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## Metric and Non-metric Data from a Series of Skulls from Mozia, Sicily and a Related Site

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Thanks are due G. Falsone, F. Johnston, G. Mannino, and J.H. Musgrave for their support and encouragement of this research, and to the many other people who helped in various ways. Among these are P. DiBenedetto, V. Fatta, L. Mitchell and A. Fresina. Special thanks are due Professor B.S.J. Isserlin for providing metric data taken by Professor Moore on two skeletons from Mozia (Iss. 1955, 1963), and for their kind permission to refer to that information in this report.

### Introduction

A series of skeletal collections from western Sicily provide the basis for a genetic characterization of these people during the period of Carthaginian colonization in the region. Since the explanation of culture change in prehistory is one of the principle goals of archaeology (see Hole 1973), these bones may provide an important tool for understanding the process of colonization. Recent developments in archaeological methods and theory have increased the use of analytical tools from other disciplines and perfected older techniques such as human skeletal analysis. Current studies of human bones, by demonstrating relative degree of difference between populations close in time or in space, permit us to calculate cultural affinities or differences. These differences, in turn, tell us something about change in the form of population movements, colonization or conquest.

Within the past 15 years significant advances have been made in the ability to use data derived from studies of skeletal populations to reconstruct aspects of culture history (Angel 1969, Bass 1979). These advances have been based, to a great degree, on the studies of W.W. Howells (1973) and the ability of scholars to process masses of data through the use of computers. In the New World these procedures have found ready application in those areas where samples of human skeletons from excavations are large (e.g. Key and Jantz 1981).

In the Mediterranean area two previous studies relate to the project proposed herein. One (Musgrave and Evans 1980) incorporates the data from a number of sites in the eastern Mediterranean to make useful statements about biological relationships. This study offers the methodology which we intend to employ in the program described below (see also Becker 1982b).

A second study related to the proposed project employs the well-preserved skeletal remains from a single site in east central Italy (Coppa *et al.* 1980). These remains provide us

with a comparative data base from a region in Italy sufficiently distant (in time as well as space) from the proposed target area in Sicily and, therefore, offers a control for this program.

### *The project*

During the eighth century B.C., Carthaginian colonists «founded» a number of cities along the western coast of Sicily. The agricultural and other wealth of this island provided direct rewards to these Punic settlers, and their outposts served as centers for the shipping and trade which enriched their homeland.

At the same time various Greek city-states also colonized the shores of southeastern Italy, the Gulf of Taranto, and the eastern coast of Sicily. The impact of these colonial ventures has been demonstrated through numerous archaeological studies. Native populations in all of these areas are believed to have moved away from the coastal areas in many cases. The archaeological record serves as the basis for this documented culture change.

A recent program of collaborative research between the Dipartimento delle Scienze di Antichità at the Università degli Studi - Lecce focused on the biological impact of colonization on the native Messapian population of Puglia. The problem which frustrated the Lecce project parallels that which confronted the applicant when he worked on Crete (Becker 1974; 1975a, b; 1977a). Poor preservation of skeletons precluded the recovery of useful samples for such comparative studies. Some 20 extremely well-preserved skulls from each location (and time period) would be ideal for making these comparisons, but smaller samples can be used (Musgrave and Evans 1980). Despite the success of the osteometric program at Lecce (Becker 1981a, b, c, mss.), insufficient numbers of intact skeletons were available from that area to answer the primary question.

Skeletal populations in other colonized areas were sought for study in 1980 and 1981. The Lucanian area subjugated by the Romans was investigated (Becker 1982) and collections from Latium have been surveyed. Neither collection provided the quantity of data which now has been located in western Sicily. Dr. G. Falsone (University of Palermo), director of the Belice Valley Archaeological Program, was conducting excavations on the island of Mozia off the west coast of Sicily. The extent of the area being investigated and the excavator's concern with using osteological analysis to compliment archaeological evidence (e.g. Becker 1982a) provide the ideal setting for a study of the native people.

Preliminary work in 1982 confirmed the presence of 26 relatively well-preserved skulls at Mozia (Appendix 1) and substantial remains at Ulina, Entella, and other sites in the Belice Valley. Permission to study these bones was secured. Continuing excavations to augment this population in May of 1983 was arranged. The osteometric study of these skulls combined with recording of epigenetic traits (see Berry and Berry 1967) will provide the data base necessary for characterizing the native population of this area, taken as a whole (c.f. Musgrave and Evans 1980). Since there is only minimal data on physical anthropology now in the published literature of this region, all of the information gathered is significant.

The ultimate goal will be to characterize the pre-Punic population in this area and then to compare it with the colonial immigrants in the same place (or at Carthage). Comparison of these sets of data should determine the extent of biological change generated by colonization, and how that increases through time. Subsequently, comparisons can be made with the Alfadena population studies by Coppa, and with the data from other sites in Italy. Thus this program was intended to provide more than just the basis for considering this question regarding colonization and culture change. As the first such program of study in this region it offers the means by which a useful data base can be provided for all subsequent studies in this region.

Excavations at sites in the Belice Valley of Sicily during the summer of 1983 were intended to recover a pre-punic skeletal population to serve as the basis for identifying the native people of this region. Prof. G. Falsone organized a considerable field program which spent six weeks excavating at the burial area of a Copper Age site prior to the arrival of the author. Despite the identification of numbers of tombs in this location prior to 1983, this field season produced no burials in this area. The author worked with the field team for an additional three weeks before this phase of the project was abandoned. Subsequently, the author spent an extended period at Mozia recording the materials listed in the tables, and then the final interval of time was devoted to studies at the Archaeological Museum of Palermo. The various skeletal populations at the Museum recovered in earlier excavations were examined in an attempt to locate material useful for this study. Only a single skull from Santa Ninfa was considered to be of use.

*Santa Ninfa:* The tomb of Timpone Pontillo, Territory of Santa Ninfa, Prov. di Trapani.

The hill («timpone, cima») called Pontillo in the territory of the town of Santa Ninfa produced an interesting tomb of the terminal Bronze Age (see Mannino 1974). Santa Ninfa lies at the center of the eastern margin of the Province of Trapani, about 10 km. southeast of Salemi (cf Becker Ms.G on Salemi, which produced fragmentary remains of 9 adults and 3 adolescents of the Early Bronze Age). The date of the Santa Ninfa tomb, at a time before the Punic colonization, and the location of the site within the Province of Trapani both create an ideal comparative situation for the study of the skeletal material from Mozia. In May and June of 1983, in conjunction with the principal research at Mozia, two research periods were spent at Palermo during which the data from Santa Ninfa was collected. Only one skull, with slight damage to its right side, was recovered from the tomb at Timpone Pontillo. The individual is an adult female, age ca. 30-35. All six maxillary molars are present but the remainder of the teeth were lost post-mortem. The alveolar margins show moderate to heavy periodontal disease, but no other anomalies or pathologies were in evidence. No post-cranial remains were recovered from the site.

#### *The Human Remains from Mozia*

Most of the remains from Mozia derive from the early excavations, and for these we seldom have a specific provenience. A brief review of the history of Mozia and the area will help to place these remains in proper context. The Carthaginian settlers on Mozia at the end of the VIIIth to the late VIIth Centuries B.C. used as a burial area, an area later covered by a defensive wall built in the early VIth century B.C. (Whitaker 1921: 206). Most, but not all, of these graves contain cremations, but 7 sarcophagi also were found. The bones in these are fragmentary. Only one uncremated infant was found in the urn cemetery at Motya (Whitaker 1921: 218-219).

By the late VIth or early Vth century the cemetery at Birgi, on the mainland of Sicily, began to be used as a supplementary burial ground. Birgi, connected to Mozia by a causeway, has mostly inhumations although cremations continued to be placed in the graves in small numbers. Whitaker (1921: 209-213) noted that the pattern of use of cremations and cremations at Mozia differed from that then known at Carthage.

Excavations at the Capuchin monastery in Lilybaeum (Marsala) located several tombs, but no systematic excavations were conducted (Whitaker 1921: 214). One tomb, at the bottom of a shaft 6.5 meters deep, contained 3 skeletons.

The island of Mozia was captured by Dionysius of Syracuse in 397 B.C., and activity appears to have declined thereafter. Lilybaeum (Marsala) on the mainland opposite Mozia appears to have been an active site before 397 B.C., but after this event the city developed into a great mercantile center. For the next 300 years Lilybaeum remained a significant

port. The cemetery from that interval had been partly explored and the remains were deposited in the Museum at Mozia.

In addition to the skeletal material excavated by G. Whitaker at Mozia, two intact and well dated skeletons were recovered by Prof. B.S.J. Isserlin (1971). An analysis of these bones was provided by Prof. Moore, and Prof. Isserlin provided a copy of that report with permission to utilize relevant metric data and to study the skulls in order to derive appropriate non-metric information. These non-metric observations required that a brief examination be made during a subsequent trip to Mozia.

## Discussion

The data, both metric and non-metric, appear in the tables. The use of these data for any significant statement regarding the biological history of western Sicily will depend on the identification and study of a population which is close in time and space to the people studied from the Punic period at Mozia. A considerable problem with the population described is the lack of good archaeological data to provide an evaluation of the temporal period from which individuals derive, except for the skeletons excavated by Prof. Isserlin. We would expect that the individual from Santa Ninfa would be completely outside the cluster from Mozia in any analysis. This could be the result of separation in time, since the Santa Ninfa material dates to the terminal Bronze Age.

At present comparative populations of significance are not available. In his research on non-metric variants in the skeleton and population comparisons Sjøvald (1973) provides a good explanation of the statistical problems, and some data of possible use to this study. The area from which Sjøvald derives his populations is at the eastern fringe of the Mediterranean, with the closest to our target being Egypt. However, he does provide data from Palestine which could be of use in studying the Carthaginian population, and by derivation the settlers at Mozia.

As noted above, the data offered by Coppa *et al.* (1980) may be far removed in space, but it does form a cluster which is cohesive in time and at a single location. The information provided by Ardito (1975, summarized in 1977) appears to provide the best opportunity to derive comparative populations for the Mozia study. However, Ardito forms clusters in which each population (Etruscan, Roman, etc.) is aggregated by "culture" and not factored for time nor space. Scrutiny of the basic data may permit sets of information to be retrieved which would be united in time and space, and thereby allow for a diachronic study of biological change.

### *Potential for Analysis*

The material included in this research derives from several locations around Mozia and from burials which were made over several hundred years. We anticipate, however, that these individuals would conform to a narrow target relative to the single individual from Santa Ninfa. Although Santa Ninfa is located in the province of Trapani, it lies on the far eastern side. Furthermore, the single individual from Santa Ninfa derives from a Terminal Bronze Age context. This individual should conform to a craniometric pattern native to western Sicily, and distinct from a Punic or mixed population of several hundred years later (Howells 1973).

A complete listing of the skulls and their various sources appears in the appendix. The data of interest here appears in the two tables.

*Pathologies: A brief note*

The population which was the focus of this study consisted almost entirely of skulls, most of which were found to be remarkably free from pathologies. In those few cases where postcranial remains are known, pathologies tend to be in the vertebral column. Prof. Moore's study of one skeleton excavated by Prof. Isserlin (ISS '55) notes osteoarthritic changes among the lumbar vertebrae, but nowhere else. Among the few vertebrae found loose among the boxes of skull fragments only one cervical body shows pathology, in the form of extensive lipping.

Since most of the skulls cannot be related to the postcranial pieces only cranial pathologies merited our attention in this situation. Fornaciari (1983) studied a series of 24 skulls from the 3rd century B.C. at Carthage. He found 13 of these to have *cribra orbitalis*, and noted that all of the children and adolescents were affected. Fornaciari suggests that this high incidence derives from chronic and endemic iron deficiency anemia, and that these skulls had a low bone iron content.

No cases of *cribra orbitalis* were clearly indicated on the skulls in this sample from Mozia. However, the period of the 3rd century B.C. is neither clearly nor extensively represented from Motya. Although pathologies were not the focal point of this study remarkably few indications of medical problems were noted. A specific program of study to deal with the paleopathologies is in order.

*Scoring and Evaluation*

In all cases but one the numbers used are coded for analysis, with «0» indicating absence of a trait and «1» indicating presence. Trait 3, the «lambdoid ossicle», is an exception, with the number listed reflecting the actual total number of ossicles in each leg of the suture. The indication «D» means that slight damage renders an accurate assessment impossible. Where the entire area is absent or destroyed no scoring is indicated.

Traits marked «present», as indicated by the number «1», are visible or present. Some confusion resulted from previous authors' use of the terms absent and present (followed here) in random fashion rather than noting that all traits were being scored on the same basis.

Note that Traits 32-34 have been added to the usual list of characteristics observed. Nasal guttering is common in the Mediterranean fringe and shoveled incisors are quite common.

**Appendix: archaeological and other data concerning the sample***Archaeological Data on the Mozia Crania from the Whitaker Excavations*

The majority of the crania now at Mozia derive from excavations conducted early in this century by G. Whitaker. Whitaker recovered skeletons from Mozia as well as from Necropoli at Birgi and Lilybaeum. These remains range in date from the early occupation of the island through the Hellenistic period or later. Most of these remains were lost or discarded, but a collection of 23 skulls was kept in a special cabinet. This collection has been moved several times within recent memory. Each shift may have led to the recombination of the skulls and the separate labels which were affixed to the wooden shelves. This listing is an attempt to present the evidence as found with the hope that some order may be achieved.

In addition to the shelved skulls several boxes of bones were held in the old church. The human bones filled four boxes, from which several «skulls» were reconstructed (X-Z).

TABLE 1. - *Non-metric data from a series of skulls recovered in excavations at Mozia, Sicily and nearby sites. Recorded in May of 1983.*

Skull	No.	A	B	C	D	E	F	G	H	I	J	K	L	M
1.	GOL	190	202	178	188	192	202	183	185	190	180	180	182	190
2.	NOL	183	199	177	186	190	200	179	181	188	179	178	181	189
3.	BNL	—	112	100	107	105	106	101	103	95	102	100	106	100
4.	BBH	—	144	132	133	140	140	132	140	125	126	131	130	132
5.	XCB	141	142	138	146	140	145	136	151	135	132	137	127	127
6.	XFB	122	117	120	119	117	125	115	126	121	118	122	106	112
7.	STB	119	113	120	114	116	125	114	124	120	116	121	105	110
8.	ZYB	—	142	120	138	135	—	122	137	126	122	127	—	120
9.	AUB	—	130	108	131	130	130	116	132	117	115	115	122	113
10.	WCB	—	69	62	75	76	73	78	44	73	78	79	47	68
11.	ASB	—	D	99	111	119	121	111	110	111	104	110	107	106
12.	BPL	—	102	98	101	96	101	96	105	90	94	99	95	95
13.	NPH	—	66	68	72	67	69	61	63	65	69	65	61	65
14.	NLH	—	51	51	53	54	53	47	50	49	50	49	45	50
15.	OBH	—	34	32	34	34	39	30	32	38	36	32	32	35
16.	OBB	—	38	36	42	39	41	37	43	41	39	41	43	36
17.	JUB	—	127	108	—	115	—	109	118	115	104	112	—	108
18.	NLB	—	25	23	28	25	23	25	27	25	24	29	27	25
19.	MAB	—	63	61	65	64	65	61	68	60	59	63	51	60
20.	MDH	31	30	25	31	24	32	27	32	28	26	29	27	30
21.	MDB	28	29	24	22	36	29	24	30	25	24	25	15	19
22.	ZMB	—	94	92	—	95	—	—	101	91	92	99	97	91
23.	SSS	—	26	19	—	27	—	—	24	21	21	27	—	28
24.	FMB	—	100	92	101	97	100	96	98	101	88	96	96	93
25.	NAS	—	27	18	19	20	22	18	20	18	15	14	27	21
26.	EKB	—	101	93	101	97	—	94	100	98	89	97	—	95
27.	DKS	—	19	11	9	11	—	14	—	8	12	13	—	6
28.	DKB	—	24	22	30	22	21	22	28	19	20	23	22	26
29.	NDS	—	16	9	15	11	14	13	10	10	13	—	8	—
30.	WNB	—	18	10	7	10	9	9	10	13	10	—	—	—
31.	SIS	—	6	4	6	5	5	5	—	5	4	—	—	—
32.	IML	—	36	31	35	33	35	34	40	35	30	34	—	31
33.	XML	—	55	54	61	59	61	50	53	51	50	52	—	45
34.	MLS	—	12	9	14	12	15	9	9	12	10	10	—	8
35.	WMH	—	37	37	44	42	40	31	38	31	37	38	40	32
36.	SOS	21	28	19	18	20	26	22	24	21	17	18	20	22
37.	GLS	8	6	0	3	3	2	1	4	2	1	3	3	2
38.	FOL	—	38	31	35	42	37	35	36	35	32	36	36	35
39.	FRC	124	118	108	108	113	120	109	108	107	110	110	101	111
40.	FRS	30	32	29	24	24	32	28	26	29	33	28	20	23
41.	FRF	67	48	44	50	50	51	56	44	44	45	48	46	44
42.	PAC	120	121	112	116	114	132	116	118	119	105	105	107	115
43.	PAS	28	26	26	25	25	31	26	—	27	23	21	23	24
44.	PAF	54	62	59	57	60	65	62	—	62	51	55	57	49
45.	OCC	110	102	91	95	103	94	96	97	97	94	94	101	102
46.	OCS	19	33	31	32	29	36	28	27	34	28	27	31	35
47.	OCF	61	40	46	46	47	49	45	41	52	45	40	39	47

*(segue Table 1)*

Skull	No.	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1.	GOL	176	178	182	178	186	184	183	195	188	192	196	171	
2.	NOL	174	177	181	177	185	184	180	191	185	189	194	171	
3.	BNL	95	92	103	98	100	106	99	103	106	110	106	91	
4.	BBH	135	136	137	138	135	131	142	144	132	147	139	122	
5.	XCB	134	142	137	142	141	148	156	143	136	151	139	132	132
6.	XFB	121	117	111	125	122	129	133	123	122	122	121	108	137
7.	STB	119	116	106	125	118	121	123	121	117	118	120	107	
8.	ZYB	126	131	126	130	132	133	135	131	133	137		117	
9.	AUB	115	124	120	122	117	126	128	121	120	133	127	114	
10.	WCB	66	77	71	74	71	76	74	70	73	77	75		122
11.	ASB	105	109	116	112	106	115	122	121	116	125	115	107	
12.	BPL	86	87	95	98	105	95	94	90		103	103		112
13.	NPH	61	65	68	66	64	67	71	62		64	71		
14.	NLH	50	49	51	50	49	50	53	49		49	53		
15.	OBH	33	35	35	34	32	31	31	33	34	34	36		
16.	OBB	37	40	36	43	41	39	36	41	39	42			
17.	JUB	113	115	114	116	116	118	115		118	117			
18.	NLB	25	21	23	23	26	26	27			25	27		
19.	MAB	59	64	55	54	61	64	63			64	56		
20.	MDH	23	30	26	30	29	28	26	27	27	30		24	
21.	MDB	20	24	16	23	26	21	29	27	22	23	30	19	
22.	ZMB	94	96	94	96	94	96	99		96	102	96		23
23.	SSS	22	25	24	21	29	22	30			26	29		
24.	FMB	94	95	95	101	100	98	97	98	98		103	91	
25.	NAS	12	13	20	18	19	20	19	18	18		19	14	
26.	EKB	95	97	94	99	100	97	96		97				
27.	DKS	6	9	14	14	19	14	12		17				
28.	DKB	20	19	17	20	20	22	22	22	22	22	24	22	
29.	NDS	—	8	11	11	8	13	11	10	10	11	9	10	
30.	WNB	8	10	12	9	9	8	12		14	9	11		
31.	SIS	—	4	6	3	3	4	6		6	4	9		
32.	IML	30	32	35	29	39	38	32	36	38	37			
33.	XML	49	48	54	52	57	61	54	51	52	54			
34.	MLS	9	10	11	10	9	12	10	11	11	12			
35.	WMH	34	40	39	41	40	40	43	38		38	41		
36.	SOS	19	20	21	22	20	23	21	25	23		29	16	
37.	GLS	1	2	0	3	2	2	3	4	4		4	2	
38.	FOL	36	36	40	35	35	34	36	34	37	35	38	37	40
39.	FRC	108	119	105	112	116	113	118	123	103	115	109	101	
40.	FRS	28	30	25	26	27	28	29	30	24	28	22	23	
41.	FRF	46	51	46	51	54	50	54	57	44	55	52	48	
42.	PAC	115	108	115	115	109	113	121	126	115	120	129	108	116
43.	PAS	27	23	24	29	22	27	29	28	25	29	29	29	27
44.	PAF	61	54	51	58	61	66	71	55	61	64	68	55	56
45.	OCC	91	99	97	102	100	87	101	97	101	104	99	88	106
46.	OCS	23	25	27	26	32	29	27	23	30	29	29	24	30
47.	OCF	40	45	41	51	48	50	47	38	55	41	59	35	47



(segue Table 1)

Skull	No.	AA	BB	CC	DD	EE	FF	GG	HH	II	LL	ISS '63	ISS '55	13/6 1981	Santa Ninfa
1.	GOL	184				182						178	193		169
2.	NOL											178	190		168
3.	BNL											100	108		95
4.	BBH											128	142		130
5.	XCB	140				133						139	139		140
6.	XFB	121										121	118		111
7.	STB	117										113	113		110
8.	ZYB												135		120
9.	AUB	122										121	124		114
10.	WCB	70											73		67
11.	ASB	124										109	118		111
12.	BPL				111							105	104		90
13.	NPH											70	68		60
14.	NLH											52	50		45
15.	OBH												31		30
16.	OBB												40		35
17.	JUB												117		112
18.	NLB											25	25		21
19.	MAB	62										60	66		60
20.	MDH	36										29	34	28	27
21.	MDB	29			24				22		28	26	22	24	21
22.	ZMB				25				23		19		100		87
23.	SSS												23		21
24.	FMB									99		98	105		92
25.	NAS											16	21		28
26.	EKB												104		93
27.	DKS												13		10
28.	DKB						24						24		21
29.	NDS												10		12
30.	WNB												13		11
31.	SIS												5		4
32.	IML											37	39		32
33.	XML											56	57		41
34.	MLS											12	11		5
35.	WMH												41		38
36.	SOS				19							14	21		17
37.	GLS		3	2				3				3	4	5	1
38.	FOL	36										36	37		36
39.	FRC	99	120	100			102					109	107	116	107
40.	FRS		27	22			24					22	23	31	25
41.	FRF		58	49			40					52	50	50	43
42.	PAC	122		123	111	113						99	119		99
43.	PAS	26		28	26	23						20	26		24
44.	PAF	57		67	58	55						45	60		59
45.	OCC	97			89							97	104		99
46.	OCS	26			24							30	33		20
47.	OCF	47			46							44	52		45

TABLE 2. - Craniometric data from the same series listed in Table 1.

Non-metric traits	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	R-L	R-L	R-L	R-L	R-L	R-L	R-L	R-L	R-L	R-L	R-L	R-L	R-L	R-L	R-L	R-L	R-L
1. Highest nuchal line present	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2. Ossicle at lambda	0	0	0	0	0	0	0	0	0	0	0	0	D	0	1	0	0
3. Lambdoid ossible present	0/0	D/1	0/0	1/1	1/1	0/0	0/0	D/0	0/0	0/2	1/0	0/1	0/0	2/1	2/2	0/0	0/0
4. Parietal foramen present	1/0	1/1	1/0	1/1	1/0	1/0	0/1	D/D	0/0	1/0	1/0	1/0	0/0	1/1	0/1	1/0	0/1
5. Bregmatic bone present	0	0	0	0	0	0	0	D	0	0	0	0	0	0	0	0	0
6. Metopism	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7. Coronal ossicle present	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/1	0/0	0/0	0/0
8. Epipteric bone present	0/D	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/1	0/0	0/0	0/0	0/0	0/0	0/0	0/1	0/0
9. Fronto-temporal articulation	D/D	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
10. Parietal notch bone present	0/0	D/1	0/0	1/1	0/0	0/0	0/0	1/D	0/0	0/0	0/0	0/0	0/0	1/1	0/0	0/0	0/0
11. Ossicle at asterion	D/1	D/1	0/1	0/1	0/0	0/0	0/0	0/D	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
12. Auditory torus present	0/D	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
13. Foramen of Huschke	0/D	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
14. Mastoid foramen exsutural	0/D	D/1	0/0	0/1	0/1	0/0	0/0	1/D	0/0	0/1	0/1	1/0	0/0	0/0	0/0	0/0	0/0
15. Mastoid foramen (absent-present)	1/D	D/1	1/1	1/1	1/1	0/1	1/1	1/D	1/1	1/1	1/1	1/1	1/1	1/1	D/1	1/1	1/1
16. Post. condylar canal present	D/D	0/1	1/1	D/D	1/1	1/1	1/1	D/D	1/1	0/D	1/1	0/1	1/0	D/0	0/1	1/1	1/1
17. Condylar facet double	D/D	0/0	0/0	0/0	0/0	0/0	0/1	0/0	0/0	0/0	0/0	0/1	1/1	D/0	0/1	1/1	0/0
18. Precondylar tubercule pres.	D/D	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/1	1/1	0/0	0/1	0/0	0/0
19. Ant. condylar canal double	D/D	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/0	0/1	0/1	1/0	0/1	D/D	0/0	1/1	0/0
20. Foramen ovale is incomplete=1	D/D	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
21. Foramen spinosum open	D/D	0/0	0/0	0/0	0/0	0/D	0/0	0/0	0/0	0/0	0/D	0/0	0/D	0/0	0/0	0/0	0/0
22. Acc. les. palatine for. pres.	D/D	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/D	0/0	0/D	0/0	D/0	0/0	0/0
23. Palatine torus present	D	0	0	0/1	1/1	0/0	1/1	1/D	0/0	0/0	D/D	1/1	0/0	1/0	0/0	1/0	0/1
24. Maxillary torus present	D/D	0/0	0/0	0/0	0/0	0	0	0	0	0	0	0	0	0	0	0	0
25. Zygomatico-facial for. abs.	D/D	1/1	1/1	1/D	1/1	D/1	1/1	1/1	1/0	0/0	0/0	0/D	0/0	D/0	0/0	0/0	0/0
26. Supraorbital foramen comp.	0/0	1/0	0/0	0/0	1/1	0/0	1/0	0/1	0/0	1/0	1/0	0/0	0/0	0/0	1/1	1/1	1/1
27. Frontal notch/foramen	1/1	1/1	0/0	0/0	1/0	1/1	0/1	0/0	1/0	0/0	0/0	1/1	1/0	1/D	0/0	0/0	1/0
28. Ant. ethmoid for. exsutural	D/D	1/D	D/D	D/D	0/0	1/1	0/0	D/D	0/0	D/D	D/D	0/0	0/0	D/D	0/0	0/1	0/1
29. Post. Ethmoid for. absent	D/D	D/D	D/D	D/D	1/1	1/1	1/1	D/D	1/1	1/D	D/D	1/1	0/0	D/D	1/1	1/1	1/1
30. Acc. infraorbital for. pres.	D/D	0/0	0/0	D/D	1/0	D/D	1/0	0/0	0/0	0/0	1/D	0/D	0/0	D/D	D/D	0/0	0/0
31. Sagittal wormian bones pres.	0	1	0	0	0	0	0	D	0	0	0	0	0	0	0	0	0
32. Nasal guttering	D/D	1/1	0/0	0/1	0/0	0/*	0/0	0/0	0/0	0/0	1/1	0/0	0/0	D/D	0/0	0/0	0/0
33. Shoveling: central I	D/D	0/0	0/D	*D	D/D	*0	D/D	0/D	D/D	**	D/D	0/0	D/1	D/D	*/*	D/D	0/0
34. lateral I	D/D	0/D	D/0	1/1	D/D	*/*	D/D	0/D	D/D	*/*	*D		D/1	D/D	0/0	D/D	
35. Sex	M	M	F	F	MP	MP	F	M	MP	F?	M	F	F	F	F	F	M?
36. Age	60	60	52	50	50	60	40	40	50	32	44	75	18	30	25	60	70



(segue table 2)

Non-metric traits	II	JJ	KK	LL	MM	ISS.	ISS.	13 Jun.	Santa
	R-L	R-L	R-L	R-L	R-L	1963	1955	1981	Ninfa
						R-L	R-L	R-L	R-L
1. Highest nuchal line present			0	0		0	0		0
2. Ossicle at lambda			0			0	*		0
3. Lambdoid ossicle present			0/D	0/0		0/0	*		0/0
4. Parietal foramen present			1/1	1/0		0/0	*		1/1
5. Bregmatic bone present	0			D		0	0		0
6. Metopism	0	0		D	0	0	0	0	0
7. Coronal ossicle present						0/0	*/*		0/0
8. Epipteric bone present					D/1	0/0	0/0		0/0
9. Fronto-temporal articulation						0/0	0/0		0/0
10. Parietal notch bone present			0/D	D/0		0/0	1/1		0/0
11. Ossicle at asterion			0/D	D/*		0/0	1/1		0/0
12. Auditory torus present			0/D	D/0		0/0	0/0	0/0	0/0
13. Foramen of Huschke			0/D	D/0		0/0	0/0	0/0	0/0
14. Mastoid foramen exsutural				D/0		1/1	1/1	1/1	1/1
15. Mastoid foramen (absent-present)				D/1		1/1	1/1	1/1	1/1
16. Post. condylar canal present						D/D	1/0		1/1
17. Condylar facet double						0/0	0/0		0/0
18. Precondylar tubercule pres.						0/0	0/0		0/0
19. Ant. condylar canal double						0/0	0/1		0/1
20. Foramen ovale is incomplete=1						D/D	0/0		0/0
21. Foramen spinosum open						D/D	0/0		0/0
22. Acc. les. palatine for. pres.						0/D	1/0	D/D	1/1
23. Palatine torus present						0	0	*/*	0
24. Maxillary torus present						0/0	0/0	0/0	0/0
25. Zygomatico-facial for. abs.						1/1	1/1	1/D	1/1
26. Supraorbital foramen comp.	0/0	D/0		D/0	D/1	0/0	0/0	D/1	0/0
27. Frontal notch/foramen	0/0	D/1		D/0	D/1	0/1	1/1	D/1	0/0
28. Ant. ethmoid for. exsutural						D/D	1/1	D/D	1/1
29. Post. Ethmoid for. absent						D/D	1/1	D/D	1/1
30. Acc. infraorbital for. pres.						D/D	0/0	D/D	0/0
31. Sagittal wormian bones pres.						0	*	D	0
32. Nasal guttering						0/0	1/*	0/0	0/0
33. Shoveling: central I						0/—		D/D	D/D
34. lateral I						0/—		D/D	D/D
35. Sex	F	F	F	F	M?	M?	M	F	F
36. Age	60	40	14	60	40?	50	40	30	33

## Scoring:

0: Absent

1: Present

D: Damaged

\*: Trace

After Berry and Berry 1967.

One box held several «sets» of long bones which had been wired together in cross patterns, probably as church decoration, and skull X. A second box had the remains of at least seven different people represented by mandibular fragments, but only five represented by skull pieces. Skulls Y and Z came from this container, which also held seven pieces of cremated bone and at least two pathological specimens (see field notes, May 1983). An animal rib with a copper-oxide stain suggests that it may have come from a tomb. Box 3 held portions of at least three skulls, generally in smaller fragments than found in Box 2. A large number

of human vertebrae and animal bones were in this lot. The fourth box held pieces of at least seven skulls, but all extremely fragmentary.

Crossfits were found between the pieces labeled «A» on the shelf and fragments from boxes two through four. Most of these fragments, including a frontal bone with a horn-like growth above the left orbit, could not be matched with other pieces. All or parts of 10 mandibles (7 adult, 3 juvenile) are present. On those 6 with gonion the eversion was generally extreme. This was true of the mandibles with «matching» skulls on the shelf, except for «M» which has no eversion.

About 25 skull pieces representing about 12 adults and perhaps 3 juveniles indicate considerable breakage and loss of small fragments. Nasal guttering is slight on one of the 2 maxillary sets found, and no palatine torus appears.

The cabinet of the 23 skulls was inventoried twice. Labels were found under some of the skulls, but these are unlikely to have meaning. Other skulls had labels affixed to them, or numbers written in pencil on the bone. In many cases the mandibles with these skulls definitely have been mismatched. In general the skulls were not cleaned, which helped considerably in their preservation. The earth or sand within the skull also may provide valuable clues as to the specific cemetery from which each originated. The following list provides letter designations to the 23 skulls as they were found, beginning with the upper left and following left to right across the 3 shelves.

A. A small cluster of skull fragments were found in this position, including a calotte, 3 temporal pieces, a maxilla, an occipital fragment, and a mandibular fragment. The label on the shelf at this locus, but as in all cases not necessarily associated with the bone, reads, «2549 Necropoli Birgi Terre di Antonio Licasi».

Some of the «extra» bone in this group have been fitted together to form skull AA; see below.

B. This relatively intact skull is missing the rear right portions and the mandible. The skull was filled with a light shade of reddish-tan sandy soil. No label was on the shelf near this skull.

C. An intact skull and mandible filled with light tan sandy soil. The label on the shelf reads, «2537 Tomba punica incavola nella roccia Necropoli Lilybeo Terre Doty (?) Lentini Contrada Cappuccine 2 Aprile 1903». All 16 mandibular teeth are present, and of the maxillary dentition only M1 had been lost antemortem.

D. A well preserved skull and mandible filled with grayish sandy soil. A tag on the right zygomatic has «l 1 44» on the obverse and on reverse, «Nel Isole di Mozia Patzalargua 22 Maggio 1906». This must not be a reliable indicator of origin since the reverse of the tag reads «2(4?)46, but the skull has «2544» written on it in pencil. This skull was found on this shelf over a label which reads as follows: «2538 Niccia incarato nella roccia caperta a losne di pretra - Nel Lilybeo - Terre Bongiorno Contrada San Carlo 19 Aprile 1903». These labels clearly disagree as to the origin of this skull and indicate that the shelf labels probably are not related to the skulls found in association in 1983.

E. Skull and mandible, the latter of a different color but articulating well with the skull. In the skull the soil is a clayey-sand of tan-brown color. The shelf label reads, «2545 Necropoli Birgi Scavi da Sanges Gen. 1907». Next to this is a loose card which says «Necropoli Birgi dono di Sanges». The agreement of the fixed shelf label and the loose tag suggest that some of these skulls might actually relate to the shelf labels, but possibly this is only by statistical chance. The agreement between the paper label text and the pencilled number on Skull J («2546») provides a further suggestion that these skulls may be fairly accurately designated.

Fifteen of the mandibular teeth are present, the 3M having never erupted. A carie is present on 2M and an abscess brackets 2M and 1M. The degree of plaque buildup is impressive. The maxillary dentition is extensively damaged.

F. and G. These two skulls were found on the right side of the top shelf, but not in direct association with any intact labels. In the area of the shelf occupied by these 2 skulls are the remains of 3 labels, either as fragmentary peices of paper or as «outlines» on the sheld where a label had been held in place by tacks. On the middle shelf of this set there were found 2 loose labels which appear to have fallen from above. Whether these 2 labels came from the 3 «slots» occupied by skulls F and G, (or more remotely, from B) cannot be established with certainty. The folds in the tops of these 2 loose labels, where the paper was bent back over the top of the shelf, clearly indicate that they came from the top shelf where all of the labels remaining have this 90 degree bend. However, the edges of the 2 loose labels do not match the scant remains of labels still in place on the top shelf. Possibly they did match, but the edges have been nibbled by insects and otherwise damaged.

The two labels are inscribed as follow:

Label No. 1: «2544 Necropoli Birgi Dono di Sanges Feb. 1906». Also on this label, in pencil rather than in ink, is the marking «111» and also «m». Note that this must relate to skull D which has «2544» in pencil written on it. F/G No. 2: «2542 Necropoli Lilybeo Terre Ginf (?) Erranto Tombo punica incavados nella roccia profonda 6 metri con 2 camere laterale Aprile 1903». Also, in pencil, there appears a «1» in the upper right portion of the label, where the «111» on tag F/G No. 1 is located. Quite possibly this second tag was beneath the area where skulls F and G were located. These 3 tags may have been numbered 2542 through 2544, with subsidiary pencil labeling of «1» through «111».

The skulls as located are as follow:

F. Skull only, no mandible, but filled with a sandy soil of rust red color. the skull has all 16 maxillary teeth in perfect condition.

G. Skull only, and without soil around it. This absence of soil suggests that this skull may have been associated with label F/G No. 2. This skull may have been washed and cleaned, but some red earth and red stains are evident in the basal area (similar to those traces on skull H). Most of the 16 maxillary teeth were lost post-mortem.

H. This very round skull, and the 2/3 of a mandible with it (but of different color), occupied the far left position on the second shelf. The mandible fragment has a green stain on it, and 2 bronze coins with it may have been the cause. If cleaned, these coins might provide a date for these bones. A pencilled «1111» appears on the shelf to the right of the label, suggesting that this is part of the sequence associated with F and G. above. The label reads «2536 Tomba punica Necropoli Lilybeo Terre Parrisiello Contrada Capuccini 16 Aprile 1903». Red earth stains similar to G above. The rear of the skull is smashed. The mandibular teeth were lost post mortem. Two maxillary teeth were lost before death and a third is carious (3/16).

I. Skull and right 3/4 of mandible filled with a gray soil. Label reads, «2539 Necropoli Lilybeo Terre Dott Bersolini all'angolo del Castello 30 Aprile 1903». Fourteen teeth were in each jaw at death, with no evidence of dental pathology.

J. This skull has a mandible and several vertebrae associated with it. The vertebrae are in a mass of brown-tan sandy soil. In pencil on this skull is «2546», a number which correlates with the associated tag («2546 Necropoli Birgi Terre Sanges 1907»). This suggests that the skulls and tags may be accurately matched.

The mandible has 16 teeth with but 1 carie, and no caries are noted in the maxilla (1/32). The maxillary central incisors and the left lateral have an interesting vertical scoring pattern on the anterior edge, perhaps reflecting an occupational use of these teeth. A class 2 malocclusion and slight lateral misalignment is evident.

K. This skull has a damaged face, but an intact associated mandible. The skull has black ash-like stains on it. The label is difficult to read («2541 Necropoli Lilybeo \_\_\_on is regione \_\_\_cis\_\_\_ fra carmina di pis\_\_\_mbo verita Terre D'Lentini Contrada Coppuccini 7 Dic. 1903»).

The mandible had all 16 teeth at death, but 3 have become lost since then.

L. The skull of an old adult with a mandible which is not a mate. The mandible has a piece of string tied to it, but no tag attached. The skull is bleached white, has no earth adhering nor soil stains, but does have «2547» written on it. The tag reads approximately as follows: «2547 Necropoli Birgi Terre Marions P(osf) obayera».

All 16 teeth were present in the mandible at death. All but 4 (possibly 5) of the maxillary teeth were lost before death and significant bone resorption had taken place. The right molar is diseased.

M. Skull of a female (?) age 18, and mandible with some brown-tan earth adhering. The tag reads «2551 Necropol di Motya Porta Nord Maggio 1911». In the lower right corner of this tag, in pencil, appears «11111». On the skull is written 255\_\_, with the last digit either a zero or an eight, but possibly a «1».

When in situ this skull lay on its side. The atlas was found in place in the earth still on the skull. All 32 teeth were present or erupting at death.

N. A skull (age ca. 30 years) and mandible with traces of tan-brown earth like that found in skull M. The label reads «2550 Necropoli di Motya Porta Nord Strato superiore Maggio 1911».

The right incus was found. Both maxilla and mandible had all 14 teeth, with no third molars erupting.

O. This female skull and mandible are the last on the right of the middle shelf. The label reads «2548 Necropoli Birgi Terre di Antonio Licasi». No dental disease is noted on any of the 32 teeth, but the right mandibular third molar is impacted.

P through T occupy the left side of the lower shelf and no labels are associated with any of them. Each is a skull and mandible «pair» and only differ in the soil adhering, or lack of earth in association. Each characterization, therefore, is limited to this information.

P. Tan-brown earth. Several mandibular teeth had been lost before death (4?) and several were lost after death. All 4 distal maxillary molars were lost before death and 2 of the maxillary premolars have caries for a disease rate of 6/16. The mandible also may have suffered a similar loss (6/16) for a disease rate of 12/36. The individual, however, appears to be a mature adult (50 plus).

Q. No associated earth. Written on this skull is «2575» (or possible «2545»). This is an old adult, with 9/16 mandibular loss rate and a 8/16 maxillary rate (17/32 total).

R. No associated earth. This skull is in excellent condition and would appear to have come from a recent tomb, although it may be simply a well preserved ancient cranium.

The age is estimated at 60 years, but only 2 teeth in each jaw had been lost before death (4/32). The right maxillary lateral incisor has a slight asymmetry, but the left has a *significant* asymmetry on the medial aspect, increasing the apparent degree of shoveling.

S. Sandy soil of a light-tan-yellow color. Disease rate of 0/32.

T. Sandy soil of a tan color. Skull has «2551» in pencil on it. The mandible definitely does not match the skull. The mandible is that of a young adult, age 30-40. The skull has lost 4 or 5 of the 16 teeth to decay. The remaining teeth in both jaws generally were lost postmortem.

U. This skull, with a damaged face, also has a mandible associated with it, and is filled with a tan-brown soil. The label, found between skulls U and V, reads approximately as follows: «2543 Necropoli di Lilybeo (Tomba) punica Terre \_\_\_\_\_nte Baluardo \_\_\_\_\_in-  
sio\_\_ Aprile 1903».

The mandible had all 16 teeth intact at death (2 teeth subsequently were lost). For the most part the maxilla was damaged by post-excavation difficulties, but clear evidence exists for disease destruction from PM2-M3. This region has dissolved or been resorbed well into the body of the sphenoid, perhaps through a cancerous growth.

V. Skull with no mandible. the skull must have been inverted in an open tomb which

filled with tan gritty soil. Only 3/4 of the skull is thus filled. The face has decayed in the way that bone decays in tomb chambers into which earth has not filtered.

Glued on the skull is a label, «Tomba Grec Porta Nord 27 (Jug) 1911». The month may read «Mg» but probably is Juglio.

W. A skull with no mandible. Repairs have been made using thick wire to hold the skull together. Tan soil is associated with the skull, and a peice of animal mandible is in association. No label. All 16 maxillary teeth were present at death, but most were lost subsequently.

The remainder of the pieces studied derived from the mixed collection of bone in storage noted at the beginning of this section. All of these have been «assembled» from the pieces, but still other skulls may have existed at one time.

X. Skull of an old adult male, from Box 1. No mandible. All 6 maxillary molars were lost before death and the bone extensively resorbed.

Y. Skull originally believed to be a late adolescent, age ca. 15 years, from Box 2. The entire face of this person has been smashed. This skull originally (Jan. 1983) was evaluated as an adolescent, but the notes of the summer of 1983 describe this person as a female age approximately 30 years. This latter analysis probably is more accurate.

Z. Skull constructed largely from pieces from Box 2, but also cross-fits found with Box 3. No mandible, frontal, or face.

AA. A relatively complete but badly damaged skull and mandible. Most of this skull (R. sphenoid, R. temporal, most of the occipital) was mixed with the pieces now skull A. A right parietal and other pieces were found in Box 4. The maxillary and mandibular fragments were matched by their similarity in texture to the rest of this skull. Whether this skull (AA) or that listed as A above belongs with the label «2549» is unknown.

The molar-maxillary area, matched by texture and red tint to the calotte, had teeth *in situ*, but smashed to the roots. Whatever caries may have been present did not cause any tooth loss.

BB. Fragment of calotte only.

CC. Piece of calotte only.

DD. Calotte.

EE. Calotte of adult female, age 35-40 years.

FF. Most of a calotte.

GG. An occipital with both parietals and a frontal bone which cannot be fitted, but which may be a match.

HH. A right temporal with pieces of a frontal(?), right parietal, and occipital bones.

II. Piece of frontal with an attached left parietal fragment.

JJ. A piece of frontal and piece of left parietal.

KK. A right temporal bone of an adolescent plus pieces of parietals and occipital.

LL. A left temporal, pieces of parietals and the occiput, plus 2 fragments of skull (one a frontal) all of which may be related.

#### *Observations on these Individuals*

J. The maxillary incisors are all worn on the lingual surface.

K. Various characteristics suggest that this is a Negro or individual with a genetic background derived from Africa.

M. A tubercle is present on the lingual surface of the maxillary left second incisor.

N. This person has an unusually small face.

O. A tiny ossicle is present at lambda.

T. The condylar facet is double in an anterior-posterior direction rather than laterally.



W. The anterior condylar canals are *very* distinct in the individual.

JJ: No measurements possible.

KK: Child.

MM: This person is represented only by a single fragment of adult frontal bone plus a piece of a zygomatic and epipteric bone.

NN: Child, age 10-12 years.

OO: Child, age approximately 8 years.

PP: Child, age approximately 10 years.

#### *Additional Skeletons Included In This Sample*

*Isserlin 1955*: Skeleton recovered from outside (north) of the Porta Nord at Motya by Prof. Isserlin in 1955 (Sarcophagus in Trench 6, Isserlin *et al.* 1958: 16-18,20,25). The evaluation by Prof. Moore, based on observations made in 1972, produced an evaluation of age at 40 years. My observations suggest an age of about 50 years. Since these skulls were being re-examined to secure non-metric data, some time was devoted to taking measurements as a test of observer reliability. In the main the measurements made by Prof. Moore were in agreement with those made by the author, when rounded to the nearest millimeter. In a few cases (e.g. WCB) significant variations were found. In order to standardize the overall program the author's results have been included.

Professor Moore calculated the stature of this male at about 174.1 cm., based on the means of 6 estimates each made from a separate long bone. No regression formula utilizing a series of bones was considered.

This sarcophagus was dated by Isserlin to the Late 6th Century B.C. Culican (Isserlin *et al.* 1958:25) notes that Whitaker (1921:246, fig. 31) had found other sarcophagi with similar contents during earlier excavations on the island.

*Isserlin 1963*: Skeleton labeled «299» by prof. Isserlin, and dated to about 500 B.C. (??).

The probability of this individual being a male is agreed upon by Prof. Moore and me. However, we differ in our evaluation of age. Whereas I suggest an older individual, Prof. Moore believes the age at death to have been closer to 30 years. He calculates a stature of about 170 cm.

*Santa Ninfa*: Single skeleton from Timpone Pontillo (see above), in the area of S. Ninfa. This individual is included as a means of testing the data listed above.

*Mozia Skeleton*: MO 81/13 Giugno K.65 Loc. 6517

During the summer 1983 research program the remains of a human skeleton excavated in 1981 at Mozia were analyzed. These appear to be the bones of a single adult female of age about 30 years (see field notes). As seen in the laboratory the bones appear to have been at least partially articulated since 3 thoracic vertebrae were in order. Ribs and other fragments, however, appeared randomly in the many packages which contained these remains. One bag included 4 rib fragments, a patella fragment, and the distal end of a femur.

The fragmentary remains of this woman are most notable for the absence of the parietals and the occiput as well as the mandible. Since the calotte and jaw would be most likely to survive we can only assume that these pieces were treated differentially at some time in the past, perhaps at a time when the rest of the remains were relocated (?), or that these elements were separated by some other process. In the absence of these sections of the skull little can be done to evaluate the remains, and the period of origin is not known. The metric and non-metric data which can be recovered have been tabulated, but little more can be said about these remains.

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