The poster is showing the results of laboratory analyses carried out on pottery of the Early Dynastic Period recovered from excavations at Tell Arbid in northeastern Syria. Work was conducted at this site by the Polish Mission of Mediterranean Archaeology, led by professor Piotr Bielinski.

The material chosen by archaeologists for analysis includes samples of various categories of wares: 22 fragments each of Fine ware, kitchenware and Metallic ware, and one fragment of a tannur. Laboratory studies were undertaken to ascertain the differences/ similarities in the body composition and in the manufacturing techniques of these wares.

Pottery from Tell Arbid -provenance and technological studies

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METHODS: Chemical analysis by WD-XRF Thin-sections microscopy MGR- analysis Water permeability Thermal shock resistance

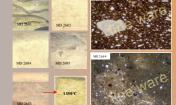
local production

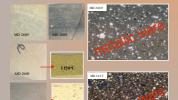












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MID 2005 S4; MID 2006 44; MID 2007 42; MID 2007 40; MID 2007 40; MID 2002 50; MID 2003 51; MID 2005 51; MID 2008 40; MID 2009 50; MID 2015 40;	77 0,59 .61 0,78 .66 0,70 by clay wi 8 .60 0,82 .22 0,82 .26 0,84 .66 0,83 .27 0,81	9,85 11,62 10,85 corr inter 14,03 13,97 12,03 13,91 13,20 y withou 13,50 13,90	4,93 5,89 5,45 clonal t 6,76 6,86 6,09 6,72 6,66 tistan t 6,86	0,075 0,117 0,085 temped 0,123 0,118 0,114 0,124 Sonal ted 0,114	6,19 3,58 5,79 4,94 5,12 5,27 4,64 mpet	27,30 33,37 18,98 19,37 20,83 18,06	0,60 0,46 0,85 0,65 0,67 1,02	2,66 2,36 2,33 2,45 2,66 1,65	0,23 0,18 0,24 0,32 0,20	133 109 153 131 134	279 264 288 272	103 93 132 124	34 21 53 64	45 44 70 65	214 234 665	27 26 27	160 152 188	400 460 275	19 25 19	92 64	21,14 23,19	5,84	38,2	
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ino vare juar t IID 2682 50, IID 2682 51, IID 2684 51, IID 2686 51, Interactio Wave C IID 2688 60, IID 2688 60, IID 2688 60, IID 2680 50, IID 2681 60, IID 2681 60,	by clay will 10,04 0,86 0,82 0,82 0,82 0,84 0,84 0,86 0,88 0,88 0,88 0,87 0,88 77 0,81	14,03 13,97 12,03 13,91 13,20 y withou 13,50 13,90	6,76 6,86 6,09 6,72 6,64 tistee 1	0,123 0,119 0,111 0,111 0,124 0,124 5onal ter	5,79 4,94 5,12 5,27 4,44 mp46	19,98 19,37 20,83 18,05	0,85 0,65 0,67 1,02	2,33 2,45 2,86 1,85	0,24 0,32 0,20	153 131 134	288 272	132	S3 64	70 66	665	27	188	275	19			1,70	28,0	
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ID 2004 St.) ID 2006 St.) Intallic Wave C ID 2008 60, ID 2009 50, ID 2015 68,	06 0,82 64 0,84 98 ady ch 68 0,88 63 0,88 77 0,91	13,91 13,20 y withou 13,50 13,90	6,72 6,64 tinten t 6,94	0,114 0,124 Sonal ten 0,114	5,27 4,44 1946	18,05	1,02	1,65											24	71	2,33	1,75	20,7	
IC 2005 60, Intallic Ware C IC 2008 60, IC 2009 60, IC 2015 68,	64 0,84 (mady ch 68 0,88 63 0,88 77 0,91	13,20 y withou 13,50 13,90	6,64 tinten 1 6,94	0,124 Sonal ter 0,114	4,66 mpeq										628	20	189	574	24	64	13,08	2,02	22,4	
Metallic Ware C IID 2008 e9, IID 2009 50, IID 2000 50, IID 2015 e8,	60 0,88 63 0,88 77 0,91	13,50 13,90	Sisten 1	Gonal ter 0,114	mpeq.	19,46	0,78			127	234	130	62	54	706	28	129	364	19	79	1,62	1,86	22,4	
IID 2688 69, IID 2689 50, IID 2690 50, IID 2615 68,	68 0,88 62 0,88 77 0,91	13,50	6,94	0,114				2,65	0,43	123	204	119	70	66	715	27	189	447	20	54	6,49	1,61	22,7	
IID 2689 50) IID 2690 50; IID 2415 48;	63 0,88 77 0,91	13,90																						
IID 2000 SO, IID 2015 48,	77 0,91		6,98			20,30	0,85	2,98		138	294	112	92			20		305	15	61	13,16	1,81	29,3	
IID 2415 48,					5,62	19,03	0,65	1,90	0,29	160	298	121	87	63	924	27	195	236	21	70	1,36	2,15	15,4	
			7,22	0,120		19,27	0,63	2,45	0,29	150	292	123	29	71	550	27	183	549	19	72	3,30	1,62	26,0	
		12,05	5,94	0,115	2,99	25,49	0,71	2,52	0,23	142	294	100	26	54	659	27	177	495	15	72	11,62	1,81	23,9	
MPURIS Malic War A	total existen																							
NO. 2004 60		99.54	5.00	0.020		1.00	4.00	0.00	0.12	117	190	40	24	-	164		242		60	101	1.53	1.92	110	
NO 2001 64		21.42	4.50	0.054		9.76	4.50	2.41		122	130	-	-		163		965			62	2.01	1.99	25.0	
MD 2001 64;				0,014		1,13	0.56		0,08	119	130	29	22		122		200		54		0.88	2.22	19.7	
Metallic Ware B													-		122						0,48	2,22	140	
IC 2000 60		20.67		0.007	0.91	0.60	0.00	2.66	0.00	114	100	91	- 22	+22	121	4	969	495	64	114	0.89	2.21	14	
MD 2200 68 1	99 134	19.22	519	0.006	0.70	0.79	0.50	2.50	0.15	100	100	- 00	-	-	140		200	955	40	120	1.00	212	150	
MD 2002 64		20.40	6.91		0.99	0.96	0.20		0.20	-	111	27			165		965			100	1.04	2.07	18.5	
NO 2000 64		20.42	4.95	0.000	0.99	1.00		4.45		100	115	97			193		200	506	50	105	1.25	2.09	17.8	
Autobio Ware C													-	_					-					
inue D1																								
MD 2002 - 50	92 111	10.12	9.59	0.164	4.90	9.00	0.37	2.50	0.10	102	922	***	60	- 01	100		127	422	22	-	1.50	2.04	184	
imus D2										-	-				-			-	-	-				
MD 2701 SR:	31 103	16.21	9.99	0.159	5.77	5.11	1.82	2.12	0.25	102	462	560	104	40	202	99	150	995	20	71	2.52	5.77	27.7	
MD 2002 50		16.19	9.09	0.173		6.00	1.60		0.94	104	440	999	100		200		145	216	95	64	1.94	5.71	22.8	
ine Ware							-						_	-					-					
	84 039	15.83	7.92	0.129	4.79	9.25	1.50	2.40	0.00	145	962	+22	60	79	215	4	185	***	24	68	3.28	5.71	22.8	

Conclusions

Fine Ware and boal (calcareous) Metalic Ware were not tempered and compared with the tanrur, most probably were produced after removing large particles of carbonate aggregates. Ceranip properties (apparent density, open porosity, water absorption) of these two types of ware mostly do not reach that of non-calcareous Metallic Ware. Original fitting temperatures vary strongly between 650°C and 1050°C.

We distinguish four groups of North-Mesopotamian Metallic Wares

• Metallic Wares A and B (or non-aclearoous North-Mesopotamian Stone ware) corresponds to the chemical groups A and B after Schneider 1989. The two groups with different but yet urknown provenances cannot be distinguisted without chemical analysis. Properties of the sherds from Tell Arbid are typical for this pottery. They are dense and not permeable for water (except sample MD2591) After removing the sufface layers, the samples are more permeable. This pottery is not suited for cooking after thermal shock some samples fell control.

imports

















- metallic Wares C (calcareous North-Mesopotamian Metallic Wares) is made at various sites. Groups can best distinguished by thin section studies or McR-analysis. Metallic Wares C is defined as fring to a yellow-greenish colour at temperatures exceeding 1110°C in an oxidizing atmosphere. In few cases, samples cannot be distinguished macrosopically from non-calcareous Metallic Wares. Besides the four samples most probably local to Tell Arbid, we analysed two samples with a differing composition thus indicating imports at Tell Arbid.
- Metallic Ware D (low caldium, high magnesium, chromium and nickel) is made at various sites. It includes most of the samples of Metallic ware found at Lidar Höyük ("Lidar-group", Schneider 1988) Groups have to be distinguished by chemical analysis with additional thin section studies or MGR-analysis. Metallic Wares D is defined as firing to a brown colour at temperatures exceeding 1110°C in an oxidizing atmosphere. Sherds of this non-calcaneous ware mostly are red. Ceramic and functional properties vary largely.

M. Dasskienicz, A. Smogorzwska, Brisf report on chemical analysis of Metallic Ware from Tell Arbid with special reference to "Storage" Metallic Ware, Orien Express 1, 1999, 25-27.