Table S1. Sites with published technical analyses of excavated prehistoric metals in northeast and central Thailand, and Laos, plus comments on recovery protocols, analyses, metals condition, and other observations. (Full review in Hamilton and White [2019]).

Region	**Site**	**Technical sample (metal artifacts with published technical analyses)**		**Study population**		**Technical sample's proportion of study population**	**Sieving protocol (published)**	**Comments**	**Main references for technical analyses**
		Cu	**Fe**	**Cu**	**Fe**				
northern northeast Thailand	Ban Chiang	102[a]	3	298	105	26.17%	1 cm	all sediments sieved; metal preservation good	Hamilton and Nash 2018; Pryce 2019; Pryce et al. 2014 for LIA
	Ban Phak Top	7		15	3	38.9%	1 cm	all sediments sieved; metal preservation variable	Hamilton and Nash 2018
	Ban Tong	29		114	2	25.4%	1 cm	all sediments sieved; metal preservation good	Hamilton and Nash 2018
	Don Klang	30	5	89	13	34.3%	1 cm	all sediments sieved; metal preservation good	Hamilton and Nash 2018; Pryce et al. 2014 for LIA
	Ban Na Di	79		~579	121	~11%	1 cm; sample at 1 mm	all sediments sieved; only Cu artifacts technically analyzed	Rajpitak 1983
	Non Nok Tha	145		533	unknown	27.2%	none	sediments not sieved due to concretized soils and rushed excavations	Rajpitak 1983; Selimkhanov 1979; Smith 1973
	Ban I Loet		2	3	19	9%	1.2 cm	all sediments sieved; only Fe artifacts technically studied	Pigott and Marder 1984
	Non Phrik		4	unknown	unknown	unknown	0.5 cm	all sediments sieved; recovery of metals from sieving unknown	Hogan 1996–97; Hogan and Rutnin 1989

	Non Khaw Wong		1	22	6	3.5%	1.2 cm	all sediments sieved; only Fe artifacts technically studied	Pigott and Marder 1984
	Ban Puan Phu		1	4	13	5.8%	1.2 cm	all sediments sieved; only Fe artifacts technically studied	Pigott and Marder 1984
	Kok Khon	33		unknown	unknown	unknown	unknown	excavation details not published in English	Rajpitak 1983
	Phu Lon	12[b]		unknown	unknown	unknown	present	LIA on 3 pieces of slag and 7 pieces of ore	Pryce et al. 2014; Vernon 1996–97
Laos	Thong Na Nguak	2		unknown	present?	unknown	unknown, probably none	rescue excavation, judgement sample of 2 ingots, 3 LIA on slag	Cadet et al. 2019
	Puen Baolo	45		unknown	present	unknown	variable	judgement sample of 42 identifiable Cu objects (26 are ingots), plus 3 fragments	Cadet et al. 2019
southern northeast Thailand	Ban Non Wat	25[c]	none ?	unknown	unknown	unknown	present	Majority of sediments dry sieved; metal preservation poor; 2 LIA analyses of lead objects; 1319 Cu artifacts from BA layers, 96 BA Cu grave goods; iron period metals not enumerated; some prills and molds elementally analyzed.	Cawte 2008; Higham and Cawte 2021; Pryce 2012; Pryce et al. 2014
	Ban Suai	3		unknown	present	unknown	none		Welch and McNeill 2004
	Non Chai	46		131	169	15%	1 cm	all sediments sieved	Rajpitak 1983
central Thailand	Nong Nor	19		unknown	3	unknown	1 cm; some 4 mm	only 6 Cu artifacts had extant metal; 3 objects were of tin; 13 artifacts, including the tin, were totally corroded	Reay and Chang 1998
	Ban Pong Manao	62	unknown	unknown	unknown	unknown	unknown	62 LIA + 62 elemental	Hirao and Ro 2013
	Ban Khu Muang	6		unknown	unknown	unknown	unknown		Hirao and Ro 2013

	Ban Mai Chaimongkol	3		25	unknown	12%	unknown		Hirao and Ro 2013
	Ban Tha Kae	2		unknown	unknown	unknown	unknown		Hirao and Ro 2013
	Nil Kham Haeng	11[d]		unknown	unknown	unknown	present	10 LIA on slag	Pryce 2009; Pryce et al. 2014
	Non Pa Wai	7[e]		17+	unknown	unknown	present	10 LIA on slag	Pryce 2009; Pryce et al. 2014
	Ban Don Ta Phet	27	30	507 & frags	1000+	~3.5% maximum	present	6 LIA on Cu artifacts; cemetery site, no habitation evident	Bennett 2013a, 2013b, 2015; Rajpitak 1983

Note: Many numbers are approximate; often there is no way to find out if multiple analyses were done on the same sample. Cu = copper-base; Fe = iron; LIA =lead isotope analysis.

[a]includes 4 crucible prills and 1 slag prill.
[b]includes 10 crucible prills.
[c]14 Cu-base artifacts have elemental-analyses; seven of these plus an additional 11 artifacts have LIA.
[d]includes 8 smelting slag prills.
[e]includes 6 smelting slag prills

Table S2. Artifact counts by class and metal for each site in study.

	BC & BCES				BPT			BT			DK			Total	%
Artifact Class	**Cu**	**Fe**	**Bi**	**Total**	**Cu**	**Fe**	**Total**	**Cu**	**Fe**	**Total**	**Cu**	**Fe**	**Total**		
Bangle	79	13	—	92	4	—	4	4	—	4	10	—	10	110	17.2
Bell	4	—	—	4	—	—	0	—	—	0	2	—	2	6	0.9
Adze/axe	1	2	—	3	—	—	0	—	—	0	—	2	2	5	0.8
Blade	3	16	—	19	—	—	0	—	1	1	—	2	2	22	3.4
Point	4	7	2	13	—	1	1	1	—	1	—	—	0	15	2.3
Misc.	1	4	—	5	—	—	0	1	—	1	—	1	1	7	1.1
Wire/Rod	26	10	—	36	1	1	2	31	—	31	46	2	48	117	18.3
Flat	45	38	—	83	2	—	2	21	1	22	5	2	7	114	17.8
Amorphous	133	15	—	148	8	1	9	56	—	56	26	4	30	243	38.0
Totals	296	105	2	403	15	3	18	114	2	116	89	13	102	639	
Crucibles				92			2			6			2	102	

Note: BC & BCES = Ban Chiang, BC (Ban Chiang 1974) and BCES (Ban Chiang Eastern Soi 1975) locales combined; BPT = Ban Phak Top; BT = Ban Tong; DK = Don Klang; Cu = copper-base; Fe = iron; Bi = bimetallic; Misc. = miscellaneous.

Table S3. Ban Chiang, Ban Phak Top, Ban Tong, and Don Klang crucibles and amorphous by period.

	Ban Chiang		**Ban Phak Top**		**Ban Tong**		**Don Klang**	
	Cruc.	**Am.**	**Cruc.**	**Am.**	**Cruc.**	**Am.**	**Cruc.**	**Am.**
Late Period–Protohistoric	1	1	—	—	—	—	—	2
Late Period	10	33	—	5	—	—	2	27
Middle Period–Late Period	7	20	—	—	—	3	—	—
Middle Period	39	31	—	—	1	7	—	1
Early Period–Middle Period	23	27	—	—	—	—	—	—
Early Period-upper	6	27	2	4	4	43	—	—
Early Period-lower	4	9	—	—	1	3	—	—
Undetermined[a]	2	—	—	—	—	—	—	—
Totals	92	148	2	9	6	56	2	30

Cruc. = crucibles; Am. = amorphous.
Note: BC = Ban Chiang 1974 and Ban Chiang Eastern Soi 1975, combined; BPT = Ban Phak Top; BT = Ban Tong; DK = Don Klang.
[a] Crucible fragments are from section cleanings.

Table S4. Compositional testing of copper-base and iron artifacts and prills, all four sites combined.

Test	Sample counts
PIXE alone	24
EDS alone	9
EDXRF alone	1
PIXE, EDS	8
PIXE, EDXRF	14
PIXE, EDS, EDXRF	2
Total artifacts/prills	57
Total # of samples	58[a]
Total # analyses	84

Note: PIXE = Proton-induced X-ray spectroscopy; SEM/EDS = Scanning electron microscope/energy dispersive X-ray spectroscopy; EDXRF = Energy-dispersive X-ray fluorescence spectroscopy; LIA = Lead isotope analysis.

[a]The bent-tipped spear point was analyzed in the blade and socket separately by PIXE, and the socket was analyzed by EDXRF as well.

Table S5. Manufacturing techniques of copper-base grave goods from Ban Chiang (BC and BCES combined) with metallographic study.

Period	**Artifact Class**	**As-cast**	**Cast, annealed, some deformation**	**Worked, annealed, some deformation**	**Hot worked, quenched**
EP-lower	bangle	3			
	point, spear (socket)			1	
	point, spear (blade)		1		
EP-upper	bangle	1			
	adze/axe	1			
EP–MP	bangle	2			
MP	bangle	5			
	bimetallic spear point socket	1			
LP	bangle				1
	wire				3
Totals		13	1	1	4

Note: EP = Early Period; MP = Middle Period; LP = Late Period.

Table S6. Manufacturing techniques of copper-base non-grave good metal objects from Ban Chiang analyzed with metallography, excluding amorphous and prills.

Period	**Artifact Class**	**As-cast**	**Cast, annealed or slow cooled**	**Cast, worked**	**Worked, annealed**	**Worked, annealed, worked**
EP-lower	flat	1				
	wire/rod	1				
EP-upper	bangle	1			2	
	point, small			1 (heavily)		
	flat			1		
	wire/rod					1
EP–MP	bangle	4		1		1
	flat	1				
	wire/rod	1				
MP	bangle	1				
	blade	1				
	flat	1				
	wire/rod	2			1	
MP–LP	bangle	3		3 (some deformation)		
	flat	1				
	wire/rod	2				
LP	bangle	8		1 (some deformation)		
	misc. (knob (bangle adorno?)	1				
	flat	4	1			
	wire/rod	1				
LP–Proto	flat	1				
Totals		35	1	7	3	2

Note: EP = Early Period; MP = Middle Period; LP = Late Period; Proto = Protohistoric Period; misc. = miscellaneous.

Table S7. Manufacturing techniques of copper-base non-grave good metal objects from the three tested sites analyzed with metallography, excluding amorphous and prills.

Period	**Site**	**Artifact Class**	**As-cast**	**Worked, left annealed**	**Some deformation**	**Worked, annealed, worked**	**Hot worked, quenched**	**Unclear**
EP-lower	BT	wire/rod				1		
EP-upper	BPT	bangle	3					
		flat			1			
	BT	flat	3			1		
		wire/rod		1		1		
MP	BT	bangle	1					
		wire/rod	4			2		
MP–LP	BT	wire/rod	2					
LP	DK	bangle	2				3	
		bell	1					
		wire/rod	1			1	17	1
LP–Proto	DK	bell	1					
		flat					1	
Totals			18	1	1	6	21	1

Note: EP = Early Period; MP = Middle Period; LP = Late Period; Proto = Protohistoric Period;
BPT = Ban Phak Top; BT = Ban Tong; DK = Don Klang.

Table S8. Copper-base alloys present in the technical samples as determined solely by compositional analysis, prills excluded.

Metal	**BC**	**BPT**	**BT**	**DK**	**Total**
Bronze (Sn 2%–19%)	17[a, b]	1	7	1	26
Leaded tin bronze	6	3	—	—	9
Arsenical tin bronze	1	—	1	—	2
High-tin bronze (Sn≥20%)	2[c]	—	—	6	8
Leaded high-tin bronze	1	—	—	—	1
Impure copper	1	—	3[d]	—	4
Leaded antimonial copper	—	—	1	—	1
Totals	28	4	12	7	51

Note: BC = Ban Chiang (including both BC 1974 and BCES 1975 locales); BPT = Ban Phak Top; BT = Ban Tong; DK = Don Klang; Sn = tin.

Occasionally, the EDXRF results produced by Pryce (2019) resulted in an alloy classification different from the classification obtained by the original PIXE and SEM/EDS results. This table is based on the original results.

[a]Includes two samples from one spear point, one from the blade and one from the socket.

[b]Pryce (2019) classified one of these as an arsenical bronze.

[c]Pryce (2019) classified one of these as a bronze.

[d]Pryce (2019) classified one of these as a leaded bronze.

Table S9. Metals and Alloys in compositionally analyzed sample by period, all sites combined, including prills.

Metal/Alloy	**EP**	**EP–MP**	**MP**	**MP–LP**	**LP**	**LP–Proto**	**Total**
Tin bronze	14[a]	2	8	1	2	—	27
Leaded tin bronze	1	2	1	1	2	—	7
Arsenical tin bronze	1	1	—	—	—	—	2
High-tin bronze	—	—	1	—	8	1	10
Leaded high-tin bronze	—	—	—	—	1	—	1
Leaded copper	—	—	—	—	1	—	1
Impure copper	2	—	2	—	2[b]	—	6
Leaded antimonial copper	1	—	—	—	—	—	1
Iron	—	—	—	—	2	—	2
Totals	19	5	12	2	18	1	57

Note: EP = Early Period; MP = Middle Period; LP = Late Period; Proto = Protohistoric Period.

[a]Pryce (2019) classified one of these as an arsenical bronze.

[b]Pryce (2019) classified one of these as a leaded copper and one as a leaded bronze.

Table S10. Unusual copper-alloy variants in technical sample identified by compositional analyses, i.e., not including tin bronze, leaded tin bronze, or high-tin bronze.

Artifact ID	Context	Artifact Class	Alloy	Test	Period
BT 905/1716	gsm	amorphous	9% Sb, 6% Pb, 1.5% As	PIXE	EP-lower
BT 812/1581	gsm	amorphous	impure copper (0.6% Sn)	SEM/EDS	EP-upper
BT 615/1426	gsm	amorphous	2.9% Sn, 2% As	PIXE	EP-upper
BT 853/1634	gsm	wire/rod	impure copper	PIXE, SEM/EDS	EP-upper
BCES 486/1395	gsm	wire/rod	4% As, 3% Sn	PIXE	EP–MP
BT 541/1214	gsm	wire/rod	impure copper	PIXE, SEM/EDS	MP
BCES 2020B/1982	gsm	crucible prill	impure copper	PIXE, EDXRF	MP
BC 987A/1005	feature	crucible prill	impure copper[a]	PIXE, EDXRF	LP
BC 987B/1005	feature	crucible prill	leaded copper[b]	EDXRF	LP
BC 2207/355	gsm	miscellaneous (knob)	leaded high-tin bronze[c]	PIXE, EDXRF	LP
BCES 237/516	gsm	flat	impure copper (1.4% Sn and 0.9% Pb)[d]	PIXE, EDXRF	LP

Note: gsm = general soil matrix; Sb = antimony; As = arsenic; Pb = lead; Sn = tin;
EP = Early Period; MP = Middle Period; LP = Late Period; PIXE = Proton-induced X-ray spectroscopy;
SEM/EDS = Scanning electron microscope/energy dispersive X-ray spectroscopy;
EDXRF = Energy-dispersive X-ray fluorescence spectroscopy

[a]Pryce (2019) defines as leaded copper, with 1.3% Pb.
[b]Pryce (2019) defines as leaded bronze, with 1.4% Sn.
[c]Pryce (2019) defines as leaded bronze, with 19.8% Sn.
[d]Pryce (2019) defines as leaded bronze, with 1.6% Sn and 4.3% Pb.

Table S11. Alloys by grave good versus non-grave good contexts for all four sites compositional test results only, excludes prills).

Metal/Alloy	**Grave goods**	**Non-grave goods**
Tin bronze	8	19
Leaded tin bronze	1	6
Arsenical low-tin bronze	—	2
High-tin bronze	2	7
Leaded high-tin bronze	—	1
Impure copper	—	4
Leaded antimonial copper	—	1
Iron	2	—
Totals	13	40

Table S12. Vickers microhardness determination ranges, all tested artifacts, by period.

Artifact ID	Artifact class	Metal/Alloy	Structure	Hv range	Period	Comments	Context
BC 687/1100	flat	copper-base	as-cast	80–87	EP-lower		gsm
BCES 762/2834	point, spear (socket)	bronze	some working, annealing, some deformation	73–111	EP-lower		gg
BCES 762/2834	point, spear (blade)	bronze	granular, some strain marks	87–100	EP-lower	hardness did not change across width of blade	gg
BC 693D/1203A	bangle	bronze	as-cast	80–98	EP-upper		gg
BCES 741/2625	point, small	bronze	cast, heavily worked	143–154	EP-upper		gsm
BPT 23/79	amorphous	bronze	as-cast	92–143	EP-upper		gsm
BT 534/1176	flat	bronze	worked, annealed, worked	170–198	EP-upper		gsm
BT 615/1426	amorph	arsenical tin bronze	as-cast	71–123	EP-upper		gsm
BT 853/1634	wire	impure copper	worked, annealed	73–80	EP-upper		gsm
BT 889/1694	wire	bronze	worked, annealed	90–98	EP-upper		gsm
BT 905/1716	amorphous	leaded antimonial copper	as-cast	50–119	EP-upper	heavily leaded	gsm
BC 713/893A	bangle	copper-base	worked, some annealing, worked	124–184	EP–MP	some working	fea
BCES 486/1395	rod	arsenical tin bronze	as-cast	81–108	EP–MP		gsm
BC 698B/1426	rod	copper-base	worked, annealed	80–101	MP		gsm
BCES 1402/1320	amorphous	copper/bronze	as-cast	67–101	MP	highly variable microstructure; a lump of copper and a lump of bronze stuck together	ba
BT 508/1081	rod	bronze	as-cast	93–111	MP		gsm
BT 541/1214	wire	impure copper	as-cast	89–103	MP		gsm

BT 555/1303	rod	bronze	worked, annealed, worked	143–182	MP	upper 4 are from rounded end	gsm
BC 2161A/781	wire	high-tin bronze	hot worked, quenched	243–273	LP	martensitic+2nd phase	gg
BC 2207/355	misc (knob)	leaded high-tin bronze	as-cast	125–162	LP		gsm
BC 2208/918	wire	high-tin bronze	hot worked, quenched	271–480	LP		gg
BCES 237/516	flat	impure copper	as-cast	65–84	LP		gsm
BCES 252/620	bangle	bronze	as-cast	107–132	LP		gsm
BCES 426B/1222	point, spear	iron	probably forged, not carburized	138–160	LP	precipitates present in ferrite	gg
BCES 749/2669	point, spear	iron	forging, some carburization	87–213 (0–0.05%C)	LP	carburized in patches	gg
BCES 1205/850	point (spike)	iron	forged nearly pure iron	102–123	LP		gg
DK 113/306	wire	high-tin bronze	worked, annealed, worked	212–260	LP		gsm
DK 126/320	wire	high-tin bronze	hot worked, quenched	245–294	LP	needled martensite+twinned alpha	ba
DK 134/328	wire	high-tin bronze	hot worked, quenched	336–352	LP	3 tests	gsm
DK 135/328	wire	high-tin bronze	hot worked, quenched	394–432	LP	martensitic+2nd twinned phase	gsm
DK 146/329	wire	high-tin bronze	hot worked, quenched	268–313	LP	martensitic+2nd phase	ba
DK 151/331	wire	high-tin bronze	hot worked, quenched	294–313	LP		gsm
DK 214/388	bangle	high-tin bronze	hot worked, quenched	212–298	LP	alpha and transformed beta	ba
DK 218/388	wire	high-tin bronze	hot worked, quenched	390–442	LP	4 tests; load was 100g	ba
DK 255B/400	blade (unclassified)	iron	forged	106–127	LP	ferrite+pearlite	gg
DK 256/400	misc (ball)	iron	forged nearly pure iron	111–130	LP	All ferrite	gg
DK 302/457	adze	iron	forged iron, carburized regions	132–160, 301–383	LP	tempered martensite range is 301–383	gg

DK 109/287	flat	high-tin bronze	hot worked, quenched	345–426	LP–Proto	cracks formed around impression	gsm

Note: A diamond indenter was pressed into the metal at a pressure of 200 gm (unless otherwise noted) for a fixed length of time. Each test was performed five times unless otherwise noted, producing a range of results for each artifact.

gsm = general soil matrix; gg = grave good; ba = burial-associated; fea = feature; EP = Early Period; MP = Middle Period; LP = Late Period; Proto = Protohistoric Period; misc = miscellaneous.

Table S13. Technical sample with elemental compositions as determined by PIXE, EDAX, and EDXRF (not by metallography), metallographic result for structure, and LIA ID number and copper provenance, if available. Arranged by period. Burial phase is noted for grave goods

Artifact ID	**Period**	**Artifact Class**	**Context**	**Structure**	**Metal/Alloy**	**Test**	**LIA sample ID and likely origin**
BCES 762/2834	EP-lower IIIa*	point, spear (socket)	gg	working, annealing, some deformation	tin bronze	PIXE (10.9% Sn)	
BCES 762/2834	EP-lower IIIa	point, spear (blade)	gg	annealing, some deformation	tin bronze	PIXE (9.2% Sn) EDXRF (9.7% Sn)	SEALIP/TH/BC/1 Sepon
BCES 596A/1984	EP-lower IVc	bangle	gg	as-cast	tin bronze	PIXE (10.3% Sn) EDXRF (11.2% Sn)	SEALIP/TH/BC/2
BCES 596B/1984	EP-lower IVc	bangle	gg	as-cast	tin bronze	PIXE (9.7% Sn) EDXRF (15.2% Sn)	SEALIP/TH/BC/3
BT 889/1694	EP-lower	wire	gsm	worked, annealed, worked	tin bronze	PIXE (6.9% Sn) EDS (7% Sn)	
BT 905/1716	EP-lower	amorphous	gsm	as-cast	antimonial leaded copper	PIXE (9.4% Sb, 6.1% Pb, 1.5% As)	
BC 693D/1203A	EP-upper Va	bangle	gg	as-cast	tin bronze	PIXE (13.5% Sn) EDXRF (11.9% Sn)	SEALIP/TH/BC/4 Sepon
BCES 741/2625	EP-upper	small point	gsm	cast, heavily worked	tin bronze (PIXE), arsenical tin bronze (EDXRF)	PIXE (4.4% Sn) EDXRF (6.6% Sn, 1.8% As)	SEALIP/TH/BC/5
BC 679A/1071	EP-upper	bangle	fea pdb	as-cast	tin bronze	PIXE (19.5% Sn) EDXRF (15.4% Sn)	SEALIP/TH/BC/6 Sepon
BC 694/1203A	EP-upper Va	adze/axe	gg	as-cast	tin bronze	PIXE (16.9% Sn)	
BPT 16/69	EP-upper	bangle	fea	as-cast	leaded tin bronze	EDS (15% Sn, 2% Pb)	

BPT 22/84	EP-upper	bangle	gsm	as-cast	tin bronze	EDS (2% Sn)	
BPT 23/79	EP-upper	amorphous	gsm	as-cast	tin bronze	PIXE (13.3% Sn) EDS (16% Sn)	
BT 582/1396	EP-upper	wire	gsm	worked, annealed, worked	tin bronze	EDS (10% Sn)	
BT 615/1426	EP-upper	amorphous	gsm	as-cast	arsenical tin bronze	PIXE (2.9% Sn, 1.9% As)	
BT 812/1581	EP-upper	amorphous	gsm	as-cast	impure copper	EDS (0.6% Sn)	
BT 822/1588	EP-upper	amorphous	gsm	as-cast	tin bronze	EDS (10% Sn)	
BT 853/1634	EP-upper	wire	gsm	worked, annealed	impure copper	PIXE (0.03% Sn, 0.9% As) EDS (0% Sn, 1% Pb)	
BT 859/1639	EP-upper	amorphous	gsm	as-cast	tin bronze	EDS (9% Sn)	
BCES 486/1395	EP–MP	rod	gsm	as-cast	arsenical tin bronze	PIXE (2.1% Sn, 3.7% As)	
BCES 609/2069	EP–MP	bangle	fea	as-cast	leaded tin bronze	PIXE (18.2% Sn, 7.6% Pb	
BCES 616/2097	EP–MP	bangle	fea pdb	cast, some deformation	leaded tin bronze	PIXE (15.9% Sn, 12.5 % Pb)	
BCES 617/2097	EP–MP	bangle	fea pdb	as-cast	tin bronze	PIXE (16.7% Sn)	
BC 2188/530	MP	rod	gsm	as-cast	tin bronze	PIXE (15.2% Sn)	
BCES 480/1367	MP	blade	fea	as-cast	tin bronze	PIXE (11.5% Sn)	
BCES 491/1286	MP VIIa	bangle	gg	as-cast	tin bronze	PIXE (15.35% Sn)	
BCES 1402/1320	MP	amorphous	ba	as-cast	tin bronze (PIXE), leaded tin bronze (EDXRF)	PIXE (both phases averaged: 3.7% Sn, 1% Pb) EDXRF (bronze phase only: 9.7% Sn, 3.5% Pb)	SEALIP/TH/BC/ 7–8[a] (both phases)

BCES 591/1981	MP VIIa	bangle	gg	as-cast	tin bronze	PIXE (15.4% Sn)	SEALIP/TH/BC/9
BCES 395A/1115	MP VIII	bangle	gg	as-cast	leaded tin bronze	PIXE (6.7% Sn, 5.2% Pb) EDXRF (8.4% Sn, 4.4% Pb)	SEALIP/TH/BC/10
BCES 2020A/1982	MP	crucible prill	gsm	as-cast	high-tin bronze (PIXE), tin bronze (EDXRF)	PIXE (22.7% Sn) EDXRF (16.8% Sn)	SEALIP/TH/BC/11 Sepon
BCES 2020B/1982	MP	crucible prill	gsm	as-cast	impure copper	PIXE (0.02% Sn) EDXRF (0.7% Sn)	SEALIP/TH/BC/12 Sepon
BT 508/1081	MP	rod	gsm	as-cast	tin bronze	PIXE (9.3% Sn) EDS (13% Sn)	
BT 509/1083	MP	wire	gsm	worked, annealed, worked	tin bronze	EDS (10% Sn)	
BT 541/1214	MP	wire	gsm	as-cast	impure copper	PIXE (0.5% Sn) EDS (0.6% Sn)	
BT 555/1303	MP	rod	gsm	worked, annealed, worked	tin bronze	PIXE (6.4% Sn) EDS (7% Sn)	
BCES 288/775	MP–LP	bangle	gsm	cast, some deformation	leaded tin bronze	PIXE (8.8% Sn, 2.9% Pb)	
BCES 742/2635	MP–LP	flat	gsm	as-cast	tin bronze	PIXE (12.9% Sn)	
BC 987A/1005A	LP	crucible prill	fea	as-cast	impure copper (PIXE), leaded copper (EDXRF)	PIXE (0.1% Sn, 0.6% Pb) EDXRF (0.2% Sn, 1.3% Pb)	SEALIP/TH/BC/13
BC 987B/1006	LP	crucible prill	fea	as-cast	leaded copper[b]	EDXRF (1.4% Sn, 3.4% Pb)	SEALIP/TH/BC/14

BC 2161A/781	LP X	wire	gg	hot worked, quenched	bronze (PIXE), (only corrosion for EDXRF)	PIXE (22.9% Sn) EDXRF (78.8 Sn, 2.0% Fe)	SEALIP/TH/BC/15
BC 2156/322	LP	bangle	gsm	as-cast	leaded tin bronze	PIXE (12.9% Sn, 16.3% Pb)	
BC 2207/355	LP	knob	gsm	as-cast	high-tin leaded bronze (PIXE)[c]	PIXE (27.3% Sn, 4.1% Pb) EDXRF (19.8% Sn, 4.1% Pb)	SEALIP/TH/BC/16
BCES 237/516	LP	flat	gsm	as-cast	impure copper (PIXE), leaded tin bronze (EDXRF)[d]	PIXE (1.4% Sn, 0.8% Pb) EDXRF (1.6% Sn, 4.3% Pb)	SEALIP/TH/BC/17
BCES 252/620	LP	bangle	gsm	as-cast	tin bronze	PIXE (16.8% Sn)	
BC 604A/492	LP	bangle	gsm	as-cast	leaded tin bronze	PIXE (14.9% Sn, 5.4% Pb)	
DK 214/388	LP	bangle	gg	hot worked, quenched	high-tin bronze	PIXE (22.2% Sn) EDXRF (25.3% Sn)	SEALIP/TH/DK/1
DK 151/331	LP	wire	gsm	hot worked, quenched	high-tin bronze	PIXE (21.3% Sn, 0.9% Fe) EDS (25% Sn, 1% Fe) EDXRF (32.5% Sn, 1.2% Fe)	SEALIP/TH/DK/2 Sepon
DK 113/306	LP	wire	gsm	worked, annealed, worked	high-tin bronze	PIXE (20.1% Sn) EDS (23% Sn)	
DK 134/329	LP	wire	gsm	hot worked, quenched	high-tin bronze	PIXE (44.4% Sn) EDS (22% Sn)	
DK 155/331	LP	amorphous	ba	as-cast	high-tin bronze	EDS (20% Sn)	
DK 265/416	LP	amorphous	gg	as-cast	tin bronze	EDS (5% Sn)	
DK 109/287	LP–Proto	flat	gsm	hot worked, quenched	high-tin bronze	PIXE (23.2% Sn) EDXRF (25.8% Sn)	SEALIP/TH/DK/3 Sepon

DK 256/400	LP	ball	ba	forged nearly pure iron	iron	EDS	
DK 302/457	LP	adze/axe	gg	forged iron, carburized regions	iron	PIXE	

Note: EP = Early Period; MP = Middle Period; LP = Late Period; Proto = Protohistoric Period; misc = miscellaneous; ba = burial-associated; fea = feature; fea pdb = feature, possible disturbed burial; gg = grave good; gsm = general soil matrix. Sn = tin, Pb = lead, As = arsenic, Fe = iron, Sb = antimony; PIXE = Proton-induced X-ray spectroscopy; SEM/EDS = Scanning electron microscope/energy dispersive X-ray spectroscopy; EDXRF = Energy-dispersive X-ray fluorescence spectroscopy; LIA = Lead isotope analysis.

*Roman numerals after period designations are burial phases.

It should be noted here a distinction between our and Pryce's evaluation of alloy constituents due mainly to Pryce's classification of an "alloy" as containing more than 1% of any non-copper element. The Ban Chiang Project classifies a deliberate alloy when it has at least 2% of a non-copper element, following the protocol used by Stech (1999). The 4 specimens where Pryce described a different composition from our study are noted in the tables. In only one sample did Pryce's EDXRF present a truly different finding from the previous PIXE results; according to the EDXRF, one flat artifact from the Late Period contained 4.3% lead, though the PIXE finding was only 0.9% lead. Given the erratic segregation of lead in a copper matrix, along with the still unclear mechanisms of lead corrosion (Quaranta et al. 2015), this discrepancy could be due to chance or to the twelve years of further corrosion from exposure to the air between our test in 2000 and Pryce's study in approximately 2013.

[a]This amorphous piece consists of two separate alloys joined together; one is reddish copper, the other a yellow bronze. The PIXE analysis merged the two. SEALIP/TH/BC/8 from the "copper" phase of this two-phase piece has neither elemental nor LIA results. The second phase is a leaded bronze.

[b]By Pryce's criterion that 1% of an alloying element marks a deliberate alloy, this would be a leaded bronze, with 1.5% Sn.

[c]Because EDXRF registered only 19.8% tin, just below the cutoff for a high-tin bronze, Pryce (2019) classified this artifact as a bronze. The PIXE result showed 27.3%.

[d] Both PIXE and EDXRF registered between 1% and 2% tin. PIXE recorded 0.8% lead; the EXDRF recorded 4.3% lead. Pryce classified this as a leaded bronze.

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