

CONTENTS

ABBREVIATIONS	8
BIBLIOGRAPHY	9
1. INTRODUCTION	21
1.1 The Site	23
1.2 The cultural significance of Tell el-Dab ^c a	27
1.3 Organization of the material	28
2. CATALOGUE OF METAL ARTEFACTS	31
2.1 Axes	31
2.1.1 Flat axe	31
2.1.2 Fenestrated axe	33
2.1.3 Socketed axes, narrow-bladed form	33
2.2 Daggers	42
2.2.1 Styled daggers with decorated blades	42
2.2.2 Styled daggers with undecorated blades	47
2.2.3 Broad-bladed daggers with undecorated blades	52
2.2.4 Unclassified daggers	54
2.3 Pommels	56
2.4 Spearheads and other projectiles	59
2.4.1 Medium-sized spearhead	59
2.4.2 Small spearheads	60
2.4.3 Spearheads with blade longer than 10 cm	60
2.4.4 Spearheads with blade between 6 cm and 8 cm in length	61
2.4.5 Spearheads with blade less than 6 cm in length	67
2.4.6 Small Projectiles	69
2.5 Single-edged knives with curved blades	69
2.6 Belts and belt fasteners	83
2.6.1 Metal belts	83
2.6.2 Possible belt fragments	84
2.7 Gold headbands	86
2.8 Stands and lids	88
2.8.1 Stands	88
2.8.2 Lids	92
2.9 Pins and toggle-pins	94
2.9.1 Silver pins and pins decorated using precious metal	94
2.9.2 Copper toggle-pins with ribbed decoration	95
2.9.3 Toggle-pins with plain shafts	99
2.9.4 Pin fragments	102
2.10 Personal items	107
2.10.1 Mirrors	107
2.10.2 Tweezers	107
2.10.3 Rings	109
2.10.4 Jewellery	116
2.11 Miscellaneous components (fittings)	118
2.11.1 Precious metals	118
2.11.2 Copper base	119

2.12 Tools	121
2.12.1 Harpoons	121
2.12.2 Hooks	123
2.12.3 Chisels	123
2.12.4 Pointed tools: needles, awls, punches etc	126
2.12.5 Cutting tools	129
2.12.6 Miscellaneous tools	129
2.12.7 Bars	129
2.13 Miscellaneous fragments	131
2.13.1 Gold	131
2.13.2 Silver	131
2.13.3 Copper-base fragments (drawn)	131
2.13.4 Copper-base fragments (not illustrated)	135
3. TYPOLOGY, CHRONOLOGY AND COMPARATIVE ANALYSIS	137
3.1 Axes	137
3.1.1 Flat axes	137
3.1.2 Fenestrated axes	138
3.1.3 Narrow-bladed axes	139
3.2 Daggers	141
3.2.1 The Levant and the Delta during the Middle Bronze Age	141
3.2.2 The wider context	144
3.3 Pommels	144
3.4 Spearheads and other projectiles	147
3.4.1 Spearheads	147
3.4.2 Projectiles	148
3.5 Single-edged knives with curved blades	149
3.5.1 Chronology and distribution	149
3.5.2 Function	150
3.5.3 Curved-swords	151
3.6 Summary of weapons	151
3.6.1 Weapons in the Levant and Nile Delta	151
3.6.2 Comparison with evidence from the Nile Valley	152
3.6.3 Decorated artefacts	152
3.7 Belts and belt fasteners	152
3.8 Gold headbands	154
3.8.1 Western Asia and the east Mediterranean	155
3.8.2 Egypt	155
3.9 Stands and lids	156
3.9.1 Stands	156
3.9.2 Lids	157
3.10 Pins and toggle-pins	157
3.10.1 The use of pins in grave contexts	157
3.10.2 Pins from non-mortuary contexts	157
3.10.3 The pins from Tell el-Dab'a in their near eastern context	158
3.10.3.1 Silver pins	158
3.10.3.2 Copper toggle-pins with ribbed decoration	158
3.10.3.3 Toggle-pins with plain shafts	159
3.10.4 Comparison with Egypt, Cyprus and the Aegean	159
3.10.4.1 Egypt	159
3.10.4.2 Cyprus and the Aegean	159
3.10.5 The development of toggle-pins in the Levant	160
3.11 Personal items	161

3.11.1 Mirrors	161
3.11.2 Tweezers	161
3.11.3 Rings	163
3.11.3.1 Rings: typology and chronology	163
3.11.3.2 Rings: discussion and comparanda	164
3.11.3.3 Bracelets and torques	165
3.11.4 Jewellery	166
3.12 Tools	166
3.12.1 Harpoons	166
3.12.2 Other tool types	167
4. METALLURGY AT TELL EL-DAB ^c A by G. Philip and M.J. Cowell	169
4.1 The metalworking evidence: metal remains	169
4.1.1 Metal ingots	169
4.1.2 Metalliferous remains	170
4.1.3 Discussion	170
4.2 The metalworking evidence: refractory materials	171
4.2.1 Open or lidded limestone moulds: catalogue	171
4.2.2 Limestone moulds: discussion	184
4.2.2.1 Limestone sources	189
4.2.2.2 Potential problems inherent in the use of limestone moulds	189
4.2.2.3 Consideration of the artefacts produced from the Tell el-Dab ^c a moulds	190
4.2.3. Clay moulds	191
4.2.3.1 Clay moulds: catalogue	191
4.2.3.2 Clay moulds: discussion	191
4.2.4. Two-piece stone moulds	193
4.2.4.1 Two-piece stone moulds: catalogue	193
4.2.4.2 Two-piece stone moulds: materials	196
4.2.4.3 Two-piece moulds in use	196
4.2.4.4 Two-piece moulds: products	196
4.2.5 Manufacturing debris	197
4.2.5.1 Tuyeres	197
4.2.5.2 Crucibles: catalogue	199
4.2.5.3 Crucibles: discussion	203
4.3 A concentration of metalworking debris in the area of the Middle Kingdom palace	204
4.4 The composition of the metal artefacts	204
4.4.1 Modification of earlier reports	204
4.4.2 Chemical analysis: laboratories and methods	205
4.4.2.1 Berlin	205
4.4.2.2 The British Museum	205
4.4.3 Composition of silver artefacts from Tell el-Dab ^c a	207
4.4.3.1 The use of precious metals	208
4.4.4 Composition of copper-base artefacts from Tell el-Dab ^c a	209
4.4.5 Analysis of composition by period and artefact category	212
4.4.6 Metalworking in Ancient Egypt	214
4.4.6.1 The evidence of representational art	214
4.4.6.2 Archaeological evidence	215
5. ARCHAEOLOGICAL CONTEXT	217
5.1 Introduction	217
5.2 Analysis of patterns by main artefact categories	217
5.2.1 Flat axes	217
5.2.2 Socketed and fenestrated axes	217

5.2.3 Daggers	218
5.2.4 Spearheads	219
5.2.5 Single-edged knives with curved blades	219
5.2.6 Metal belts	219
5.2.7 Gold headbands	220
5.2.8 Stands and lids	220
5.2.9 Pins and toggle-pins	220
5.2.9.1 Pins in grave contexts	220
5.2.9.2 Toggle-pin use	222
5.2.9.3 Pins from non-mortuary contexts	222
5.2.10 Personal items	223
5.2.10.1 Mirrors	223
5.2.10.2 Tweezers	224
5.2.11 Rings	224
5.2.12 Pendants	225
5.2.13 Tools	225
5.2.14 Miscellaneous items	225
5.2.15 Summary of funerary data: patterns of association	225
5.2.16 The displacement of artefacts within graves	227
5.2.17 Specific contextual issues	228
5.2.17.1 Rarity of metalwork from the Middle Kingdom settlement in Area F/I	228
5.2.17.2 The Tell el-Dab ^c a grave assemblages in context	228
6. A CONSIDERATION OF THE IMPLICATIONS OF THE METALWORK FROM TELL EL-DAB^CA	231
6.1. The Tell el-Dab^ca metalwork: styles and the communication of status	231
6.1.1 Styles	231
6.1.2 Change through time	231
6.1.3 The Delta-southern Levant stylistic area	232
6.2 The Tell el-Dab ^c a metalwork and Egyptian metallurgy	234
6.3 Delta material culture and 'the Hyksos'	235
6.3.1 Material culture and the delta community: conceptual issues	235
6.3.2 External links and appropriation	236
6.3.3 Delta elites: the material symbolism	237
6.3.3.1 The Palace Cemetery in Area F/I	237
6.3.3.2 Mining in Sinai and the caravan trade	238
6.4 Tell el-Dab ^c a and the east Mediterranean world	239
6.4.1 The economic significance of the Tell el-Dab ^c a metalwork	239
6.4.2 Tell el-Dab ^c a, Byblos and elite symbols in the east Mediterranean	240
6.4.3 Tell el-Dab ^c a and Palestine: metalwork styles and political dynamics	241
APPENDIX 1 TELL EL-DAB^CA METALWORK LISTED BY CONTEXT	243
APPENDIX 2 CONCORDANCE OF EXCAVATION REGISTRATION NUMBERS AND SEQUENTIAL CATALOGUE NUMBERS	249