furnace the base of which was uncovered. It was blown from below through a special air–inlet channel.

Z. HENSEL: Badania materialoznawcze ostróg średniowiecnych z Kalisza. Summary: Material science investigations of medieval spurs from Kalisz. Archeologia Polski 45/1–2 2000, 93–97. Medieval spurs from Kalisz, Poland, 26 in number, show mostly low carbon, phosphoric metal. In 5 cases carburization processes were observed (up to 0.8% C). In one case traces of gold coating were discovered.

IRON, BLACKSMITHS AND TOOLS. Ancient European Crafts. Acts of the International Conference at Podsreda (Slovenia) in April 1999 (M. Feugère and M. Guštin eds.). Monographie Instrumenta 12. M. Mergoil, Montagnac 2000, 248 pp. Contents: *V. Serneels*: Preface, 3. *M. Feugère*, *M. Guštin*: Foreword, 4. Part 1. Crafts in General: *M. Mangin*: Vie rurale et artisanat du fer dans les campagnes d'Alésia, 7–11. *F. Quesada*, *M. Zamora*, *F. Requena*: Itinerant smiths in the Iberian Iron Age? (6th – 7th centuries BC), 15–19. *B. Cech* (Mrs): Gold and silver production in the fifteenth and sixteenth century based on the archaeological excavation in the Gastein Tal, Austria, 21–33. Incl. a blacksmith's workshop for pick production and reparation. *F. Bessan*: Fabbri e produzioni di armi nel medioevo: l'area friulana, 35–41.

Iconography, punch marks. Part 2. Workshops: *L. Orengo*, *E. Frénée*, *P. Fluzin*: Un atelier du forge de l'âge du Fer au „Bois du Jarrier 3" commune de la Celle–sur–Loire (F. Nièvre). Archéologie et archéometrie, 45–66. Hearths and slags of the Hallstatt/Early La Tène periods. *M. Polfer*: Eisenproduktion und Eisenverarbeitung in Nordgallien und dem Rheinland während der römischen Kaiserzeit. 67–87. Survey of production regions and places. *K. Czarnecka* (Mrs): Iron smelting in the Pre–Roman and Roman periods in central Poland, 89–91. *M. Horvat*: Iron furnaces from Sela pri Dobu near Ivačna Gorica (Slovenia), 93–96. Two devices in superposition, Roman period. *E. Iaroslavchi*: Les fourneaux de réduction du minerai de fer chez les Daces, 97–102. Furnace sites, iron blooms in a survey. *T. Anderson*, *A. Duvauchelle*, *V. Serneels* and *C. Agustoni*: Stone and metalworking on the Roman site of Châbles–les Saux (Ct. Fribourg, Switzerland), 103–108. A smithy and quarry for mill stone production. *B. Mušič*: Results of geophysical prospecting on Prehistoric and Late Roman sites associated with iron metallurgy: Case studies: Cvinger near Meniška vas and Ajdoviščina above Rodik (Slovenia), 109–120. Magnetic surveying of slag dumps at a Roman site. *L. Orengo*, *J.–M. Bonnon*, *D. Bevilacqua*: L'emploi des bloc tuyères dans les forges antiques du centre de la Gaul (Auvergne, Lyonnais et Forez au deuxième age du Fer et à l'époque romaine). Découverts archéologiques et experimentation, 121–136. The application of brick–shaped tuyeres at iron forges from several sites. *R. Marichal*: Outillage antique de Ruscino (Château–Rousillon, Pyrénées Orientales, F.), 139–168. Roman smithies and a hoard of iron objects (76 items). *M. Feugère*: Outillage agricole et quincaillerie antique de Valentine (F., Haute Garonne), 169–178. Implements from hoards. *H. Sedlmayer*: Bewährte Simplizität. Zu einem Neufund aus dem Kastellvicus von Favianis/Mautern an der Donau (Österreich), 179–186. Socketed iron axeheads. *A. Gaspari*, *M. Guštin*, *I. Lazar*, *B. Žbona Trkman*: Late Roman tools finds from Celje. Gradište at Zbelovska Gora and Sv. Pavel above Vrtvovin (Slovenia), 187–203. Fourteen hoards with iron tools. *M. Sagadin*: Late antique wood–working tools from Gradavov hrib near Kamnik (Slovenia), 205–208. A hoard. *R. Krempuš*: Krvavica bei Vransko in Slowenien, Höhensiedlung des 3. bis 6. Jahrhunderts, 209–231. Early Slav iron implements from a settlement. *A. Rustoiu*: Outils en fer pour le travail des métaux non ferreux en Dacie préromaine (1er siècle av. J.–C. – 1er siècle ap. J.–C.), 233–241. Iron smithing tools used in bronze work. *Zs. Visy*: Neuere Angaben zu einigen Wagenbeschlägen, 241–248.

M. JANČO: Germánska dielňa z Berouna. [Summary in German, not entitled – A Germanic workshop at Beroun, Bohemia]. In: Sborník Miroslavu Buchvaldkovi (P. Čech and M. Dobeš eds.), Most 2000, 107–110. Within a conglomerate of Germanic settlements on the territory of Beroun, central Bohemia, many traces of making iron in the early Romano–Barbarian period were discovered during rescue excavcations in previous years. Here, a sunken–floored feature is being presented, interpreted as a bloomery with a hearth of a freestanding furnace in the SW corner an a stone anvil nearby. [However, the context speaks rather for a smithy where iron and non–ferrous metals were worked as copper sheet fragments show].

S. MÄDER: *Mado wo akeru* – Ein Fenster öffnen. Überlegungen zur Kategorisierung europäischer Klingen auf Grundlagen japanischer Begutachtungen. Summary: Mado wo akeru – open a window. Thoughts towards categorizing European sword blades on the Japanese expertise criteria. Ethnographisch–archäologische Zeitschrift (Berlin) 41/1 2000, 17–27. A proposal for classification of European sword (and sax) blades according to Japanese swordsmith lore (*Kantai*) which requires a flat polishing of blades. Individual criteria and terminology are discussed. The method was tested on two Alamanian blades (a *spatha* and a *sax*) which were investigated in Japan.

MINES ET METALLURGIE EN GAULE. Recherches récentes. (C. Domergue and M. Leroy eds.). Gallia 57 2000, 1–158. Contents: *C. Domergue* and *M. Leroy*: L'état de la recherche sur les mines et les métallurgies gauloises au Haut Moyen Age, 3–21. Clérimois, mines at Mans and La Bussière: Vert–Saint–Denis (Pyrénées, furnace), Blessey (smithy), Bordeaux. Survey. *M. Leroy*, *M. Mangin*, *H. Laurent*, *M. Boukezzola*, *B. Raissouni*: La sidérurgie dans l'est de la Gaule, 11–21. 1000 sites (mines and siderurgie) Bourgogne, Franche Comté, Lorraine. Districts de production: Morvan (200), Lorrain (152), Mâcon. Iron Age 2nd/1st centuries BC, beginnings of production districts? Roman period: Morvan in the north, Montley–en–Auxois, mining village. Rural smithies. Avenches, Autun, St. Aubin, Choisy (large smithy), environ of Alésia, Blessey–Salmais. The decline in the late antiquity. The *loricaria* at Augusto-

dunum, other *fabricae* for weapons as in the *Notitia Dignitatum. P.–M. Decombei*x, *C. Domergue*, *J.–M. Fabre*, *A. Gorgues*, *Chr. Rico*, *F. Tollon*, *B. Tournier*: Réflexions sur l'organisation de la production du fer à l'époque romaine dans le basin supérieur de la Dare au voisinage des Martys (Aude), 23–36. During three centuries (60/560 BC to 260 AD) 80 000 tonnes of ironwere produced in that region which yielded 33 ferriers: excavated was the Grand Ferrier, Montrouch (battery of 6 furnaces). *A. Beyrie*, *J.–M. Fabre*, *R. Sablayrolles*: Les hommes du fer du dieu Ageio. Exploitation antique du fer dans les hautes Baronnies (Haute Pyrénées), 37–52. The inscription from Asque (*Ageio deo pagani ferrarienses)*, mining sites, mines. *C. Dubois*: Lercoul (Pyrénées arièGeoises). Un site sidérurgique du IIIe siècle de notre ère, 53–62. Three bloomery furnace, 400 tonnes of slag, iron mines, collier sites. *N. Dieudonné–Glad* (Mrs): L'atelier sidérurgique gallo–romain du Latté à Oulches (Indre), 63–75. A 4th century AD bloomery with small amount of glassy slag debris, newly connected with possible steel making processes. *I. Daveau* (Mrs), *V. Goustard*, *J.–J. Bahain*: Un complexe métallurgique et minière du Haut Moyen Age. Le site du Fourneaux à Vert–Sain–Denis (Seine–et–Marne), 77–99. 25 000 bell pits, 80 roasters, bloomery ironworks from 7th to 9th centuries AD. *P. Fluzin*, *A. Ploquin*, *V. Serneels*: Archéometrie des déchets de production sidérurgique. Moyens et méthodes d'identification des différents éléments de la chaine opératoire directe, 101–121. Identification of different types of iron slags: bloomery, reheating, smithing, hammer–scale. *P. Abraham*: Les mines d'argent antiques et médievales du district de Kaymar, 123–127. *B. Cauuet* (Mrs): Techniques de boisage dans les mines d'or gauloises du sud–ouest Massif Central, 129–146. Glossaire, 147–149. Bibliographie: 150–158.

K. NOVÁČEK: Výroba a zpracování kovů na sídlišti u sv. Petra na Poříčí v Praze. Summary: Metalworking at the Str. Peters settlement area in Prague. Archaeologica Pragensia (Praha) 15 2000, 219–230, 233–241. Non–ferrous and ferrous metallurgical evidence uncovered during rescue digs at Prague–Poříčí, at the Midle Ages a pre–urban site (PCB as well as bloomery tap slags).

R. SCHWAB: Überlegungen zur Eisenversorgung des Oppidums von Manching basierend auf metallkundlichen Untersuchungen an Waffen und Geräten. [In German: Reflections concerning the supply of iron in the oppidum of Manching, Bavaria, based on metallographic investigations of weapons and tools]. Berliner Beiträge zur Archäometrie 17 2000, 5–44. The oppidum at Manching depended on imported iron from the environment, the metal was rich in phosphorus; 14 further iron objects (supplementing the unpublished set investigated by Pleiner) metallographically examined – mostly knives of different quality and construction (sandwich iron–steel–iron appeared several times, heat treatment of steel stated at 26%). The smithing activity appears in the northern part of the site where crafts were concentrated.

D. STARLEY: Metallurgical analysis of medieval quarrel heads and arrowheads. Royal Armouries Yearbook 5 2000, 178–186. Eight projectile heads (three called arrows, five cross bow bolts) of unidentified German origin (14th century AD?) were investigated metallographically. Hard phosphoric iron was used, traces of carburization or composite iron–and–steel constructions are discussed without definite conclusions.

B. Early iron as in other publications (2000)

S. FICHTL: La ville celtique (Les *oppida* de 150 av. J.–C. à 15 ap. J.–C.). Errance. Paris 2000. A blacksmith's workshop from Mont Beuvray–Bibracte at the Raboul Gate is shortly described.

S. KURZ: Die Heuneburg–Aussensiedlung [In German: Heuneburg – the outer settlement, SW Germany]. Theiss, Stuttgart 2000. In chapter Anmerkungen zur wirtschaftlichen Produktion in der Aussesiedlung, 152–156 appears on p. 156 a short remark on possible blacksmith's activity within the Late Hallstatt period site.

S. SIEVERS (Mrs): Vorbericht über die Ausgrabungen 1998–1999 im Oppidum von Manching. [In German: Preliminary report on 1998–1999 excavations in the oppidum of Manching, Bavaria]. Contributions by *R. Gebhard*, *M. Leicht*, *R. Schwab*, *J. Völkel*, *B. Weber*, *B. Ziegaus.* Germania 78/2 2000, 255–394. Pp. 382–385. *R. Schwab*: Zur Schmiedetechnik von eisernen Waffen und Geräten; *M. Leicht*, p. 365: On slag concentration in area 1g 1042–1044.

BIBLIOGRAPHY 2001 (as in February 2002)

A. Specialized items

ARCHAEOMETALLURGY IN CENTRAL EUROPE III – Actes of the International Conference at Herľany 2000. Special issue of the Acta Metallurgica Slovaca (Košice) 7/2 2001, 282 pp. Iron is concerned in following contributions; the wording of the titles appears as it is printed. *J. Petrík*: The archaeometallurgical analysis of the slag and iron objects from Gelnica, 6–19. Medieval finds from eastern Slovakia. *J. Prostředník* and *J. Hošek*: A smithy at the castle Trosky, 29–35. At Trosky, a medieval castle in Bohemia a smithy was investigated which served to the needs of the castle, probably still in the 17th century. *Ľ. Mihok* and *M. Fröhlichová* (Mrs): Analyses of Etruscan slags from Populonia, 36–42. Fayalitic and wustitic slags from the earlier strata of the site, the 5th – 4th centuries BC. *J. Navasaitis* et al.: Compositions of slag inclusions in bloomery iron objects, 41–50. Microanalyses in some early medieval and post–medieval iron tools. *A. Williams*: The role of Nürnberg in the mass–production of armour, 51–65. The city of Nürnberg traded over Europe a relatively cheap plate armour of inferior or medium quality. *J. Petrík* et al.: The analysis of slags from the south Spiš, 66–79. Bloomery and smithing slags from low shaft and high shaft furnaces of the 13th – 15th centuries AD. *A. Pribulová* et al.: Analysis of slag and iron objects of Vandali tribe origin, found in Blažice, Slovakia, 80–88. *M. Gurin*: Metallographic examination of ancient and half–finished products in Belarus, 89–96. A small bloom and four bar–shaped irons with low, high and heterogeneously distributed carbon content, Romano–Barbarian period. *R. Pleiner*: Cast iron in the European bloomery period, 97–101. The bloomery process involved, under specific conditions, germs of of creating cast iron in small or even considerble quantities. Mostly trated as unworkable waste. *Ľ. Mihok* et al.: Iron smelting and working in Spiš in Roman and Slav periods, 102–118. Smelting and smithing slags from the Romano–Barbarian and Great Moravian periods. *J. Navasaitis* et. al.: Metallographic analyses of the as–smelted bloomery iron, 119–125. Analyses of unworked iron fragments from Lituanian sites. Heterogeneously distributed carbon content, incl. ledeburite in the Lieporiai sample (smelting site): Composition of slag inclusions in bloomery iron objects, 41–50. Microscopic analyses of slag inclusions in some early medieval and post–medieval iron tools. *H. L. Knau* et al.: Iron works and water power – the development of mechanical hammer in the 'Südgebirgen', 127–143. The use of water power in the Sauerland and Siegerland as early as in the 13th century AD. *M. Gurin*: Evolution of iron implements in Belarus, 144–154. Different iron–and–steel construction applied in cutlery and axehead manufacture (the 6th to 18th centuries AD). *V. La Salvia* et al.: Medieval iron metallurgy in town Cencelle, Italy, 155–174. Products and wastes from a smithy analysed (13th – 14th centuries AD). *K. Stránský* et al.: Reflections on metallurgical processes in composition of slags. lst part: charcoal–blast–furnace, 182–189. Analyses of slags from early blast furnaces (16th –18th centuries AD) from the Moravian–Bohemian Highlands. *V. Ustohal* et al.: The band–like structure in artifacts from archaeological finds, 209–213. Banded structures caused by segregation of phosporus as seen on two Celtic iron objects from the *oppidum* at Staré Hradisko, Moravia. *R. Vargová* (Mrs) et al.: Medieval blacksmiths in town Košice, 214–226. The Dominican Square at Košice yielded, during rescue digs many iron artefacts (41 of which, mostly fittings) were analysed. A heavily carburized and quenched sickle. *D. Hedge*: The construction and metallurgy of mail armour in the Wallace Collection, London, 227–234. Certain difference in the manufacture of European and Oriental mail armour. Metallography, especially of rivet areas. *H. Lyngstrøm* (Mrs): Iron in Northern Europe, the Danish example, 235–240. Metallography of prehistoric and medieval knives, smelting experiments in Denmark. *V. Serneels* and *M. Mauvilly*: The Early La Tène metallurgical workshop at Sévaz, Fr/Switzerland: An attempt of quantification, 268–277. In a 500 BC workshop have been found 49 crucible fragments and 500 PCB smithing cakes. Bi–metallurgical activities. The non–ferrous metallurgy was concerned in articles by *A. E. Ceckinli* (gold, 20–26), *A. Schäfer* (a bronze foundry, 190–203; *J. Labuda* (copper mining, 204–208), *V. Ustohal* and *D. Janová* (Mrs) (post–medieval printer's types from Kralice, 241–252), *A. Pribulová* (Mrs) et al. (lost–wax process, 278–283).

L. ESCHENLOHR: Recherches archéologiques sur le district sidérurgique du Jura central suisse. [In French: Archaeological investigations concerning the iron producing district of central Jura, Switzerland],

Lausanne 2001, 319 pp., 40 figs. 1 map and partial schematical plans of sites in the catalogue. The volume is a fundamental contribution to the development of iron production in one of the European regions, rich in ores and yielding over 300 archaeometallurgical sites. However, the technology of ironmaking, as documented by archaeology and written sources can be classified mostly as traditional, processed in low shaft furnaces (bellows–blown and, later, operated by induced draught). The archaeometallurgical merits of August Quiquerez (19th century) are appreciated. The Eschenlohr's book is written with a highly interdisciplinary approach applying modern prospection, palaeobotanic, mineralogical, chemical and metallographical analyses. According to the author, the theme was inspired by the systematical investigation of a so far single site, that of Boècourt–Les Boulies (the 6th – 7th centuries AD) but enormous work has been realized in the field of magnetometric prospection. The bulk of sites has to be dated to the high Middle Ages.

Contents: Préface (*P.–L. Pelet*), 5 – 6. Remerciements, 7–8. Sommaire, 9–12. Résumé: Objectifs – Méthodologie – Champ d'application – Conclusions, 13–14. 1 Introduction, 15–28. 2 Les matères primaires, 27–44 (ore, charcoal, palynology). 3 La production du fer (Jurassic bloomery furnaces of the Boècourt and the so–called Quiquerez types. 4 Les ferriers (ca 100–150 m^3 of slag debris per ferrier). 5 L'apport interdisciplinaire, 85–134. Magnetic prospection, chemical analyses of slags, metallography. 6 Le travail du fer, étape opératoire de la postréduction, 135–140. 7 Aspect socio–économique, 141–151 (the role of monasteries). 8 Conclusions et perspective, 153–161 (main periods of production, furnace types and models, impact of the ironmaking on the environment. Summaries and abstract in German, Italian, English (168–170). 9 Bibliographie, 171–180. 10 Index, 181–183 (places and personal names). 11 Annexes 185–206 (Synoptical tables, sites, chemical analyses of ores an slags, pollen diagrams) 12 Catalogue, 207–316. List of illustrations, 317–319. The evidence of metallurgical activity during the La Tène and Roman periods is scarce. More important activities began in the Early Middle Ages (6th–7th centuries AD; 70 smaller ironmaking sites – *ferriers*). The bulk of metallurgical sites is medieval (9th – 12th centuries, about 200 ironmaking sites); this was the period of discoveries made by Quiguerez in 1860's which brought a specific type of induced furnace with inclined shaft. The 14th and 15th centuries are classified as a decline of the industry despite the fact that the final phase saw the introduction of hydraulic power into the siderurgy. The comparison with the development with other parts of Europe is restricted on the West, especially France. The region, about 80 km^2, yielded pisolithic ores, the dominating fuel was beech charcoal, in lower regions alder, willow and fir as well. The siderurgical activities lead to drastic deforestation. As to the developer or supervisor of the industry, the author consider the main owner of the land: the church, especially the abbey of Franches Montagnes. The book is perfectly equipped.

A. JOCKENHÖVEL: Frühe Zangen. [In German: Early tongs]. In: Archäologie in Nassau. Neue Funde und Befunde. Festschrift für F.–R. Herrmann. Inst. für Archäologie, M. Laidorf, Espelkamp 2000, 91–102. Comments to the development of earliest metalworking tongs, pincers and pivotted tools.

K. NOVÁČEK: Nerostné suroviny středověkých Čech jako archeologický problém: bilance a perspektivy výzkumu se zaměřením na výrobu a zpracování kovů. Summary: The mineral resources of medieval Bohemia as an archaeological problem: the state and perspectives of research into metal production and working. Archeologické rozhledy 53, Praha 2001, 279–309. P. 284: Innovation in iron metallurgy. The iron production expelled from Prague–Old Town, the bloomery ironworks at Chýnice (central Bohemia). Reflections of various aspects of non–ferrous mining and metallurgy in Bohemia. On pp. 284–285 the author points attention to previously published results concerning the ceasing of activities connected with iron working in the Old Town of Prague during the 13th century when bloomery ironworks of traditional type produced iron in the environment of Prague (in the west and south).

PREHISTORIA 2000, Revue de l'Union Internationale des Sciences Préhistoriques et Protohistoriques, Université de Gent, 1/2001. This volume has been prepared on the occasion of the XIVthe Congress of the UISPP at Liège. Archaeometallurgy concern following contributions: *R. Clayton*: New developments in isotope archaeochemistry. A review of recent advances in transition and heavy metal isotope studies and their application in archaeometallurgy, 51–61. *R. Pleiner*: Special Commitee: Ancient siderurgy, 199–201. A report on activity of the Comité pour la sidérurgie ancienne de l'UISPP.

THE INTRODUCTION OF IRON IN EURASIA. Uppsala October 4–8 2001. The National Heritage Board Research Report RO105 (S. Forenius ed.), Uppsala 2001. Abstracts. Contents: *L.–E. Englund*: Bloomery Iron Working in Gästrikland, Sweden, 5–6. *A. Espelund*: A Critical Examination of Successful Bloomery Iron Making in the Past, with Emphasis on Metallurgical Theory and Find Material, 6–7. *E. Hjärther–Holdar* (Mrs): Bronze Age Iron Production in Sweden, 7–8. *L. F. Stenvik*: The Introduction of Iron in Mid–Norway in Pre–Roman Iron Age, 8. *P.* and *S. Crew* (Mrs): Laxton, Northants – Large Scale Iron Production in the Early Roman Period, 9. *G. Gassmann*: Actual Excavations at an Early Celtic Iron Smelting Settlement in the Swabian Mountains, Southern Germany, 10. *G. McDonnell*, *S. Dockrill* and *J. Bond* (Mrs): The Evidence for the Adoption and Use of Iron in the Northern Isles, with Particular Reference to Old Scatness Broch, Shetland, 10. *M. van Nie*: Iron Production in a Clay Envelope (Hengelo, The Netherlands, 11–15. *A. Schäfer* and *T. Stöllner*: Early Metal Production in the Central Lahn Valley, Hesse, Central Germany, 16. *E. Godfrey* (Mrs), *M. van Nie* and *G. McDonnell*: Early Evidence for the Use of Ultrahigh Carbon Steel in Europe, 17. *M. Goodway* (Mrs) and *W. L. Elban*: Wrought Iron Bridge Cable, 18. *H. Lyngstrøm*: Early Iron Forging in Denmark. *D. B. Wagner*: The earliest use of iron in China. *M. Gurin*: The Introduction of Iron and the Development of Blacksmith's Work in Belorussian Polesye, 20. *L. Koryakova* (Mrs), *G. Beltikova* (Mrs) and *S. V. Kuzminykh*: The Introduction of Iron Technology in Central–Northern Eurasia (Eastern Europe, Ural and Western Siberia), 20–21. *S. V. Kuzminykh*: Iron in the Bronze Age Cultures of North Eurasia, 21. *D. Nedopako*: Iron Working in the Tchernjchov Settlements in the Ukraine Territory, 24. *T. A. Pushkina* (Mrs) and *L. S. Rozanova* (Mrs): Black Metal Processing in the Dnieper Basin Sites, Smolenski Region, in the 1st Millennium AD, 24. *N. N. Terekhova* (Mrs): The Earliest Tools of Meteorite Iron in the Territory of Russia. *Y. Bassiakos* and *L. Grandin* (Mrs): A Late Geometric Metal Working Centre in Asine, Argolid, Greece: Analysis and provenance, 25. *E. Jarva*: Early Iron Working in Latium: The Case of Ficana, 25–26. *M. Kostogolu* (Mrs): Iron Production in Ancient Greece: a Re–evaluation Based on new Evidence from Aegean Thrace, 26. *Chr. Risberg* (Mrs): Traces of Early Iron Production and Iron Working in Mainland and Aegean Greece, 27. *R. Pleiner*: Iron in Eurasian Bronze Ages, 28. Participants.

Z DĚJIN HUTNICTVÍ 30 [Contribution to the history of Metallurgy]. Rozpravy Národního technického muzea v Praze 172. Praha 2001. Contribution dealing with early and medieval iron: *I. Laboudková* (Mrs): Jubilejní 40. seminář z dějin hutnictví. Das 40. Jubiläumsseminar zur Geschichte des Hüttenwesens, 7–10. *R. Pleiner*: K životnímu jubileu Ing. Zdeňka Rasla. *J. Hošek*: Rozbor železných předmětů z hradiště Kal. A metallographic examination of iron artefacts from hillfort Kal, 17–27. Nine iron artefacts (knives, arrowheads, fittings) from the 8th century AD hillfort Kal in NE Bohemia were metallographically investigated. Iron–to–steel welding, medium quality of objects. *J. Petrík*, *Ľ. Mihok*, *K. Füryová* (Mrs) and *M. Soláriková* (Mrs). Archeometalurgická analýza trosky a železných predmetov z lokality Zalužany–Nemešany. Archaeometallurgical analysis of the iron objects from Zalužany–Nemešany, 21–33. The PCB slag cakes analysed, as well as two nails (ferrite and globular pearlite); the items come from an abandoned village (15th century) in N. Slovakia. *J. Petrík* and *Ľ. Mihok*: Východoslovenské sekery zo 14. až 20. storočia. East Slovakian axes from the 14th to 20th century, 34–39. Nine axeheads from museum collection analysed (iron–to–steel welding, heat treatment). *L. Mihok* and *R. Vargová* (Mrs): Metalografická analýza železných predmetov zo stredovekej dediny Pavľany–Krígovce. Metallographische Analysen von Eisengegenständen aus dem mittelalterlichen Dorf Pavľany–Krígovce. Metallography of 17 iron objects (15th century AD) – horse–shoes, knives, a sickle, a nail, fittings etc., carburization, iron–to–steel welding and heat treatment of tools.

ZEITSCHRIFT ZUR GESCHICHTE DES BERG– UND HÜTTENWESENS is the new title of the Fischbacher Hefte.zur Geschichte des Berg– und Hüttenwesens, edited by the Charivari–Verlag, Idar–Oberstein, Germany. Volume 7/1 contains an article dealing with post–medieval iron mines: *H. Walling J.* and *Haneke*: Die nassau–weiburgische Eisenrzgruben im sog. Burgenland vom Kirschheimvorland, 32–42.

B. Early iron as in other publications (2001)

SBORNÍK z konzervátorského a restaurátorského semináře, České Budějovice 2001 [Proceedings of a conservation and restoration seminar at České Budějovice, Bohemia]. Technické muzeum Brno 200l.

The conservation and investigation of early iron is treated in following contributions: *A. Selucká* (Mrs), *A. Richtrová* (Mrs) and *M. Hložek*: Konzervace železného meče ULFBERHT. Conservation of an iron sword ULFBERHT, 65–68 (Summary 103–104). A grave find of the 9th century AD from Nemilany, northern Moravia with the swordsmith's inscription, with textile and wood from the scabbard. Metallographically, a welding–on steel cutting–edges were identified and mild quench–hardening of the point part. *A. Daňková* (Mrs): Průzkum archeologických předmětů před konzervací – železné předměty. The research of archaeological iron objects. 79–82 (summary p104). A metallographic examination revealed cold–hammering of a 14th century iron helmet, and of a 16th century steel sword from collections of the Museum at Poděbrady, Bohemia. *D. Perlík*: Vliv plazmy na metalografii a deinozaci železných archeologických nálezů. The effect of plasma on metallography of archaeological iron objects, 89–95, summary p. 105. The hydrogen plasma treatment carried out at 150–200 °C during 5 hours does not influence heat treatment structures of steels.

N. VENCLOVÁ (Mrs): Výroba a sídla v době laténské. Projekt Loděnice. Summary in English: Production and settlement: The Loděnice project, central Bohemia. Inst. of Archaeol. Prague 2001. This monograph deals with the results of a long–term research project pointing in the La Tène period settlement in the region of the Loděnice basin, known especially due to the production of sapropelite bracelets, exported to a great part of Europe. Iron is treated in chapters: 7.4 Specialized production II: Iron production, 296–297 (the pagination concerns the summary). Eighteen sites revealed traces of iron production. Raw material sources: pelosiderite ore (*M. Malkovský*). The problem of the Cenomanian ferrugineous sandstone. Bloomery ironworks at Mšec, bloomery smelting at Mšecké Žehrovice. Production calculated. No currency bars neither in the environment, nor in Bohemia. 7.5 Specialized production III: Iron working, 297–298. A smithy at Mšec III closely bound to the bloomery ironwork.

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