

Prehistoric Flint Mines in Europe



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Edited by

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Cover photo: Jacek Lech. The Photo shows the flint mine site Grime's Graves, Norfolk, England. Base of a shaft near Greenwell's Pit. View from entrance to gallery in 1975. Scale 20 cm



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Contents

List of Figures and Tables.....	iii
List of Authors	xiii

Introduction

About the beginnings of prehistoric archaeology, studies of stone artifacts and ancient flint mines.....	1
Françoise Bostyn, Jacek Lech and Dagmara H. Werra	

Part I

Key Sites of Prehistoric Flint Mining in Europe

Chapter 1	
The Early Neolithic mine of Defensola and the Gargano Promontory (Italy).....	19
Attilio Galiberti and Massimo Tarantini	
Chapter 2	
The mining complex at Rijckholt-St. Geertruid (Eijsden-Margraten, Limburg, The Netherlands).....	59
Marjorie E. Th. de Grooth, Jos Deeben*, Jan Willem de Kort and José Schreurs	
Chapter 3	
The Neolithic flint mines of Spiennes (Belgium).....	103
Hélène Collet and Jean-Philippe Collin	
Chapter 4	
Grime's Graves (Norfolk, England).....	131
Frances Healy, Peter Topping and Gillian Varndell	

Part II

Some other European Flint Mines

Chapter 5	
The flint mine of Casa Montero (Madrid, Spain). Making society in Early Neolithic Europe.....	167
Pedro Díaz-del-Río, Susana Consuegra, Nuria Castañeda, Enrique Capdevila, Marta Capote, Cristina Criado, Cristina Casas and Aurora Nieto	
Chapter 6	
The chocolate flint mine of Tomaszów (Poland).....	187
Romuald Schild*	
Chapter 7	
Śąspów near Cracow (Poland). A Neolithic flint mine of the Danubian communities.....	225
Jacek Lech	
Chapter 8	
Neolithic chert extraction and processing on the southeastern Swabian Alb (Asch-Borgerhau, Germany).....	269
Lynn E. Fisher, Corina Knipper, Susan K. Harris and Rainer Schreg	

Chapter 9	
The Late Neolithic opencast flint mining and axehead blank production on the Lousberg in Aachen (Germany)	285
Daniel Schyle and Jürgen Weiner	
Chapter 10	
The Nagytevel flint mine (Hungary)	315
Katalin T. Biró and Judit Regenye	
Chapter 11	
Flintmining at Södra Sallerup (Sweden)	327
Elisabeth Rudebeck, Anders Högberg, Deborah Olausson in cooperation with Åsa Berggren	
Chapter 12	
Cissbury and the South Downs flint mines (Sussex, England)	341
David Field	
Chapter 13	
The neolithic flint mine at Jablines ‘le Haut-Château’ (Seine-et-Marne, France)	357
Françoise Bostyn	
Chapter 14	
The flint mine of Ri-Ronai (Orne, Basse-Normandie, France)	369
Emmanuel Ghesquière, Cyril Marcigny with the collaboration of François Charraud, David Giazzon, Sébastien Giazzon and Laurent Juhel	
Chapter 15	
The Neolithic quarries at Plancher-les-Mines (Haute-Saône, France), 5th and 4th millennia cal BC	387
Pierre Pétrequin	
Chapter 16	
‘Les Orlets’ and ‘Le Grand Bois Marot’ at Villemaur-sur-Vanne (Aube, France): face to face in the Pays d’Othe mining complex	407
Pierre-Arnaud de Labriffe	
Chapter 17	
Borownia (Poland). A mine of striped flint from the Early Bronze Age	423
Jacek Lech	
Chapter 18	
Wierzbica ‘Zełe’ (Poland). A flint mine from the Bronze Age	455
Jacek Lech and Dagmara H. Werra	
Index	487
Danuta Piotrowska and Wojciech Piotrowski	

List of Figures and Tables

Introduction

Figure 1. Grimes Graves (England). End of July 1975. Aerial view from the Greenwell's Pit onto the south-west part of the mining field.....	2
Figure 2. Spiennes (Belgium). <i>Camp-à-Cayaux</i> . Occurrence of workshop artifacts on the surface of the site.....	4
Figure 3. Krzemionki Opatowskie flint mine site (Poland). July 2016. Flint workshop exposed on the surface of a mining field by heavy rain.....	5
Figure 4. Models. A – Flint mine site as a unit of a simple settlement pattern. B – flint mine site: a model.....	6
Figure 5. Krzemionki Opatowskie flint mine site (Poland). August 1979. Pit 4/606. Part of the underground chamber near the shaft bottom with pillar and limestone rubble from the underground spoil heaps.....	7
Figure 6. Krzemionki Opatowskie flint mine site (Poland). ALS picture, showing parabolic-shaped mining field of shafts and pits.....	7
Figure 7. Harrow Hill (England). 1982. 'Prehistoric Flint Mines Working Group' on the mining field during lunch time.....	8
Figure 8. Paris. September 2007. The first meeting of the first presidium UISPP Commission 'Flint Mining in Prehistoric and Protohistoric Times'.....	9
Figure 9. Map of the mines presented in the book.....	10

Part I

Key Sites of Prehistoric Flint Mining in Europe

Chapter 1

Figure 1.1. Topographic location of the Defensola A area.....	20
Figure 1.2. Geological map of the Gargano with location of the flint mines.....	21
Figure 1.3. Above: part of the artificial section created by earthmoving works in 1981; two levels of the Defensola A mine are visible. Middle: stratigraphical profile (axonometric view) of the same section, with the complex series of layers of mining debris. Below: a particular of the layers of mining debris.....	22
Figure 1.4. Defensola A, area A5. Collapse of limestone slabs.....	23
Figure 1.5. Defensola A. A view of the track laid in gallery B. The archaeologists move along it lying on a trolley.....	23
Figure 1.6. Sub-horizontal mining system in compact formations and hilly environment.....	24
Figure 1.7. Defensola A, dump B. Left: view of the top of the slope dump formed by mining debris. Right: longitudinal section of the same slope dump.....	25
Figure 1.8. Defensola A. Map of the mine upper level.....	26
Figure 1.9. Defensola A. Left: typology of the stone dry walls. Right: construction sequence of the types A1–A2.....	27
Figure 1.10. Defensola A. Above: a stone dry wall (type B1) in the gallery M1. Below: another stone dry wall in the same gallery M1 (type A2).....	27
Figure 1.11. Defensola A, gallery N. Above: the stone dry wall plastered with limestone mud applied by hand pressure. Below: particulars of the same stone dry wall, with the imprints of hands and fingers.....	28
Figure 1.12. Map of the hypothetical main directions of exploitation of the mine during the two principal phases.....	29
Figure 1.13. Extraction techniques for flint nodules in compact formations. Left: by 'collapse'. Right: with extraction step.....	30
Figure 1.14. Defensola A, area A6. A short extraction step.....	31
Figure 1.15. Defensola A, area G. An extraction face with a large step.....	31
Figure 1.16. Defensola A, area A3. Extraction by 'collapse'.....	32
Figure 1.17. Picks and mallets from Defensola A.....	34
Figure 1.18. Picks and mallets from Defensola A.....	35
Figure 1.19. The flint workshop area inside the Defensola mine, area A3.....	36
Figure 1.20. Defensola A, flint workshop area. Lithic industry with macro-wear analysis.....	36
Figure 1.21. Vessel n. 133 left in its functional position in Defensola A.....	37
Figure 1.22. Vessel n. 169 left in its functional position in Defensola A.....	37
Figure 1.23. Some ceramics from Defensola A.....	38
Figure 1.24. Defensola A. Limestone lamps n. 115 in its functional position.....	40
Figure 1.25. Limestone lamps from Defensola A.....	42
Figure 1.26. Limestone lamps from Defensola A.....	43
Figure 1.27. Engravings from Defensola A. Schematic drawings.....	43
Figure 1.28. Engraving no. 1 in its context.....	43
Figure 1.29. Engraving no. 7 in its context.....	44
Figure 1.30. Chronological data available for the Gargano Neolithic flint mines.....	44
Figure 1.31. Distribution of C14 dates in Defensola mine.....	46
Figure 1.32. S. Marco mine. Map and sections and a view of the interior along section C–D.....	48
Figure 1.33. Arciprete mine. Above: localization of the geophysical surveys at Arciprete and the entrance to the mine. Middle: In red the anomalies. ERT survey, cross-section AB. Below: Resistivity in Ohm*m.....	49
Figure 1.34. Finizia shafts and picks (above and middle). Defensola B shaft and sub-horizontal entrance (below).....	51

Table 1.1. Picks and mallets from Defensola A	33
Table 1.2. Chronological data available for the Gargano flint mines	45

Chapter 2

Figure 2.1. General map of the Rijckholt area, and its location in the Netherlands	60
Figure 2.2. East-west geological cross section of the Meuse (Maas) river valley, south of Maastricht	60
Figure 2.3. North-south geological cross section of the prehistoric mining area	61
Figure 2.4. Generalised section of the flint-bearing strata in the flint mine area	61
Figure 2.5. Nodule of Lanaye flint	62
Figure 2.6. Map showing flint extraction sites and main geological outcrops in the Rijckholt region	63
Figure 2.7. Overview of archaeological investigations before 1964	65
Figure 2.8. Mining gallery in the Schone Grub slope, investigated by Dominicans	66
Figure 2.9. Antler mining pick in the back-fill of a mining shaft from Van Giffens 1925 excavation on the plateau	66
Figure 2.10. Cross sections of mining shafts 1, 4, 7, 9 and 10 and the west side of trench 1 from Waterbolck's 1964 excavation on the plateau	67
Figure 2.11. Members of the Prehistoric Flint Mines Working Group with Prof. H.T. Waterbolck	68
Figure 2.12. a - Map of the Working Group's excavation; b - Digitised map of the Working Group's excavation	69
Figure 2.13. Exploration tunnel with wooden props; in the background prehistoric galleries and flint nodules	70
Figure 2.14. Working at the front of the exploration tunnel	70
Figure 2.15. Large-scale roof collapse in the tunnel	71
Figure 2.16. Motor scooter winch operated by Sjeuf Felder	71
Figure 2.17. Tunnel with steel props and conveyor belt	72
Figure 2.18. Prehistoric gallery with the original fill of chalk rubble	73
Figure 2.19. Cultural Heritage Agency study area. 1 - Field survey 2008; 2 - Field survey 2009; 3 - Field survey 2010; 4 - Field survey 2011	74
Figure 2.20. Cultural Heritage Agency study area. 1 - Augering line	74
Figure 2.21. Cultural Heritage Agency study area. 1: Resistivity; 2: Magnetometer; 3: Ground Penetrating Radar; 4: Electro-Magnetic Induction	75
Figure 2.22. Cultural Heritage Agency study area. 1: Trial trenches 2011; 2: Trial trenches 2012; 3: Trial trenches 2013. 4: Trial trenches Waterbolck 1964	75
Figure 2.23. The excavations of Van Giffen (1923) and Waterbolck (1964) projected on the results of the RCE geophysical research	76
Figure 2.24. Results of the geophysical research near Eijsderbosch	78
Figure 2.25. Comparison between 1: distribution of solution pipes in the mine field of Rijckholt; 2: distribution of mine shafts in the mine field of Rijckholt; 3: distribution of circular anomalies near Eijsderbosch	79
Figure 2.26. Hypothesised range of activities in the RCE study area	80
Figure 2.27. Finds from the Hamal-Nandrin excavations	82
Figure 2.28. A void in the fill of a gallery indicating a wooden implement now decayed	83
Figure 2.29. One of the flint pick 'hoards' encountered in the galleries	83
Figure 2.30. Conjoinable broken flint picks found underground	84
Figure 2.31. Rope marks at the foot of a prehistoric mine shaft	85
Figure 2.32. Pick marks on the roof of a prehistoric gallery	85
Figure 2.33. Ground plans of characteristic mines	86
Figure 2.34. Schematic overview of the lay-out of the mines	87
Figure 2.35. Cleared prehistoric gallery with pillars left standing for safety reasons	88
Figure 2.36. Two aspects of a blade core found on the plateau	91
Figure 2.37. Sets of conjoined blades from a deposition found by the Hamal-Nandrin team	92
Figure 2.38. Broken rough-out of an axe of the Buren type, found near the Grand Atelier	92
Figure 2.39. Generalised distribution map of artefacts made from flint mined at Rijckholt	95
Figure 2.40. Present-day entrance to the Rijckholt flint mines	97
Figure 2.41. View in the exploration tunnel 2022	98
Table 2.1. Lithostratigraphical division of the Upper Cretaceous and the Paleocene in Southern Limburg and contiguous areas	62
Table 2.2. Average size of flint picks	84
Table 2.3. Overview of radiocarbon dates for the Rijckholt mines	90
Table 2.4. Estimates of average output, number of mines and annual workload in different parts of the Rijckholt mines for a 1300 year exploitation period	93

Chapter 3

Figure 3.1. Location of the Neolithic flint mines of Spiennes	103
Figure 3.2. Flint outcrops and geographical context of the flint mines of Spiennes	104
Figure 3.3. Raw material from the deep shafts at <i>Camp-à-Cayaux</i>	105
Figure 3.4. Raw material from the mines of <i>Petit-Spiennes</i>	105
Figure 3.5. The Neolithic flint mines of Spiennes. Background map	106
Figure 3.6. <i>Camp-à-Cayaux</i> in 1906 with numerous knapped flints scattered on the surface	107
Figure 3.7. Mining shaft visible on the surface of the fields at <i>Petit-Spiennes</i>	107
Figure 3.8. Section opened during the railway works in 1867	108
Figure 3.9. The excavations of deep mines at <i>Camp-à-Cayaux</i> by Baron A. de Loë in 1914	108
Figure 3.10. Undated open-air quarry discovered on the slope of <i>Camp-à-Cayaux</i> in 2005	110

Figure 3.11. Interpretation of the underground flint extraction as it could have been undertaken at <i>Camp-à-Cayaux</i> in Spiennes	111
Figure 3.12. The mines of <i>Petit-Spiennes</i> excavated by the <i>Society for Prehistoric Research in Hainaut</i>	112
Figure 3.13. Mining waste at the bottom of shaft ST 20 at <i>Petit-Spiennes</i>	112
Figure 3.14. Trampled layer within the mine ST20	113
Figure 3.15. Plan of the mines excavated at <i>Petit-Spiennes</i> by the <i>Society for Prehistoric Research in Hainaut</i>	113
Figure 3.16. Shaft n°2 at <i>Camp-à-Cayaux</i>	113
Figure 3.17. Gallery of the deep mines at <i>Camp-à-Cayaux</i>	114
Figure 3.18. Plan of the mines at <i>Camp-à-Cayaux</i> where galleries lie 15 and 16 metres deep beneath the surface	114
Figure 3.19. Flint pick from the mine ST 20 of <i>Petit-Spiennes</i>	115
Figure 3.20. Flint pick from the mine ST 20 of <i>Petit-Spiennes</i>	115
Figure 3.21. Mining tools from the ST 11 of <i>Petit-Spiennes</i>	116
Figure 3.22. Radiocarbon dates from the flint mines of Spiennes.....	117
Figure 3.23. Cross section of the Shaft ST11 at <i>Petit-Spiennes</i> and radiocarbon dates provided by the feature	120
Figure 3.24. Unfinished axe discovered in the vicinity of the deep shafts at <i>Camp-à-Cayaux</i> in 2005	121
Figure 3.25. Polished axe from Spiennes discovered between Naast and Le Roeulx in Hainaut Province	121
Figure 3.26. One square metre of the chipping floor excavated at <i>Petit-Spiennes</i> in 2011.....	121
Figure 3.27. Discarded flint blades from 1965 workshop at <i>Camp-à-Cayaux</i> . Excavation F. Hubert.....	122
Figure 3.28. Spiennes blade core from workshop I. 'Fonds Stevens'.....	122
Figure 3.29. Skeleton from shaft ST6 at <i>Petit-Spiennes</i> displayed in the SILEX'S	123
Figure 3.30. Polished axe found in the shaft ST6 at <i>Petit-Spiennes</i>	124
Figure 3.31. SILEX'S, the Spiennes Mines Interpretive Centre of the City of Mons.....	126
Table 3.1. Radiocarbon dates available for the flint mines and the enclosure of Spiennes	118

Chapter 4

Figure 4.1. Location of Grime's Graves with main British Chalk deposits. © Trustees of the British Museum	132
Figure 4.2. Plan of Grime's Graves showing features mentioned in the text. The contours show the course of a dry valley forming an arc around the north-west edge of the visible earthworks	132
Figure 4.3. Aerial photograph of Grime's Graves from the east, looking across the area of deep galleried shafts	133
Figure 4.4. E.T. Lingwood's published section through Pit 2.....	134
Figure 4.5. Floorstone <i>in situ</i> in Pit 1	134
Figure 4.6. Laser scan of Canon Greenwell's Pit, captured in 2002.....	135
Figure 4.7. A.L. (Leslie) Armstrong at Grime's Graves	137
Figure 4.8. The late P.J. Felder's suggested mining sequence for the exploitation of Greenwell's Pit.....	138
Figure 4.9. A shaft in the Pit 11A–Pit 11H complex under excavation by the Prehistoric Flintmines Working Group of the Dutch Geological Society, Limburg Section in 1973.....	139
Figure 4.10. A simple pit of late Neolithic date on the West Field	140
Figure 4.11. Schematic profiles of 'primitive' Pits 3 and 3A, showing two tiers of niches, the first bottoming on the surface of the <i>in situ</i> chalk, the second at floorstone level.....	140
Figure 4.12. Red deer antler pick and crown <i>in situ</i> in Gallery 15H3 of Pit 15H, the pick set vertically to support the roof	141
Figure 4.13. Bone picks from 'primitive' Pit 3. The example on the right (A98) is made from a human femur shaft. The other two are made from the distal ends of cattle tibiae.....	142
Figure 4.14. Grooved Ware bowls. The vessel on the left is from an undercut at the base of Greenwell's Pit	142
Figure 4.15. Chalk objects from late Neolithic contexts: a 'cup', (C25), a perforated fragment (C107), and fragmentary phallus (C299), all from Greenwell's Pit, and a ball (C152) from Pit 12.....	144
Figure 4.16. Schematic diagram showing the periods of use of the main episodes at Grime's Graves, together with the currency of Beaker pottery in Britain.....	145
Figure 4.17. Oblique arrowhead (1), scraper (2), borer or point (3), fabricator or rod (4), discoidal knives (5, 6) and axeheads of Lech's types 1, with pointed butt (7), 2, with rounded butt (8) and 3, with rounded butt and parallel sides (9).....	148
Figure 4.18. Start estimates for the better-dated galleried shafts, in approximate chronological order from bottom to top, together with their approximate depths.....	150
Figure 4.19. Greenwell's Pit complex. Antler picks seen through breach near Shaft E	152
Table 4.1. Resource estimates for the 1971 Pit (Mercer 1981, 28–32) and Greenwell's Pit	138
Table 4.2. Highest Posterior Density intervals for selected starts, ends, durations and intervals.....	146

Part II

Some other European Flint Mines

Chapter 5

Figure 5.1. Location of Casa Montero in the Iberian Peninsula.....	168
Figure 5.2. Highway plan after the modification of the track.....	168
Figure 5.3. Plan of the recorded area with the 10 by 10 meter sampling units and the excavated shafts.....	169
Figure 5.4. Aerial view of the excavations at the Early Neolithic mine of Casa Montero.....	170
Figure 5.5. Stratigraphic column showing the disposition of the four silicification episodes	171
Figure 5.6. Refit of a flint nodule with an opaline outer part that was removed in order to access the better quality flint in the inner part	172

Figure 5.7. Comparison of the way in which nodules were reduced according to their size. While small nodules were directly reduced to produce blades, big nodules were used to obtain large flakes	173
Figure 5.8. Image and diacritic scheme of a blade core from Casa Montero	174
Figure 5.9. Plan of the recorded area with the excavated shafts coloured considering their depth.....	175
Figure 5.10. Plan of the recorded area with all the documented lateral excavations.....	176
Figure 5.11. Box plot for length, width and thickness values of 2383 complete blades documented in Casa Montero	177
Figure 5.12. Correlation between observed skill levels and abandonment stages of examined cores	178
Figure 5.13. Large earthenware jar recovered at the Casa Montero	179
Figure 5.14. Lump of ochre pigment found inside one of the shafts	180
Figure 5.15. Upper left: fragment of a clay object with incised decoration. Upper right: Fragment of a red quartzite decorated pebble. Below: possible limestone stelae	181
Figure 5.16. Plan of the recorded area with the location of the shafts that have been radiocarbon dated	182
Table 5.1. Radiocarbon dates for Casa Montero	183

Chapter 6

Figure 6.1. Pre-Quaternary geology of the north-eastern foothills of the Holy Cross Mountains with the location of chocolate flint occurrences marked	188
Figure 6.2. Location of the Tomaszów quarry and the main directions of chocolate flint distribution in the early Neolithic	189
Figure 6.3. Directions of ice sheet flow in the north-western section of the chocolate flint belt during the Kamienna Advance, according to Lamparski (1970) and Różycki (1972)	191
Figure 6.4. Tomaszów. Contour map of Sites I and II, showing the location of cuts and trenches	192
Figure 6.5. Schematic cross-section of the quarry.....	192
Figure 6.6. Tomaszów I, Cut IV, Deep Cutting 1, a cross-section of the north-eastern face showing subglacial melt-out channel overlain by Odranian (early Saale) glacial till	193
Figure 6.7. Tomaszów I, Cut IV, Deep Cutting 1, North-Eastern Wall. Subglacial melt-out channel with Lower Palaeolithic artefacts overlain by the Odranian till cutting into pre-Quaternary laminated sand of Bed VIII	194
Figure 6.8. Tomaszów I, Cut IV, Deep Cutting, Subglacial melt-out channel, Lower Palaeolithic artefacts.....	194
Figure 6.9. Tomaszów I. View of minefield after the harvest, forest-covered dune of Tomaszów II in the background	196
Figure 6.10. Tomaszów II. View of Rzeczków hill; forest covered dune of Tomaszów II on the left	196
Figure 6.11. Tomaszów I, Cut I. Outlines of pits.....	196
Figure 6.12. Tomaszów I, Cut I. Light-coloured outlines of emerging pits	197
Figure 6.13. Tomaszów I, Cuts II-IV. Outlines of pits and deep cuttings (DC)	197
Figure 6.14. Tomaszów I, Cut II, Deep Cutting 1, south-eastern face. The advanced phase of excavation of Pit 3.....	198
Figure 6.15. Tomaszów I, Cut III. An early phase of excavation. Note indistinct outlines of pits	198
Figure 6.16. Tomaszów I, Cut IV, Deep Cutting 2. An early phase of excavation.....	198
Figure 6.17. Tomaszów I, Cut IV, Deep Cutting 2. The advanced phase of excavation	199
Figure 6.18. Tomaszów I, Cut IV, Deep Cutting 2, northern face. Cross-section of Test Pit 17.....	200
Figure 6.19. Tomaszów I, Cut IV, Deep Cutting, Northern Face. Basal section of Test Pit 17.....	200
Figure 6.20. Tomaszów I, Cut II, Deep Cutting 1, Northern Face. Cross-sections of Pits 2, 1, and 3	201
Figure 6.21. Tomaszów I, Cut II, Deep Cutting 1, Northern Face. Cross-section of Pit 1	201
Figure 6.22. Tomaszów I, Cut III, Deep Cutting 2, Northern Face. Cross-section of Pits 5c, 6, and 10.....	202
Figure 6.23. Tomaszów I, Cut III, Deep Cutting 2, Northern Face. Pit 10	203
Figure 6.24. Tomaszów I, Cut III, Deep Cutting 1, Eastern – South-Eastern Face. Cross-section of Pits 3, 4, 5 Central, 5c, and 5a.....	203
Figure 6.25. Tomaszów I, Cut III, Deep Cutting 2. Traces of hoeing on the wall of Pit 10.....	204
Figure 6.26. Tomaszów I, Cut II, Pit 3. Strangled flake hoe broken on impact.....	204
Figure 6.27. Tomaszów I, Cut III, Pit 4. Tetrahedral pick broken on impact	204
Figure 6.28. Tomaszów I, Cut IV, Pit 12. Clay scraper on a pre-core preparation flake	204
Figure 6.29. Tomaszów I and II (M). Radiocarbon ages from Tomaszów I and II (M). of quarry pits and Vistulian camp debris in Cut II of Tomaszów II (M)	206
Figure 6.30. Tomaszów I, Pit 4, Sandy clay. Unfinished carinated pre-core.....	207
Figure 6.31. Tomaszów I, Pit 3, Last Phase of back-filling.....	208
Figure 6.32. Tomaszów I, Pit 1, Last Phase of back-filling.....	209
Figure 6.33. Tomaszów I, Pit 12, Second Phase of back-filling	210
Figure 6.34. Tomaszów I, II, and III (To). Structure of flint assemblages from Mesolithic workshops (To) and Neolithic quarry pits	211
Figure 6.35. Tomaszów I and II. Tree diagram of General Technological Structures of Mesolithic (To) and Neolithic pit assemblages; nearest neighbour, Euclidean distance.....	211
Figure 6.36. Tomaszów II, Cut II, late Mesolithic. Excavations in 1973.....	212
Figure 6.37. Tomaszów II, Cut II, late Mesolithic. Articulation networks, according to the sequence of removal.....	213
Figure 6.38. Tomaszów II, Cut II, late Mesolithic. Pre-core	214
Figure 6.39. Tomaszów II, Cut II, late Mesolithic, South-Eastern Concentration	215
Figure 6.40. Tomaszów II, Cut II, South-Eastern Concentration.....	216
Figure 6.41. Tomaszów II, Dune surface, Krukowski's collection of 1946, late Mesolithic	217
Figure 6.42. Three-dimensional plot (inverse squared distance smoothing) of major technological indices from Mesolithic workshops and Neolithic pits of Tomaszów.....	218
Figure 6.43. Three-dimensional plot of rejection distances of camp cores, workshop cores, and workshop pre-cores.....	218
Figure 6.44. Changes in the structure of general technological indices of Vistulian assemblages according to distance from the source of flint; stacked percentages of chocolate flint in relation to other raw materials	218

Figure 6.45. Three-dimensional plot of selected technological indices from Final Palaeolithic Masovian Sviderian and late Mesolithic Vistulian assemblages made from chocolate flint in relation to other raw materials and according to distance from the source	219
Figure 6.46. Tomaszów I, Cut I, Central Pit, Sandy Infill. Middle Bronze. Initially worked celts.....	219

Chapter 7

Figure 7.1. Saspów near Cracow (Poland) in Central Europe	226
Figure 7.2. Cracow Upland. The Ojców Jura (Poland). Landscape of the most elevated part of the Polish Jura not far from the Saspów flint mine site. View of the Prądnik River Valley in the mid- 1970s	226
Figure 7.3. The Prądnik River Valley at Ojców, Cracow district. The Ojców National Park.....	227
Figure 7.4. Geological map of the Cracow Upland and neighbouring territory, omitting drift deposits, according to R. Gradziński (1962) with changes and the flint mine sites	228
Figure 7.5. The Jurassic-Cracow flint of the Saspów variety. Core for blades from the Saspów flint mine site.....	229
Figure 7.6. Saspów, Cracow district, site I. Beginning of July 1970. Salvage excavations in progress. View of Are 31, quadrant C and part of quadrant A from Are 41. H. Młynarczyk is making notes.....	232
Figure 7.7. Saspów, Cracow district, site I. July 1971. Rescue excavations in progress. In cross-section the upper part of Shaft 8 is visible	233
Figure 7.8. Saspów, Cracow district, site I. Part of cuttings from 1970-1971. Distribution of various features and structures.....	233
Figure 7.9. Saspów, Cracow district. View onto the north-western slope of Saspów Valley with prehistoric flint mine site I. April 1974.....	234
Figure 7.10. Archaeological Station at Igołomia near Cracow, branch of former Institute for History of Material Culture in Polish Academy of Sciences. Anna Dzieduszycka-Machnikowa and author of article in 1972, during studies of flint material from Pits 1 and 3/1960.....	234
Figure 7.11. Cover of book by A. Dzieduszycka-Machnikowa and J. Lech (1976).....	235
Figure 7.12. Cover of book by J. Lech (1981).....	235
Figure 7.13. The Ojców National Park. Mid-1970s. Clay with flint nodules revealed after a downpour	236
Figure 7.14. Saspów, Cracow district. Site I. Simplified drawing of partly damaged Shaft 7, excavated in 1971.....	237
Figure 7.15. Saspów, Cracow district. Site I in September 1970. Cross-section of cutting from Are 52 – south-western part. Fillings of Shaft 1 and the probe pit – a ‘trial hole’ are visible. Heaps of natural flint nodules of Jurassic-Cracow flint from level of karstic clay are lying on the loess terrace	238
Figure 7.16. Saspów, Cracow district. Site I. Cross-section of cutting from Are 42. Cutting at right angle to cross-section from Figure 7.15. Upper parts of fillings of Shafts 4 and 1 are visible	239
Figure 7.17. Saspów, Cracow district. Site I. Simplified drawing of partly damaged Shafts 8 and 2, excavated in 1970 and 1971.....	239
Figure 7.18. Saspów, Cracow district. Site I in September 1970. Cross-section of cutting from Are 52 – south-western part. J. Lech – head of excavations – explains the cross-section to T.B. Żurawski who will be drawing it. Heaps of natural flint nodules of Jurassic-Cracow flint from level of karstic clay are visible on the loess terrace of the cutting	240
Figure 7.19. Saspów, Cracow district. Site I. Rescue excavations in September 1970. Upper part of filling of Shaft 3 is visible	241
Figure 7.20. Saspów, Cracow district. Site I. Fragments of pottery from Pits 1 and 3/1960.....	242
Figure 7.21. Saspów, Cracow district. Site I. Flint specimens from the filling of Shafts 1 and 2.....	244
Figure 7.22. Saspów, Cracow district. Site I. July 1971. Flint floors – <i>krzemieniska</i> and flint processing workshop 1/1971.....	245
Figure 7.23. Saspów, Cracow district. Site I. Pit 3/1960. Single platform cores for blades	247
Figure 7.24. Saspów, Cracow district. Beginning of the Saspów Valley. Summer 1972. Rock shelter ‘By the Mine’ during excavations.....	248
Figure 7.25. Cracow Upland. The Ojców Jura. Caves settled by Danubians.....	249
Figure 7.26. Iwanowice, Cracow district. <i>Babia Góra</i> I/II site on a tip of the plateau, over the river Dłubnia. Archaeological cutting from 1972	250
Figure 7.27. Iwanowice, Cracow district. <i>Babia Góra</i> I/II site. Flint from pits of the late Pleszów group (Modlnica phase)	251
Figure 7.28. Jerzmanowice, Cracow district. October 1970. Professor Waldemar Chmielewski, discoverer of site I at Saspów in front of the <i>Jaskinia Nietoperzowa</i> (‘Bat’ cave)	253
Figure 7.29. Jerzmanowice, Cracow district. Surroundings of the ‘Bat’ cave (<i>Jaskinia Nietoperzowa</i>). Depot of precoces found in 2008. Nodules were exploited from karstic clay	253
Figure 7.30. Saspów, Cracow district. Model for the organization of labour within the area of the mine, based on analysis of structures and assemblages of Lengyel-Polgár communities (Modlnica group – later Danubian) – B-E = Flint Mine Cluster.....	254
Figure 7.31. The Saspów flint mine and supply of siliceous rocks to the Linear Pottery settlements with some other mining sites and raw materials from various regions of the north-eastern part of central Europe north of the Danube	255
Figure 7.32. Saspów, Cracow district. The beginning of the Saspów Valley. Road with ditch in the place where excavations were carried out in 1970-71 and one of the houses built on the Neolithic mining field without earlier salvage excavations or rescue explorations.....	257
Table 7.1. Radiocarbon dating of archaeological features from the Saspów mine.....	243
Table 7.2. Saspów, Cracow district. General structure of workshop assemblages from the mining field.....	246

Chapter 8

Figure 8.1. Geological map of southwestern Germany. The rectangle indicates the location of the study area.....	270
Figure 8.2. Location of surveyed agricultural fields and investigated Neolithic sites in the area around the Asch-Borgerhau quarry.....	272

Figure 8.3. Distribution of surface features and location of geomagnetic survey areas in the Asch-Borgerhau wood.....	273
Figure 8.4. View of uneven ground surface characterized by wide, irregular depressions and debris heaps in the central part of the Borgerhau wood.....	273
Figure 8.5. Location of surface survey areas and test trenches excavated at Borgerhau in 2007, with geomagnetic images of two test fields.....	274
Figure 8.6. Combined profile of Borgerhau trenches 3, 4, and 7, showing complex stratigraphy resulting from intersecting chert extraction pits.....	275
Figure 8.7. South profile of Borgerhau trench 5, with abundant artifacts dispersed in varied fill sediments.....	275
Figure 8.8. Photo of trench 2 excavation at Borgerhau, showing dense secondary deposit of chipping debris.....	276
Figure 8.9. Combined profile of Borgerhau trenches 1 and 2, showing the dense deposit of chipping debris in trench 2, feature 1, adjacent to anthropogenic fill layers with few artifacts in trench 1.....	276
Figure 8.10. Examples of Jurassic nodular chert variants from Borgerhau excavations.....	277
Figure 8.11. Example of a possible chert digging tool showing battering, splintering, and some smoothing on edges of a natural fragment, found at base of feature 5 in trench 3.....	277
Figure 8.12. Fragments of a Michelsberg vessel (c. 4200-3500 BC) were found in the dense lithic concentration in Borgerhau trench 2 (feature 1).....	278
Figure 8.13. Calibrated radiocarbon dates on charcoal for Asch-Borgerhau quarry features.....	279
Figure 8.14. Splintered pieces from the Borgerhau excavation.....	280
Figure 8.15. Large early stage core from Borgerhau excavation.....	280
Figure 8.16. Blades from Borgerhau excavations.....	280
Figure 8.17. Core from the Sonderbuch 'Grund' settlement, showing strong macroscopic similarity to typical Borgerhau chert raw material.....	282
Table 8.1. AMS radiocarbon dates on charcoal samples from Asch-Borgerhau test excavations.....	279

Chapter 9

Figure 9.1. Location of the Lousberg immediately north of downtown Aachen.....	286
Figure 9.2. Raw material slab showing the specific 'chocolate' brown exterior and the greyish interior colours of the Lousberg flint.....	286
Figure 9.3. Contour plan of the plateau on the Lousberg indicating the location of the excavation trenches (hatched).....	287
Figure 9.4. Western section of large excavation trench 79-2.....	289
Figure 9.5. Reconstructed phases of deposition (shaded: 1, 2, 3, 4, 6, 7, 9, 11) and removal (5, 8, 10) of mining dumps in the western section of trench 79-2.....	290
Figure 9.6. Traces of mining on the limestone remnant in trench 80-1.....	291
Figure 9.7. Sections drawings of trench 80-1.....	291
Figure 9.8. Fragments of antler 'crowbars'.....	292
Figure 9.9. Complete antler 'crowbar'.....	292
Figure 9.10. Antler 'picks'.....	293
Figure 9.11. Hammerstones, 1 rock, 2-3 flint.....	294
Figure 9.12. Notched hammers with two working ends ('Kerbschlägel') and hafting notches (1, rock) or pecked grooves (2-3, flint).....	295
Figure 9.13. Notched hammers with one working end ('Keilhauen') and pecked hafting grooves (rock).....	296
Figure 9.14. Flat notched hammers with two working ends ('Kerbschlägel') and hafting notches / grooves made of flint (1) and rock (2).....	297
Figure 9.15. Selected pottery found during the excavation on the Lousberg.....	297
Figure 9.16. Flint tools (1, 3, 5) and artefacts used to remove the cortex (2, 4, 6) by scraping.....	298
Figure 9.17. Various discarded axe-blade-blanks, 1 displaying a break along natural cleft.....	299
Figure 9.18. Fragments of discarded axe-blade-blanks, displaying typical flaking accidents as overshot fracture (1), fracture caused by 'plunging' cortex (2) or simple snap fracture (3).....	300
Figure 9.19. Hammerstone made of sandstone with refitted fragments, found within the <i>in-situ</i> chipping floor.....	301
Figure 9.20. Antler retouching hammer, one with shaft hole and two working ends.....	302
Figure 9.21. Refittings, 1-complete axe-blade-blank and corresponding upper and lower 'peelings'; 2-partially refitted axe-blade-blank.....	303
Figure 9.22. 'Brick' reconstructed from Figure 9.21.1.....	304
Figure 9.23. 1-2- pecking stones (flint), 3- grinding stone.....	305
Figure 9.24. 1 - Primary, or 'Opening flake' refitted to a 'brick', 2-5 - axe-blade-blanks discarded in various stages of work.....	306
Figure 9.25. Distribution of finds of slabs, axe-blade-blanks, axe shaping and other flakes of Lousberg flint, indicating off-site axe production at settlement sites.....	308
Figure 9.26. Distribution map of polished axes made of Lousberg flint. Yellow star: Lousberg; red dots: Lousberg axe finds; crosses: other Neolithic flint mines; circle: 50 km diameter around the Lousberg.....	309
Figure 9.27. Distribution map and GIS-calculated distribution areas of Lousberg axes and rectangular axes made of 'Kieselgeoden'.....	310
Table 9.1. List of radiocarbon dates.....	297
Table 9.2. Refittings between layers in trench 80-2. Shaded: layers belonging to / refittings within the main occupation / knapping event. Layers 10, 3, 4, 6, 12S, 14, 17 belonging to the upper, layers R, L, S, H, F2 to the lower occupation / knapping event.....	307

Chapter 10

Figure 10.1. Locality map. Modified by the authors.....	316
Figure 10.2. Tevel flint core from Kup.....	316

Figure 10.3. Geophysical survey map 2005. Geophysical survey overview from slope direction with areas A and B, respectively.....	317
Figure 10.4. Photo of cleared surface (2005); the large pit complex filled with argillaceous sediment is feature 2005/2, the deepest opened mining pit (>2 m).....	318
Figure 10.5. Features observed on the exposed surface (2005). Above: according to excavation grids (5x5 m). Below: on the geophysical map	319
Figure 10.6. Parallel trenches in Feature 2005/4 W	320
Figure 10.7. Mining features excavated in 2006 – small pits on area B	321
Figure 10.8. Large flake, inv. nr. 2008.4.1. 8a: In situ, Feature 2005/2; 8b: refitted.....	321
Figure 10.9. Geophysical survey 2005 and 2008.....	322
Figure 10.10. Details from the digital geological map of the area. The flint-bearing layers are marked uK3.....	323
Figure 10.11. Tevel flint distribution data on archaeological sites	325
Table 10.1. OSL data on the Nagytevel flint mine	322
Table 10.2. Geochemical data on the Nagytevel flint by optical emission spectroscopy (OES), neutron activation analysis (NAA) and prompt gamma activation analysis (PGAA)	324
Chapter 11	
Figure 11.1. South Scandinavia with Södra Sallerup marked	327
Figure 11.2. Documented and partly excavated areas around the Ängdala farm in Södra Sallerup, showing the years of excavation and the Malmö Museum catalogue numbers.....	328
Figure 11.3. Scandinavian Senonian Flint, the type found at Södra Sallerup	329
Figure 11.4. A drawing of a section through one of the flint mine shafts together with an illustration of different types of extraction pits and shafts and two photos from excavations.....	330
Figure 11.5. Mining tool from Södra Sallerup, <i>in situ</i>	332
Figure 11.6. Aerial photo of the protected flint mining area	335
Table 11.1. Radiocarbon dates of organic material from the filling of flint mines, investigated between 1975 and 1991 in the Södra Sallerup area.....	331
Table 11.2. Knapping floors recorded at Södra Sallerup.....	333
Chapter 12	
Figure 12.1. Cissbury Hill: The flint mine is located at the southwest end of a prominent Iron Age hillfort, the ramparts of which cut across the shafts and spoil heaps of the Neolithic mining. Earthworks in the north-eastern part of the hillfort and to the east of the mined area mostly relate to Iron Age and Romano-British occupation.....	342
Figure 12.2. The location of flint mines at Harrow Hill, Blackpatch, Church Hill and Cissbury situated on the chalk hills above the modern coastal resort of Worthing and bracketed by the Rivers Arun and Adur. Chance finds of ground axes concentrate on the coastal plain	343
Figure 12.3. Cissbury Hill: Photograph of shafts and spoil heaps.....	344
Figure 12.4. Plots of shafts and galleries excavated by a) Harrison Lane Fox and c) Pull drawn to a common scale	346
Figure 12.5. The ‘cave’ shaft as depicted by Harrison (1877)	347
Figure 12.6. Drawing of Neolithic carinated bowl based on a sherd found at a depth of c. 4 m in the ‘Large Pit’ at Cissbury by Lane Fox in 1875.....	350
Figure 12.7. Neolithic flint axe, the so called Cissbury-type with asymmetrical pointed butt, excavated from Pit 15 in 1868 by Lane Fox at Cissbury	354
Chapter 13	
Figure 13.1. Geological trench across the different levels of flint and the limestone outcrop.....	358
Figure 13.2. Raw material extracted from the shafts at the flint mine of Jablines as large plaquettes	358
Figure 13.3. Aerial photographic survey of the flint mine in 1987. Each dark point corresponds to a shaft.....	358
Figure 13.4. Simple extraction pit	359
Figure 13.5. Chambered feature.....	359
Figure 13.6. Galleries with pillars. Narrow passages can be seen at the bottom; they link the galleries of neighbouring features.....	360
Figure 13.7. The roofs of the galleries sometimes collapse because of gaps in the galleries which were not completely filled	360
Figure 13.8. Antler tool marks on the wall of a gallery	361
Figure 13.9. Filling of a 4 metre deep shaft, showing alternating natural and deliberate filling.....	361
Figure 13.10. Cross section of one of the deepest shafts. It shows the black level at the top	362
Figure 13.11. Antler tool trapped in the filling of a gallery.....	362
Figure 13.12. Radiocarbon dates of the flint mine of Jablines	363
Figure 13.13. Flaked axeheads.....	363
Figure 13.14. The lower Marne valley with the different sites of the middle Neolithic linked to the flint mine of Jablines	364
Figure 13.15. Child grave with three axeheads as grave goods at Vignely ‘La Porte aux Bergers’.....	365
Figure 13.16. Distribution of the finished products from the two main flint mines of Spiennes (Belgium) and Jablines (France).....	366
Chapter 14	
Figure 14.1. Position of the estimated extent of the Ri-Ronai mine and the extent of the excavation on the route of the A88 motorway	370
Figure 14.2. Polished axes in the context of the Argentan plain.....	371

Figure 14.3. The main flint mines in the Caen/Falaise/Argentan plain. The blade mines correspond to the production of regular blades from the Early Neolithic (5100-4500 BC). The axe mines correspond to the production of polished axes from the Middle Neolithic II (4400-1800 BC)	372
Figure 14.4. Morphological differences of shafts according to their location and their altitude in the mine	373
Figure 14.5. 3D scanner survey of a manually excavated zone. Left: Shaft openings on the surface of the excavation surface. Right: At the base of the exploitation.....	374
Figure 14.6. In western Europe, splitting of antler by fire is only significant at the mine of Grimes Graves and at that of Ri. This is easily identifiable by the reddening and shedding of the bony cortex and by the frequency of small areas of carbonisation	375
Figure 14.7. Examples of short antler pickaxes, the main tool involved in shaft digging at Ri.....	376
Figure 14.8. The flint tools discovered during the excavation consist mainly of large retouched flakes, perhaps used to cut up antler. One of the rare tools reserved for digging is represented by the retouched cortical envelopes	376
Figure 14.9. An example of a hearth discovered in shaft 131, in the upper fill of the structure. This example is particularly extensive; the others generally measure half a metre in diameter	377
Figure 14.10. A large initial series of classic datings of antlers failed to reveal the expected evolution between the small pits in the south and the large shafts (puits) in the north	378
Figure 14.11. Illustration of the two techniques for the shaping of axes from spheroid nodules from the mine: to the left from a very large flake, to the right from a half-sphere (central mass).....	379
Figure 14.12. Some examples of preforms among the 84 discovered during the excavation. The polished piece comes from a field 200 metres below the mine	380
Figure 14.13. An example of a flint-working concentration from the uppermost fill layer of a shaft (structure 142)	381
Figure 14.14. The main flint-working concentration discovered in the context of the excavation, preserved in an intermediate silt layer. Bottom, attempt at sociological reading of the same waste concentration from the distribution by category of waste.....	382
Figure 14.15. Potential for polished axes produced by major type of shaft according to the tonnage of flint extracted and experimental results	383
Figure 14.16. These two fixed grindstones were discovered at Montabard. Their presence at the intersection of a sandstone bed and a small watercourse, a few kilometres to the north of the mines of Ri and Commeaux is probably linked to these exploitations	384
Figure 14.17. The digging of four experimental shafts has revealed the ease of digging in a powdery limestone, the lack of need for a lighting and propping system and the speed of execution. The experiments have thus also enabled us to conclude that a medium shaft required three days' digging for two miners.....	384
Figure 14.18. The ten tonnes of unworked nodules collected from the sterile areas have enabled experiments on the spheroids and the validation of the two principal shaping techniques; on flake and on half-sphere	385
Chapter 15	
Figure 15.1. The quarries of Plancher-les Mines are located in north-eastern France, to the south of the Vosges mountains. Distribution of the rough-outs and polished axeheads in quantities per commune.....	388
Figure 15.2. Situation of the two groups of quarries in the Marbranche valley at Plancher-les-Mines (Haute-Saône), between 500 to 800 m a.s.l.	389
Figure 15.3. Geological transect of the valley of Plancher-les-Mines and of the levels of Visean pelite-quartz.....	389
Figure 15.4. Types of <i>debitage</i> of pelite-quartz relative to the orientation of the sedimentation strata	390
Figure 15.5. General plan and chronology of the exploitation of the quarries in the Upper Marbranche valley.....	391
Figure 15.6. A working face at the quarry in the upper reaches of the Marbranche Valley, dating from the early 4th millennium BC	392
Figure 15.7. Evolution of the average length of the polished axeheads. The exploitation of the quarries of Plancher-les-Mines coincides with the longest polished axehead	394
Figure 15.8. Examples of Plancher-les-Mines products found at Bennwihr (Haut-Rhin)	395
Figure 15.9. Experimental approach to the <i>debitage</i> of blades from a pelite-quartz core, using 4th millennium BC technique ..	396
Figure 15.10. Experimental <i>debitage</i> of a blade using a heavy hammer made of antler beam.....	396
Figure 15.11. Three blades from the full <i>debitage</i> phase from the Sickert (Haut-Rhin) hoard. Detail of the curved striking surface, regularized by <i>piquetage</i>	396
Figure 15.12. Evolution of the proportions of rough-outs extracted either parallel to, or longitudinally to the strata.....	397
Figure 15.13. Distribution of <i>debitage</i> flakes, hammerstones, cores for the production of blades, and worked blades from the vicinity of the quarries of Plancher-les-Mines	398
Figure 15.14. Distribution of contemporary settlements associated with the exploitation of the Plancher-les-Mines quarries	399
Figure 15.15. Distribution of the extraction activities and shaping of the rough-outs at the quarry of Saint-Amarin (Haut-Rhin), Finsterbach	400
Figure 15.16. Decreasing cline in the number of rough-outs and polished axeheads relative to the distance from the quarries of Plancher-les-Mines.....	401
Figure 15.17. Distribution of axeheads in the process of being polished and hoards of rough-outs and polished axeheads	402
Figure 15.18. Comparative distribution of <i>debitage</i> flakes and defended settlements during the 4th millennium cal BC.....	403
Chapter 16	
Figure 16.1. Geological map.....	408
Figure 16.2. Pâlis 'Les Pennecières' aerial photography	409
Figure 16.3. Map of Pays d'Othe mining complex near Villemaur-sur-Vanne.....	409
Figure 16.4. Villemaur-sur-Vanne aerial photography of the 'Grand Bois Marot' and the 'Orlets'	410
Figure 16.5. Villemaur-sur-Vanne, the dry valley, map of the sites and cross section	410

Figure 16.6. Villemaur-sur-Vanne ‘Les Orlets’, general view of the site after stripping.....	411
Figure 16.7. Villemaur-sur-Vanne ‘Grand Bois Marot’, general map of the features.....	412
Figure 16.8. Villemaur-sur-Vanne ‘Les Orlets’, general map of the features	412
Figure 16.9. Villemaur-sur-Vanne ‘Les Orlets’, the trench beeing dug and drawing of a shaft section.....	412
Figure 16.10. Villemaur-sur-Vanne ‘Le Grand Bois Marot’, general cross section of the mine.....	413
Figure 16.11. Villemaur-sur-Vanne ‘Les Orlets’, general cross section of the mine.....	413
Figure 16.12. Three dimension drawing of a shaft in Les Orlets trench.....	414
Figure 16.13. Villemaur-sur-Vanne ‘Grand Bois Marot’, extraction structures, profile sketches	414
Figure 16.14. Villemaur-sur-Vanne ‘Orlets’, extraction structures, profile sketches	415
Figure 16.15. Grand Bois Marot, St. 35 et 53, example of fillings. St. 35 usual filling; St. 53, inverted filling form a test shaft	416
Figure 16.16. Reconstitution of the extraction <i>chaîne opératoire</i>	417
Figure 16.17. Orlets, St. 18, ceramic found at the bottom of the entonnoir	418
Figure 16.18. Radiocarbon dates from Villemaur-sur-Vanne ‘Grand Bois Marot’ (VBM) and Villemaur-sur-Vanne ‘Les Orlets’ (VVO)	419

Chapter 17

Figure 17.1. Borownia, Ostrowiec district (Poland). Iłża Foreland. Prehistoric mining field.....	424
Figure 17.2. Borownia (Poland). Kamienna River below the Borownia mine in early April 2009	424
Figure 17.3. Borownia (Poland). An artefact of striped flint. The specimen is slightly patinated	425
Figure 17.4. Borownia (Poland). Iłża Foreland. Segments of mining field A-E. In segments A and D cuttings from 2017 are marked. X shows arable fields where single artefacts from Funnel Beaker and Globular Amphora cultures were found on the surface	426
Figure 17.5. Borownia (Poland). July 2017. View from the north onto segment A of prehistoric flint mine – forest located at the beginning of the slope of the Kamienna River valley.....	426
Figure 17.6. Borownia (Poland). August 2017. View from the southeast onto segment D of the prehistoric flint mine. Cutting II was located in the forest on the right.....	427
Figure 17.7. Borownia (Poland). April 20, 2013. A group of archaeologists stands on the former dirt road separating segment B from segment C of the prehistoric flint mine site. Dr J. Budziszewski (wearing glasses) explains	429
Figure 17.8. Borownia (Poland). Beginning of July 2017. Segment A. Cross cutting – cutting I. Start of excavations	430
Figure 17.9. Borownia (Poland). August 2017. Segment A. Cross cutting. Eastern part. In section N, on the right side, a heap of limestone debris, shaft A1 on the left.....	430
Figure 17.10. Borownia (Poland). August 2017. Segment A. Cross cutting. Eastern part. On the left, N section of the upper part of Shaft A1; on the right, a fragment of a limestone debris heap	431
Figure 17.11. Borownia (Poland). August 2017. Segment D. Cutting II. Section of the upper part of Shaft D1.....	431
Figure 17.12. Borownia (Poland). July 8, 2017. Segment A. Cross cutting. Eastern part. Metre 6. The centre of a concentration of hammerstones	432
Figure 17.13. Borownia (Poland). Early axe-head roughout from Cutting II	435
Figure 17.14. Borownia (Poland). Preforms of small axe blades from flakes. Artefacts found during exploration of Cuttings I in segment A and II in segment D	436
Figure 17.15. Mierzanowice, Opatów district (Poland). Sandomierz Upland. Part of site I in late autumn 2017	437
Figure 17.16. Mierzanowice (Poland). Site I. The Early Bronze Age Cemetery. Axe-roughouts, flint hammerstone and polishing plate found in grave (a) and two features connected with graves (b-e). Mierzanowice culture	438
Figure 17.17. Mierzanowice (Poland). Visualization of the settlement (houses and granaries) with a cemetery from the Early Bronze Age against the background of the loess uplands landscape above the valley of the Gierczanka River	439
Figure 17.18. Borownia (Poland). Visualization of segment A of the flint mine on the Kamienna River in the Early Bronze Age	439
Figure 17.19. Mierzanowice (Poland). Site I. The Early Bronze Age cemetery. Axe blades from graves. Raw material: striped flint. Mierzanowice culture	441
Figure 17.20. Mierzanowice (Poland). Site I. The Early Bronze Age cemetery. Selection of flint artefacts from Grave No. 28. Mierzanowice culture.....	443
Figure 17.21. Mierzanowice (Poland). Site I. The Early Bronze Age cemetery. Selection of artefacts from the ‘Specialist flint-knapper’ grave (No. 18). Mierzanowice culture	444
Figure 17.22. Borownia (Poland). The old dirt road, cutting across the prehistoric mine before 2017	446
Figure 17.23. Borownia (Poland). March 23, 2017. The new asphalt road that destroyed a part of the mine.....	446
Figure 17.24. Borownia (Poland). March 23, 2017. Barry Gamble co-author of <i>Krzemionki Prehistoric Striped Flint Mining Region. World Heritage Nomination, Poland, January 2018</i> and Włodzimierz Szczaluba, director of the Historical and Archaeological Museum in Ostrowiec, initiator of the application for inscribing Krzemionki Flint Mine Site on the World Heritage List are viewing flint artefacts from the prehistoric features destroyed by the new road.....	447
Figure 17.25. Borownia (Poland). Prehistoric mining field (segment A) in summer 2017. Shaft depressions are visible on the surface. Among the vegetation, lily of the valley (<i>Convallaria majalis</i>), clumps of common hazel (<i>Corylus avellana</i>) and hornbeam (<i>Carpinus betulus</i>) as the only species of tree	447
Table 17.1. Radiocarbon dates for Polany II according to T. Herbich, J. Lech 1995; for Wierzbica ‘Zełe’ according to H. and J. Lech 1995; 1997 and J. Lech, D.H. Werra 2017	433
Table 17.2. Borownia 2017. Comparison of general structure of flint and stone material without sifted specimens and together with sifted specimens, according to four morphological groups	436

Chapter 18

Figure 18.1. Wierzbica, Radom district (Poland). a. October 1979. The prehistoric flint mine field ‘Zełe’, and surroundings. The boundaries of the mine field according to the state of research in 2020.	456
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Figure 18.2. Wierzbica, Radom district (Poland). The prehistoric flint mine site 'Zełe'. Cutting III/82. Geological stratification, in cross section showing different levels of the 'Zełe' flint	457
Figure 18.3. Wierzbica, Radom district (Poland). The prehistoric flint mine site 'Zełe'. Nodules of 'chocolate' flint of the 'Zełe' type (medium size), originating from excavations in Cutting I/80.....	458
Figure 18.4. Wierzbica, Radom district (Poland). The prehistoric flint mine site 'Zełe'	459
Figure 18.5. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe' in early spring of 2012. Middle and northern part of the mine field after ploughing. View from the south. Fine limestone rubble, patinated flint flakes and waste from ploughed over waste heaps and chipping floors	459
Figure 18.6. Wierzbica, Radom district (Poland). April 18-23, 1966. Surface survey in the fields of Wierzbica commune, conducted by Olga Lipińska MA from the State Archaeological Museum in Warsaw.....	460
Figure 18.7. Hanna Młynarczyk (1949-2008).....	461
Figure 18.8. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Map of distribution of cuttings and shafts 1980-2014. Measurements and drawing by J. Fellmann; completed by H. Lech and D.H. Werra	462
Figure 18.9. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Cutting II/81. H. Młynarczyk with filling of shaft 10 behind her. In the foreground a fragment of filling of shaft 11	463
Figure 18.10. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Cutting III/82. In the foreground is the geological profile of the site. On the right, a fragment of filling of shaft 16. On the left, outline of shaft 24 and others.....	463
Figure 18.11. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. In the foreground, shaft 28 in cutting III/83. Further back, a series of cuttings made in order to determine the border of the mine field to the east.....	464
Figure 18.12. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. View from SW onto eastern part of cutting from 2014 in advanced stage of excavations. Dr Dagmara H. Werra is standing.....	465
Figure 18.13. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Cutting II/82. Uncovered part of shaft 19 profile. In the wall on the right, fragment of older shaft no. 20	466
Figure 18.14. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Cutting III/82. Shaft 17. Cross-section: west face	466
Figure 18.15. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Cutting I/80. Profile of shaft 1. On the left, fragment of filling of shaft 2, on the right of shaft 5, younger than shaft 1. In the lower part, s hafts 1 and 2, as well as 1 and 5 are separated by weathered limestone rock <i>in situ</i>	467
Figure 18.16. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Cutting II/81. Profile of shaft 7. In the cutting is the head of the excavations	467
Figure 18.17. Wierzbica, Radom district (Poland). The prehistoric flint mine site 'Zełe'. August 1983. View of Shaft 28 with cross-section of its filling - west face	468
Figure 18.18. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Antler pick with broken point	468
Figure 18.19. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Cross-section of shaft 17 showing from where charcoal was taken for dating	471
Figure 18.20. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Bottom of shaft 28. North wall	472
Figure 18.21. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Cross-section of shaft 19 showing places from which dated sample of charcoal was taken	473
Figure 18.22. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Early roughout of axe (b), its fragments (a,c) and splinters (d,e)	474
Figure 18.23. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Core for flakes	475
Figure 18.24. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Cores for blades (a), blades and flakes (b), and splinters (c, d)	476
Figure 18.25. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Tools.....	477
Figure 18.26. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. Paracores and splinter	478
Figure 18.27. Wierzbica, Radom district (Poland). The prehistoric flint mine 'Zełe'. November 27, 2018	480
Table 18.1. Flint mine Wierzbica 'Zełe'. Radiocarbon dating	469

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Introduction

About the beginnings of prehistoric archaeology, studies of stone artifacts and ancient flint mines

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One of the many fields of prehistoric research is the archaeology of flint mining, which studies what remains after the exploitation of flint and similar raw materials such as chert, hornstone, radiolarite and obsidian by man in the distant past. During the Stone Age and at the beginning of the Bronze Age, stone artifacts occupied an important place in the culture of human communities. Systematic exploitation of siliceous rocks occurred from the Middle Paleolithic to the Late Bronze Age, i.e. at least from tens of thousands of years ago to about 1000 years BCE. The scale and organizational complexity of this exploitation grew enormously among farming communities during the Neolithic and Bronze Age. Our book is devoted to the siliceous rock mines from these later periods.

About prehistoric flint mine sites in Europe to c. 1872

The archaeology of prehistoric flint mining has been part of the scholarly exploration of the distant past since the breakthrough caused by the publication of the theory of evolution in the second half of the 19th century. Until then, the biblical myth was the basis of views and teachings about the most ancient history of mankind. In Europe, a popular lecture presenting an abbreviated history of the world and mankind began with the account set down in the Book of Genesis. It was delivered by bishop J.B. Bossuet (1627-1704), a member of the French Academy and famous orator, known as the Eagle of Meaux (Harris 1968, 25–26; Lech and Werra 2018, 577–578).

For a long time now Europe's best-preserved prehistoric mining fields have attracted attention. The visible remains of ancient flint mines have for centuries been considered local curiosities. At the end of the 17th century, at the dawn of the Age of Enlightenment, the concentration of numerous depressions and the low embankments surrounding them, in a strange place called Grime's Graves, near the town of Brandon in eastern England, was referred to by the local people as 'Devil's Hollows' and among learned men thought to be remnants of old fortifications (Figure 1 ; see also p. 133,

Figure 4.3). In the first half of the 18th century, they were considered a 'Danish encampment' (Clarke 1963, 3–4; Dyer 1973, 221; Barber *et al.* 1999, 4; Topping 2011, 30–32; cf. Daniel 1964, 9–43; Mercer 1981, 1; Pomian 1990; Trigger 2007, 84–110).

When the Stone Age, distinguished by the Danish antiquarian Christian J. Thomsen (1788-1865) as the first stage in the Three-Age System, first began to be studied in a more scientific manner, attention turned to stone artifacts, products of human beings from the early period of their history. In many European countries, the distinguishing of the Stone Age accelerated the growth of collections of various finds from flint and other rocks, which in part were later designated as archaeological relics and were permanently included in the first museums. Such artifacts had been collected earlier, but now a theory had emerged indicating their importance in the history of mankind. The development of antiquarianism was fostered by the occurrence of similar finds almost all over the continent.

Among antiquaries in Western Europe, flint *livres-de-beurre* – 'slabs of butter' became popular collectors' items. In fact, these were honey-colored Chalcolithic cores with a wax-like surface, and long blades knapped from the cores, impressive exhibits in private collections and at the first exhibitions. This distinctive raw material came from a small area in the Grand-Pressigny region of the Indre-et-Loire department in France, south of Tours. From descriptions, comparisons and systematization of collections prehistory was born. All this needed a theory. The Three-Age System was not enough (Daniel 1964, 32–33 and 47–48; 1967, 110–113; Harris 1968, 110–111; Rodden 1981; Sklenář 1983, 27–60; Gräslund 1981; 1987, 17–30; Schnapp 1996, 286–291 and 299–303; Trigger 2007, 121–131, 140–141 and 144).

The finds gathered in collections were from many different places. In Belgium, the village of Spiennes, situated near the large industrial centre of Mons, in the province of Hainaut, near the French border, attracted attention. Flint pieces resembling axe-heads



Figure 1. Grimes Graves (England). End of July 1975. Aerial view from the Greenwell's Pit onto the south-west part of the mining field. Visible well-preserved shaft depressions surrounded by heaps of chalk debris. Shaft depressions and spoil-heaps covered by lush grass and bushes. Photo and ©: J. Lech

were collected in the fields known as *Camp-à-Cayaux* outside the village, but the ancient flint mine located underground remained undiscovered. Similarly, the first surface studies carried out in 1852 and 1866 in the Grime's Graves area did not reveal the true nature of this place (De Koninck 1860; Mercer 1981, 1–2; Hubert 1997, 3; Collet *et al.* 2008, 41–44, 2016, 5–6; cf. Trigger 2007, 121–129).

Determining that processes of evolution occurred in nature provided the study of mankind's past with a new, attractive scientific theory and better methods. Observations gathered by anthropology – a new science arising out of evolution – began to be used more widely. The emerging evolutionist archaeology was outlined by the young author John Lubbock (1843-1913) in the superbly written book *Pre-historic Times, as Illustrated by Ancient Remains, and the Manners and Customs of Modern Savages* (1865). A few years after the publication of Darwin's theory (1859), Lubbock's masterpiece of clear scientific exposition presented new ideas and announced to the world the birth of new science, soon to be called prehistory or prehistoric archaeology. According to J. Lubbock (1865, 2): 'Archaeology forms, in fact, the link between geology and history'. This short sentence contains the essence of the world-outlook revolution taking place in Europe, rejects the biblical vision of man's past and derives it from Nature, apart from the Bible and, for its opponents, also apart from God and Christianity. *Pre-historic Times* divided Thomsen's Stone Age into older and younger periods, named by Lubbock the Palaeolithic and Neolithic. Each of them is classified as one of the four great epochs along with the Bronze Age and the Iron Age. The Reader will also find them in the pages of this book.

In the early development of prehistory as a separate discipline of knowledge, *livres-de-beurre* and the long blades from Grand-Pressigny continued to attract considerable attention. Flint workshops from this region and their products were noted in various publications, including the journal published by Gabriel de Mortillet (1821-1898): *Matériaux pour l'Histoire positive et philosophique de l'Homme*, beginning with the first issue of September and October 1864. In January 1865, Grand-Pressigny was visited by John Evans (1823-1908), in the company of Henry Christy (1810-1865), Louis Lartet (1840-1899) and others. On the trip Evans collected a considerable amount of material. On Saturday, November 16 of the same year, he presented a paper to the Society of Antiquaries of London on the worked flints from the region, illustrating it with the artifacts he had brought. The paper was published in the Society's journal 'Archaeologia' with drawings of some of the pieces. It began by noting that there was great interest among French archaeologists in the discoveries of worked flints from the Grand-Pressigny area (Chasteignier 1864; Chevalier 1864; Leveille 1864; Evans 1867, 381; *Congrès* 1868, 46 *et passim*; cf. Mortillet 1883; Mallet 1992, 5–7 and 106).

The first discovery of a flint mine was made by chance in Spiennes, in the time of the success of capitalism, liberalism, positivist philosophy and the theory of evolution, eight years after the publication of Charles Darwin's work (1859). During the construction of the railroad from Mons to Chimay in 1867, a cutting was made through the *Petit-Spiennes* plateau. In its walls could be seen deep shafts and galleries (cf. Chapter 3). The press wrote extensively about the spectacular discovery. The local *Société des Sciences, des Arts et des Lettres du*

Hainaut set up a commission to conduct geological and archaeological studies. The most active members were Alphonse Briart (1825-1898) – a palaeontologist and geologist, and his friend François L. Cornet (1834-1887), a geologist and coal mining engineer, interested in archaeology. Auguste Houzeau de Lehaie (1832-1922), secretary of the society, also participated. The following year, the Commission published a report with Cornet's carefully drawn cross section across the Petit-Spiennes plateau (see p. 108, Figure 3.8). The discovered flint mine was from the Younger Stone Age. It supplied the raw material for the production of blades and polished stone axe-heads. The latter were evidence that the mine belonged to the younger part of the Stone Age, which just then began to be called the Neolithic or the Age of Polished Stone. The cross section recorded in the drawing showed a large variety of types and significant density of exploitation features in the area of the mining field and that many of the shafts were surprisingly deep. It was found that the exploitation method depended on the depth at which the flint deposit lay in the Spiennes chalk. On the slope of the plateau, which dips towards the Trouille River flowing in the valley, and on its edge, shallow mining pits and open shafts were also found; deeper into the plateau, the depth of the narrow shafts increased (Briart *et al.* 1868a; 1868b). The discovery and its publication initiated professional research on prehistoric flint mining (Clark and Piggott 1933; Lech 1991, 557; Collet *et al.* 2008, 44–45).

At the end of August 1867, the recently established *Congrès International d'Anthropologie et d'Archéologie Préhistoriques* was holding its second session in Paris. Houzeau de Lehaie, as secretary of the society that was sponsoring the Spiennes excavations, sent a letter to the participants of the Paris meeting. The letter was read out on Tuesday, August 27, when Édouard Lartet (1801-1871), researcher of the Dordogne caves, author of the famous paper *Sur l'ancienneté géologique de l'espèce humaine dans l'Europe occidentale*, addressed in 1850 to the French *Académie des sciences*, was chairing the meeting. Driven by justifiable pride in the discovery made by Belgian prehistoric archaeology, in his letter Houzeau de Lehaie invited members of the *Congrès* to a meeting in Belgium (*Congrès...* 1868, 258).

The discovery at Spiennes called attention to the possibility of similar discoveries being made in England. In September 1867, Colonel Augustus Lane-Fox (1827-1900), later known as Pitt Rivers, the name he adopted upon inheriting his cousin's estate, soldier, archaeologist and anthropologist, an advocate of the theory of evolution, and the antiquarian and collector William Greenwell (1820-1918), Canon of Durham Cathedral, undertook excavations of the upper parts of the mysterious pits at the prehistoric univallate hillfort of Cissbury north of Worthing, West Sussex. The origins or age of these depressions were unknown. Colonel

Lane Fox then continued the research on his own. On Thursday, March 5, 1868, he presented the results of his work to the Society of Antiquaries of London, rightly concluding that the pits were dug '... for the purpose of obtaining flints' (see p. 342-345, Figures 12.1 and 12.3.; Lane-Fox 1869, 53 and 73; Dyer 1973, 281–282; Lech 1991, 557; Trigger 2007, 291–294).

Canon Greenwell, after parting with Lane-Fox, moved to Grime's Graves, where between 1868 and 1870 he excavated a large hollow at the eastern edge of the site. Digging through part of the fill of the feature, at its bottom he found galleries and determined that this was a mining shaft serving, just like the Spiennes shafts, for the exploitation of high-quality flint. The excavated shaft had been sunk in sand and clay, and then in chalk to a depth of 39–40 ft., or 12 m (Longworth and Varndell 1996, 9–34). Greenwell's Pit was the first exploitation unit in Europe to be extensively researched. W. Greenwell (1870) correctly determined the age of the shaft and underground workings as Neolithic. The report published by him in 1870 has retained value to this day.

The invitation from Houzeau de Lehaie and the *Mons Société* was accepted and taken advantage of in 1872 when the sixth session of the International Congress of Anthropology and Prehistoric Archaeology took place in Brussels. The organizers of the session prepared a day trip to Spiennes. It was described in a report included in the proceedings of the Brussels session. On Monday, August 26, the participants set off at 10 a.m. on a special train from Brussels to Spiennes. An hour later, the train brought them to what was to be the highlight of that day's program, the railroad cutting along the southwestern edge of the *Camp-à-Cayaux* plateau. *Camp-à-Cayaux* was introduced to the members of the Congress as the place where a huge flint workshop was located during the Age of Polished Stone. The visitors climbed the plateau and began collecting some of the more interesting artifacts (Figure 2). After this exploration, the excursion continued through the Trouille River Valley to the source of the Vallière creek. Here, the participants stopped for a meal prepared by local residents, and A. Houzeau de Lahaie, on his part, prepared a two-wheeled cart full of flint advanced axe-head roughouts with which the guests could supplement their collections. Then, led by F.-L. Cornet and A. Briart, everyone made their way to the famous *Petit-Spiennes* railroad cutting. At the foot of the hill, prepared for sightseeing, were two underground galleries carved in the white chalk by 'man of the age of polished stone'. That very morning, a 5 m long section had also been cleared on the slope of another hill to demonstrate the full cross-section of the Quaternary layers. Climbing the slope, F.-L. Cornet used this cross-section to talk about the two Stone Ages of the Spiennes region, emphasizing that during the later one, the Age of Polished Stone, the former inhabitants of Hainaut



Figure 2. Spiennes (Belgium). *Camp-à-Cayaux*. Occurrence of workshop artifacts on the surface of the site. View from the central part of the mining field to the south-east (A) and a close-up of a core (specimen on the left) found on the surface (B). June 26, 2005. Scale 20 cm. Photo: J. Lech

cut vertical shafts through the Quaternary and Tertiary layers in order to dig exploitation galleries in the chalk rock in search of flint. After visiting the cleared galleries, the tour proceeded to a cutting in nearby Mesvin. The return to Brussels took place at 5 p.m. The description of this excursion was included in the proceedings of the Session in Brussels. Apart from the official publication, the trip was also described by one of the participants, the first Polish prehistorian Count Jan Zawisza (*Congrès... 1873*, 71–72; Zawisza 1873).

The Brussels Session of the International Congress of Anthropology and Prehistoric Archaeology contributed greatly to the international fame of the discoveries in Spiennes and the continued interest in the local flint mining in the following decades. During the era of positivism, the Congress enjoyed high prestige among scientists around the world. Membership in this organization was tantamount to being entered on the attendance list in the disciplines of science represented by the Congress, regardless of whether one participated in the deliberations of subsequent sessions. The proceedings of the Congress sessions were one of the most important sources of information in the field of prehistoric archaeology.

The articles in this book and the cited archaeological literature will provide more history of research into prehistoric flint mining in various regions of Europe. We feel they are well worth becoming acquainted with.

The prehistoric flint mine sites: features and structures

Siliceous rocks used in prehistoric times for the production of tool blades and weapons are found only in certain regions of Europe. The most attractive in terms of quality, appearance and availability are rare. Only some of the deposits were known in prehistory. The methods of exploiting the raw material were determined by geological conditions, work safety, the demand for flint or other siliceous rocks – chert, obsidian, radiolarite. The known and highly rated deposits were usually dug for a long time, sometimes for several centuries (Lech 1981, 46–51). Traditions were established relating to the organization and methods of work, tools and techniques used. There also existed a symbolic culture, beliefs and magic but these are difficult to observe in archaeological excavations. Such factors determined that similar shafts and galleries were dug in the mining fields for the exploitation of the raw material and after



Figure 3. Krzemionki Opatowskie flint mine site (Poland). July 2016. Flint workshop exposed on the surface of a mining field by heavy rain. Scale 20 cm. Photo and ©: J. Lech

its obtainment and processing there remained until the present day spoil heaps of waste rock and concentrations of flakes and other waste from the processing of flint or chert (Figure 3). The latter formed workshops (*ateliers*) of various sizes, sometimes extensive chipping floors, and, together with the previously mentioned features, flint mine clusters (Lech 2022, 578-587).

The flint mine cluster is a group of interrelated features and structures commonly distinguished during excavations, characteristic for flint mine sites, the remains of prehistoric mining fields (Figure 4). This archaeological category comes in useful when describing and analyzing excavated mining sites. The flint mine cluster usually comprises an exploitation pit or shaft, with galleries and chambers (Figure 5) or without, a spoil-heap connected with the shaft (together called an exploitation unit), a chipping floor(s), also called a workshop(s), and the remains of a miners' camp (cf. Fiedorczuk 2006). It corresponds to the household cluster of archaeological sites that are remnants of permanent settlements (Flannery 1976a; 1976b; Flannery and Winter 1976; Bogucki and Grygiel 1981; Lech 2013; 2022).

The most popular raw materials were widely distributed. Learning about the scope, mechanisms, economic importance, social and symbolic contexts of this distribution is an important objective of the archaeology of prehistoric mining (Lech 1987; 1990; Schild 1987; 1997; de Grooth 1990; 1993; 1997; Bostyn 1997; 2015; Burnez-Lanotte ed. 2003; Allard 2005; Schild *et al.* 2011; Giligny and Bostyn eds 2016). The

exploitation of flint in those distant times was the first economic activity of human communities to cause permanent destruction of fragments of our planet's surface. For several thousand years, it was not possible to use these pieces of land for agricultural cultivation or permanent settlement (Figure 6).

In the times of the first farmers, in most cases, the mining fields were usually some distance away from the settlements and areas of permanent economic exploitation of the natural environment. For most of the communities involved in obtaining attractive raw materials, it was necessary to organize expeditions to the deposits. It can be assumed that such enterprises lasted on average from a few days to several weeks, rarely less or more. After arriving at the mining field, a camp was set up and the activities necessary to obtain the raw material – most often nodules of flint, chert or, more rarely, obsidian would begin. For this purpose, primitive shafts were dug through the rock. Spoil heaps formed. The tools necessary for the work were partly brought to the site and partly made on the spot.

The extracted raw material was heavy. In order to limit the transport of potential waste, the obtained flint or chert nodules were processed on site. The scale of the work depended on the specific situation and was influenced by the natural conditions of the deposit and the long-standing tradition of many years of accumulated experience of these ancient human communities. The work cycle of supplying miners' communities with raw material was completed with the

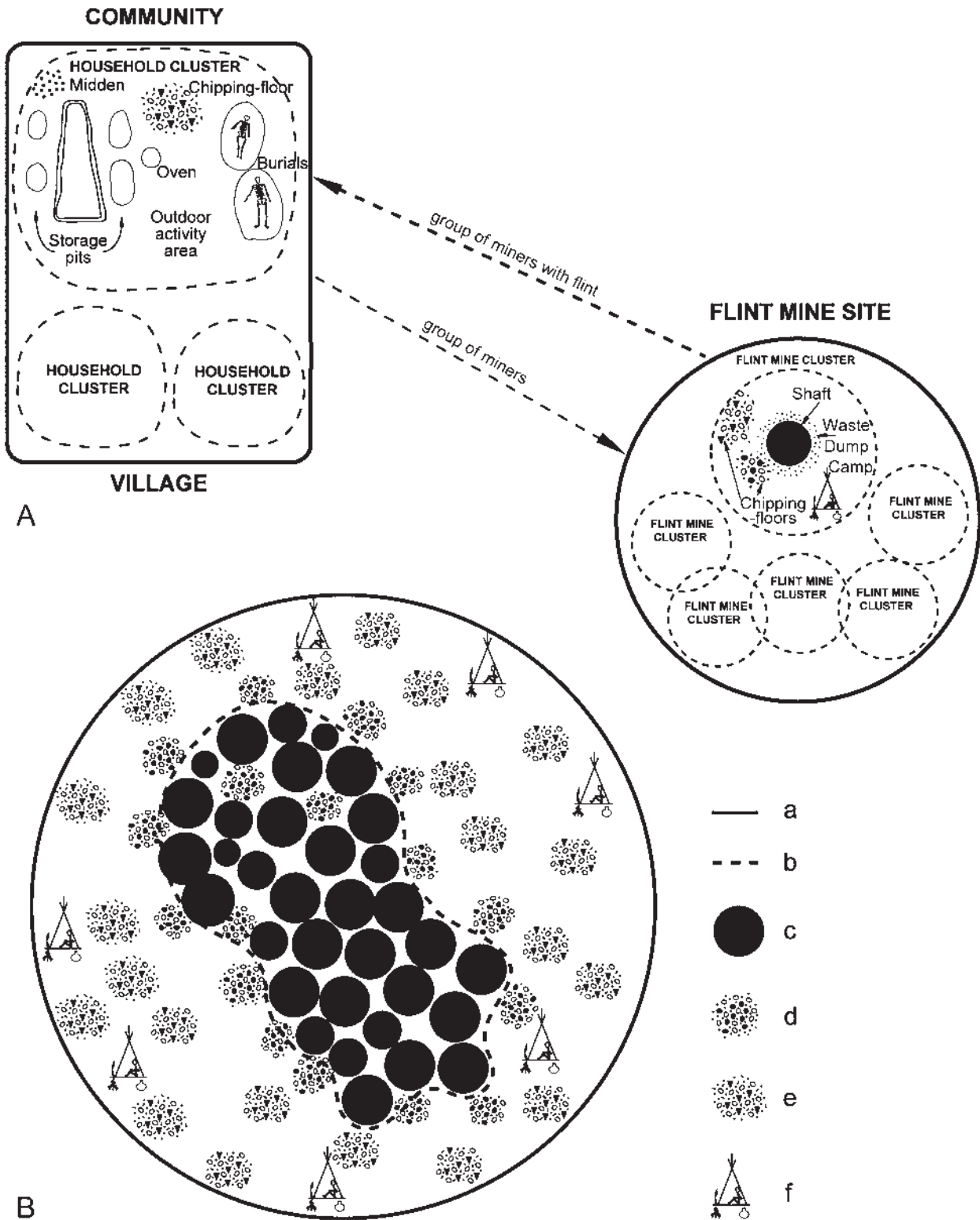


Figure 4. Models. A – Flint mine site as a unit of a simple settlement pattern. Model showing a standard relationship between Neolithic village with household clusters and a flint mine site with flint mine clusters.

B – flint mine site: a model. After J. Lech 2013 and 2022: a – border of flint mine site; b – border of mining field; c – extraction pits or shafts; d – chipping floor of initial flint work; e – chipping floor of advanced flint work; f – camp (Drawn by E. Gumińska in 2010 after J. Lech's draft)

transport of the final products of flint mine chipping floors such as pre-cores, blade blanks or axe roughouts

back to the settlement (Saville 1981; Geslin *et al.* 1982; Lech 1983; Schild 1987; 1997; de Grooth 1990; 1993; 1997;



Figure 5. Krzemionki Opatowskie flint mine site (Poland). August 1979. Pit 4/606. Part of the underground chamber near the shaft bottom with pillar and limestone rubble from the underground spoil heaps. Photo and ©: J. Lech

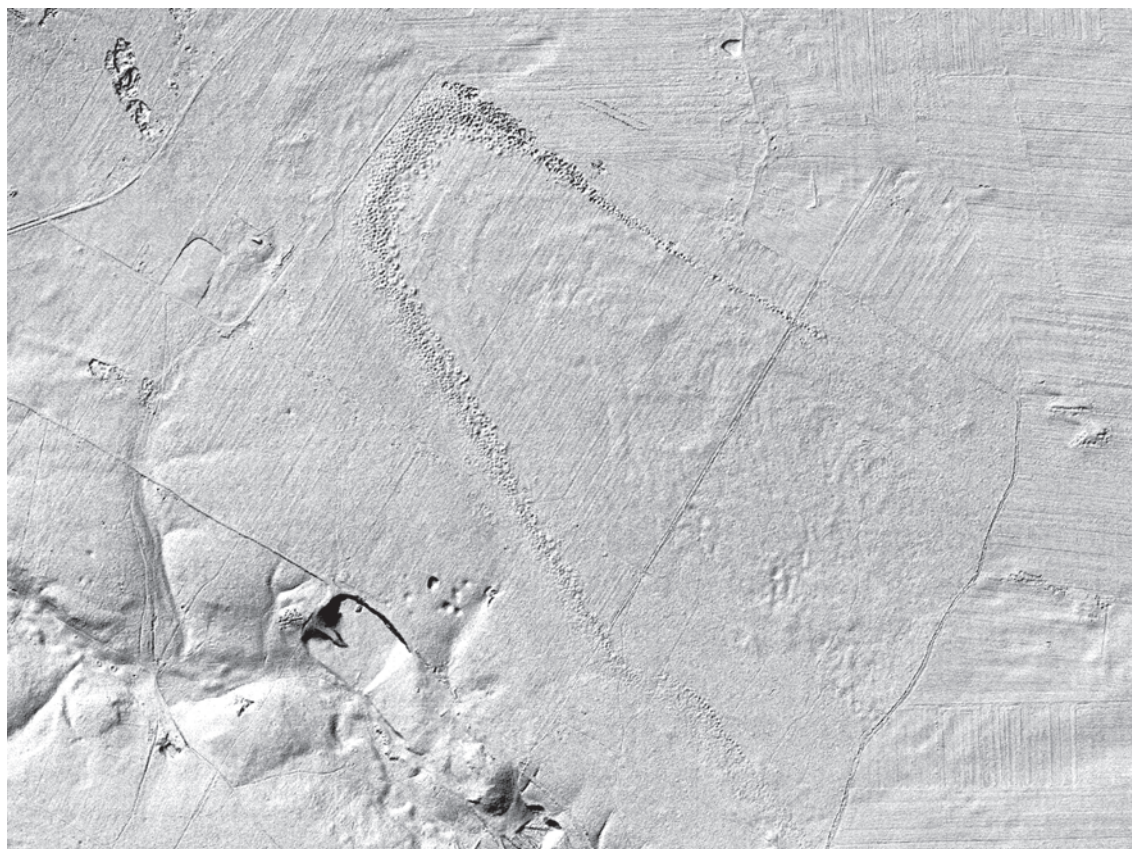


Figure 6. Krzemionki Opatowskie flint mine site (Poland). ALS picture, showing parabolic-shaped mining field of shafts and pits.
After *Krzemionki* 2018, Fig. 2



Figure 7. Harrow Hill (England). 1982. 'Prehistoric Flint Mines Working Group' on the mining field during lunch time. J. Lech (on the left) visiting the site, in conversation with Sjeuf Felder (in the centre). Photo: G. de G. Sieveking

Bostyn 1997; 2015; Lech and Longworth 2006; Giligny *et al.* 2011; Verjux *et al.* 2012; Giligny and Bostyn eds 2016. Cf. Fig. 4).

International recognition of mining sites

Prehistoric flint mines in Europe belong to a characteristic category of archaeological sites. They are also known and studied on other continents. It should be noted with satisfaction that the Flint Mine in Spiennes (Collet *et al.* 2016; Collin 2016), entered on the UNESCO World Heritage List in 2000, was joined in 2019 by the 'Krzemionki Prehistoric Striped Flint Mining Region' located on both sides of the Kamienna River in Poland (Krzemionki... 2018; Piotrowska 2018). This new entry covers three flint mines: Krzemionki Opatowskie (cf. Figures 3, 5 and 6), Borownia (cf. Chapter 17) and Korycizna, all with a well-preserved landscape of prehistoric mining fields, and an archaeological site located on the loess plateau in Ćmielów, hiding the remains of a Neolithic settlement inhabited by a community exploiting striped flints and participating in its exchange.

The UISPP Commission 'Flint Mining in Pre- and Protohistoric Times'

The commission was formed by researchers of prehistoric flint mining and partly by participants of

flint symposiums organized in 1969-1999 by the well-deserved 'Prehistoric Flint Mines Working Group' of the Dutch Geological Society, Limburg Section (Felder *et al.* eds 1998).

In 1964-1972, the 'Working Group' carried out a successful underground exploration of galleries of the prehistoric flint mines of Rijckholt-St. Geertruid (cf. Chapter 2), and in the following years, excavated Neolithic pits at Grimes Graves and Harrow Hill (Figure 7; cf. Longworth and Varndell 1996; McNabb *et al.* 1996; Felder *et al.* eds 1998). In the years 1969-1999, it organized eight International Flint Symposiums, the first three in Maastricht, and the next in Brighton, Bordeaux, Madrid, Warsaw – Ostrowiec Świętokrzyski, and the last one in Bochum. They played an important role in the development of research on prehistoric flint mining in Europe. After the symposium in Bochum in 1999 and the cessation of the Group's activities at the beginning of this century, its members supported the establishment of the UISPP Commission dedicated to prehistoric flint mining.

The proposal for the creation of a Commission devoted to 'Flint Mining in Pre- and Protohistoric Times' within the framework of UISPP came from discussions among a group of scholars interested in the topic, former participants of 'Flint Symposia' such as Françoise



Figure 8. Paris. September 2007. The first meeting of the first presidium UISPP Commission 'Flint Mining in Prehistoric and Protohistoric Times'. From left to right: Dr Françoise Bostyn the first president, Prof. J. Lech – her deputy, Alan Saville – a member, Dr Pierre Allard – a member, Dr Anne Hauzeur – a secretary. Photo and ©: G. Trnka

Bostyn, Marjorie de Grooth, Jacek Lech, the late Alan Saville, the late Romuald Schild, Andreas Zimmermann and others. The final initiative was undertaken by Professor Jacek Lech and Dr Anne Hauzeur (2009, 219). Between the end of June and the beginning of August 2006 the application to the XVth UISPP Congress in Lisbon (4–9 of September 2006) was supported by 42 scholars from eleven European countries, Israel and USA, among others: Pierre Allard (F), Jerzy T. Bąbel (PL), Paolo Biagi (I), Katalin T. Biró (H), Hélène Collet (B), the late Peter J. (Sjeuf) Felder (NL), David Field (GB), Attilio Galiberti (I), François Giligny (F), Avi Gopher (IS), François Hubert (B), Michał Kobusiewicz (PL), Jolanta Małecką-Kukawka (PL), Deborah Olausson (S), Jacques Pelegrin (F), Antonín Přichystal (CZ), Michael M. Rind (D), Xavier Terradas (SP), Peter Topping (GB), Gerhard Trnka (A), Gillian Varndell (GB), Pierre M. Vermeersch (B), Barbara Voytek (USA), Jürgen Weiner (D), and the late Gerd Weisgerber (D).

The Commission was given official approval during the meeting of the UISPP Permanent Committee in Lisbon at the beginning of September 2006, during the XVth UISPP Congress, where organizers were represented by Dr Anne Hauzeur.

The group of members of the new Commission had their first meeting in the Archaeological Museum in

Kraków in late September 2006, where it was decided to hold the first conference of the Commission in Paris in the summer of 2007 (Hauzeur 2009, 219–220).

The first meeting of the members of this new UISPP commission was held in Paris on 3–4 September 2007 at the Institut d'art et d'archéologie, Université de Paris 1 – Panthéon-Sorbonne. It was organized by Dr Pierre Allard, Dr Françoise Bostyn (Figure 8) and Dr François Giligny, and addressed the topic: *Archaeology of the pre- and protohistoric flint mining: a contemporary perspective*. An important aspect of the 1st Conference was the presentation of archaeological material from flint mining research in France.

The 2nd Conference, under the title *Flint Mining and Quarrying Techniques in Pre- and Protohistoric Times*, was held from 14–17 October 2009 in Madrid, in the main meeting hall of the newly created Centre for Human and Social Sciences of the Spanish National Research Council (CCHS of the CSIC), and organized by Marta Capote, Dr Susana Consuegra, Dr Pedro Díaz-del-Río and Dr Xavier Terradas (Capote *et al.* eds 2011, 9–13; Consuegra and Díaz-del-Río 2011). The catalyst for the 2nd Conference of our Commission in Madrid was the discovery of the Early Neolithic flint mine of Casa Montero in 2003 and an overview of the five-year research

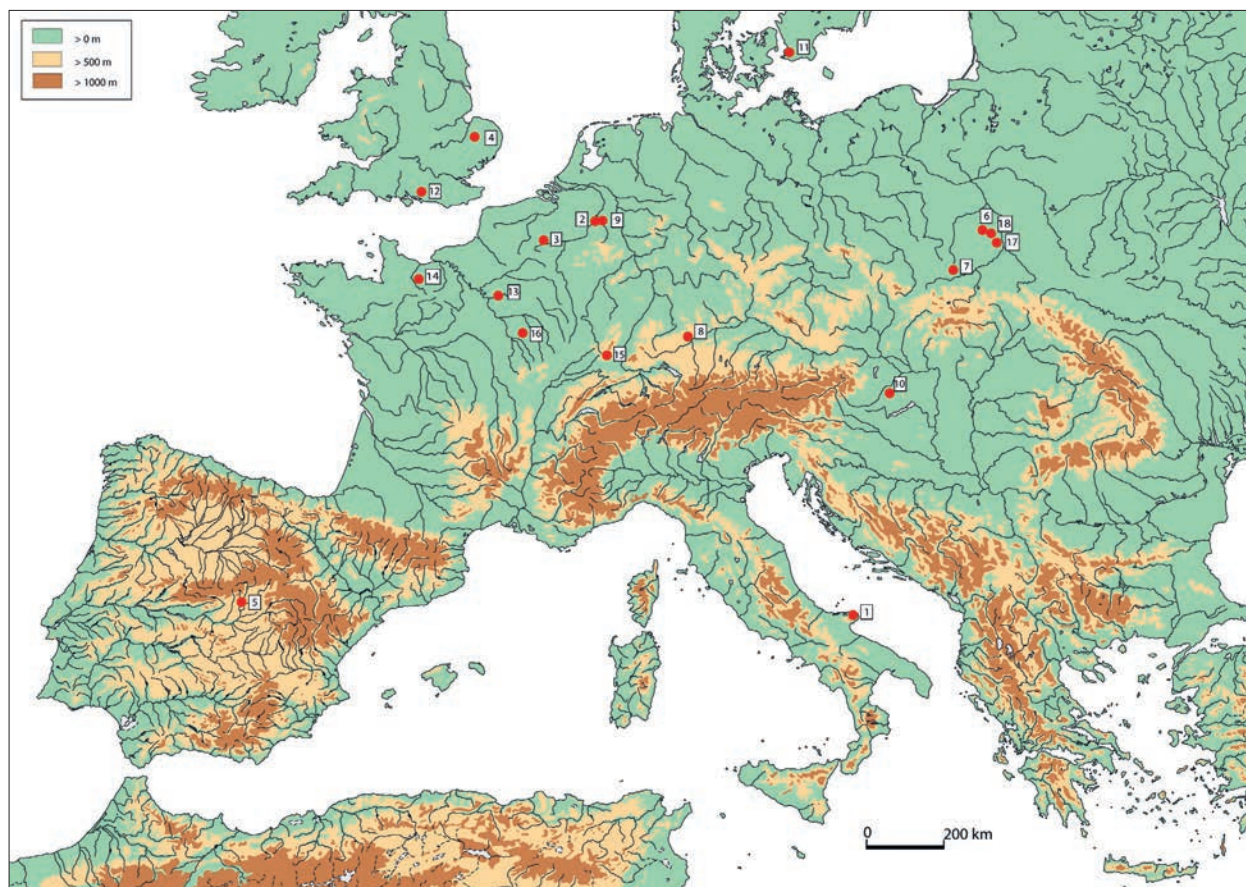


Figure 9. Map of the mines presented in the book (the numbers correspond to the order of presentation):
 1- La Defensola (Italy); 2- Rijckholt-Sint Geertruid (The Netherlands); 3- Spiennes (Belgium), 4- Grime's Graves (Norfolk, England); 5- Casa Montero (Madrid, Spain); 6- Tomaszów (Poland); 7- Saspów (Poland); 8- Asch-Borgerhau (Germany); 9- Lousberg (Aachen, Germany); 10- Nagytevel (Hungary); 11- Södra-Sallerup (Sweden); 12- Cissbury (Sussex, England); 13- Jablines, 'le Haut-Château' (France); 14- Ri-Ronai (France); 15- Plancher-les-Mines (France); 16- Villedmaur-sur-Vanne (France); 17- Borownia (Poland); 18- Wierzbica 'Zełe' (Poland). © F. Bostyn

project on the site (cf. Chapter 5). The conference was an opportunity to hear about the results of the excavations. Archaeological material and the site itself were also presented during three workshops prepared by the conference organizers. A field visit to the mine provided the opportunity to gather some samples of raw material.

The theme of the 3rd Conference was *Archaeological Features and Structures at Flint Mining Sites: Differentiation and Studies*. Organized by Professor Gerhard Trnka and Dr. Michael Brandl in Vienna, at the Faculty of Historical and Cultural Studies of the University, the conference took place from 21–27 September 2010. It included two visits, the first to the radiolarite mine at Vienna-Mauer, and the second to the Krumlovský les (the Krumlov Forest) mining complex in southern Moravia (the Czechia).

The 4th Conference, entitled: *Lithic raw material extraction in pre- and protohistoric times worldwide*, was held on the 5th of September 2011, during the UISPP

Congress at Florianópolis (Brazil), at the Universidade Federal de Santa Catarina. Again, we had a successful and interesting session organized by Dr. Françoise Bostyn (France), Dr. Véronique Darras (France) and Prof. Jacek Lech (Poland). Seven papers were presented, four of which were about the extraction of siliceous rocks in both Americas.

The 5th conference of the UISPP Commission was held on 10–11 September 2012, again in Paris at the Institut d'art et d'archéologie, Université de Paris 1 – Panthéon-Sorbonne, and was organized by Françoise Bostyn and François Giligny. There were two sessions, the first on lithic raw material reference collections and the second on chipping-floors, workshops and related aspects (Bostyn and Giligny eds 2014).

The 6th conference of the Commission took place during the XVIIth UISPP congress at the University of Burgos (Spain) between 1–7 September 2014. The session 'Siliceous rock extraction and prehistoric lithic economies' was organized by Jacek Lech, Alan

Saville (Great Britain), Xavier Terradas (Spain) and Andreas Zimmermann (Germany).

The 7th conference was organized in September 2016 by Hélène Collet and Anne Hauzeur (Belgium) at Mons and Spiennes, one of the most impressive Neolithic flint mines in Europe and listed as a UNESCO World Heritage Site. Three themes were selected: 'Mining and quarrying, geological characterisation and knapping processes and distribution networks during Pre- and Protohistoric Times' (Collet and Hauzeur eds 2019). This meeting gave the opportunity to all members to go down the deepest mine-shafts (15 m in depth) and also to see the visitor centre 'SILEX', located on the *Petit-Spiennes* part of the mine and inaugurated in April 2015 (see p. 126, Figure 3.31).

Once again, the XVIIIth UISPP Congress in Paris on 4–9 June 2018, provided the opportunity for members of the commission to meet and discuss two different topics: 'Siliceous rocks: procurement and distribution systems' and 'Flint mines and chipping floors from prehistory to the beginning of the nineteenth century'. The two sessions were organized by Dr Françoise Bostyn (France), Dr François Giligny (France) and Peter Topping (Great Britain; Bostyn *et al.* eds 2021).

In September 2019, between two international congresses, a conference was organized by Dr Dagmara H. Werra, Dr Magdalena Sudoł-Procyk, and Dr hab. Maciej Krajcarz at Krzemionki, Poland, motivated by the inscription of this important Neolithic flint mine (cf. Figures 3, 5 and 6), on the UNESCO World Heritage list in July 2019, almost a hundred years after its discovery (1922). The speakers presented various papers around the theme of this conference, which was 'The flint mining studies: archaeological excavations – extraction methods – chipping floors – distribution of raw materials and workshop products' (Werra *et al.* 2022, 1-2; cf. Werra *et al.* eds 2019; 2022). The conference was held at the 'Krzemionki' Museum and Reserve, and guided tours of the mine were given to all members, both on the surface and underground. Other excursions were organized to the Borownia flint mine and to the settlement of Ćmielów, both of which are included in the limits of the protected area, and the last day of the conference was dedicated to visiting flint mines in the Polish Jura region.

The XIXth UISPP World Congress should have been held in Meknès (Morocco) in September 2020, but the Covid pandemic forced the organizers to postpone the congress for one year. The congress was thus held in September 2021. Unfortunately, due to the ongoing health crisis, all the sessions had to take place by video conference. Françoise Bostyn, Michael Brandl, and François Giligny organized one half-day session 'New

methods for exploring flint mines – From producers to consumers, from Prehistory to History'.

About this work

It should be mentioned that the idea for this work arose in 2010 in Vienna, at a meeting of the Commission. Jacek Lech and Alan Saville then proposed preparing a richly illustrated book which would provide readers, in an attractive form, with a view of the flint mining phenomenon in the European Neolithic and the Bronze Age. Our intention was to present a wider selection of flint mines from Europe. Unfortunately, we did not receive all the expected articles. However, we hope that this will be compensated by the one or two more in-depth studies of lesser-known mines, extensively researched in the last half-century.

The reader will find the results of excavations of prehistoric flint mine sites from various regions of Europe presented in further chapters of this book (Figure 9). We rely mainly on archaeological researches from the last half-century, but for the best-known mines such as Spiennes, Grimes Graves, Cissbury or Rijkholt-St. Geertruid it is also important to know about the work of our predecessors. We hope that the book we are placing in the hands of our Readers will serve to broaden their knowledge of prehistoric flint mining not just in Europe.

We would like to express our deepest gratitude to our colleagues Paul Barford, David Field, Michael Ilett and Peter Topping who spent a lot of their time proof-reading the articles to improve the English.

We dedicate this book to the memory of our colleagues Alan Saville (1946–2016) from Edinburgh and Romuald Schild (1936–2021) from Warsaw, two outstanding archaeologists, researchers of prehistoric flint mining, founding members of the UISPP Commission 'Flint Mining in Pre- and Protohistoric Times', also the co-authors of this volume.

Paris – Warsaw, December 2021

Editors

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