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The Stature of the Susquehannock Population of the Mid-16th Century Based on Skeletal Remains from 46HM73

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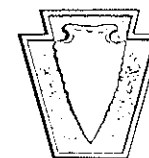
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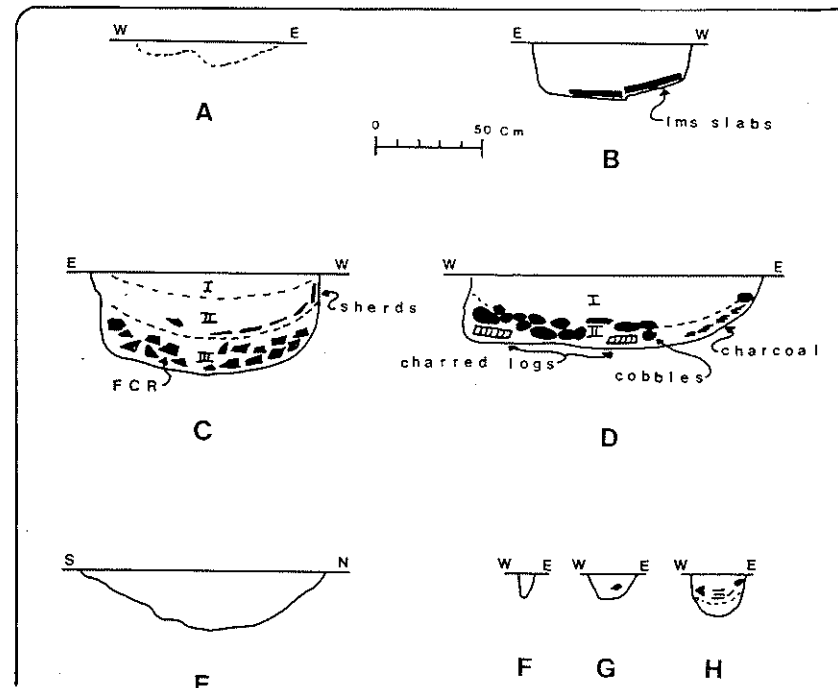
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The Stature of A Susquehannock Population of the Mid-16th Century Based on Skeletal Remains from 46HM73

Marshall Joseph Becker

ABSTRACT

When John Smith first contacted a group of Susquehannock in 1608 he described these people as "gyant-like." Direct confirmation of this observation can now be provided through studies of the long bones of a population which was part of the Susquehannock "confederacy." Recent excavations at a Susquehannock site on the South Branch of the Potomac River in Hampshire County, West Virginia, revealed portions of a palisaded village and associated features dating from the middle of the 16th century. This remnant of a flood-destroyed site yielded 13 relatively intact burials. Surface collection of skeletal material immediately downstream of the site after the flood provided long bones from at least 18 other adults. Calculation of the stature of the individuals represented in this sample and comparisons with the other Native American populations of this period confirm John Smith's observations.

INTRODUCTION

During the summer of 1986 Janet Brashler directed excavations at a palisaded Native American site (46HM73) located along the South Branch of the Potomac River and dating from the early Contact period (ca. A.D.1550). The ceramics from the site indicate that the occupants were related to, or a branch of, the Susquehannock of central Pennsylvania (Brashler, 1987). By 1525 the protohistoric Susquehannock had begun their relocation into an area along the lower end of the Susquehannah River (Kent 1984), with several factors combining to spur this move. The growing power of the Iroquois

confederacy and their control of the fur trade from the Great Lakes, across what is now central New York to the Hudson River, forced the Susquehannock to look elsewhere for furs to trade for European goods. From the area around Lancaster, Pennsylvania, the Susquehannock had access to large numbers of furs from the Mississippi Valley, via the Ohio River route, which they sold to European traders. By 1608 the Chesapeake Bay clearly had become one point of contact with Europeans. However, in 1622, after members of the Powhatan Confederacy attempted to kill all the European settlers along the Chesapeake Bay, the Susquehannock prudently shifted their trade to the Delaware River

(see Myers, 1912; Rising 1653–56). Unfortunately, the recent translation of the Rising report (Dahlgren and Norman 1988) is unreliable in those areas where Native Americans are discussed (Becker 1989).

Fur trading stations along the Chesapeake may have been established before the Spanish mission in that area was built by the 1560s. The shortest route for Susquehannock merchants who brought furs from the west to the upper reaches of the Potomac was to take them down that river into Chesapeake Bay. Village site 46HM73 along the West Branch of the Potomac, which is the subject of this study, must have been an early trade outpost of the Susquehannock nation. Although the Susquehannock people appear to have been resident along the Susquehanna River at a single, large palisaded village, numerous subdivisions or outlier communities must have existed.

The demographic complexity of the Susquehannock is indicated in the Rising report of 1653–1656. During this period the Susquehannock were coming under increasing stress from the Seneca as well as English colonists. In an attempt to encourage Swedish trade, and to gain Swedish military support, a delegation of White Minquas (the Lenape designation for the Susquehannock) came to the Swedish Fort Trinity (now Newcastle, Delaware) in 1655. Accompanying these "White Minquas" were "their united nations, the Tahaque, the Skonedidehoga, the Serasquacke, the true Minquas and the Lower Quarter of the Minquas . . ." (Rising 1653–56, and Myers 1912:140, 159–60, and Johnson 1917:278). These five peoples undoubtedly lived in separate villages not yet identified archaeologically (cf., Cadzow 1936:18). The mid-16th-century villages along the South Branch of the Potomac must have been settlements related to, but not necessarily subordinated to, one or more contemporary Susquehannock villages of that time.

The Susquehannock at Site 46HM73,

and at an even earlier village located nearby (Brashler 1987:3), could receive furs from suppliers from an enormous territory, and then relay these pelts to Europeans by using routes which avoided conflicts with the Five Nations. "Military" encounters, however, may have been sought to provide "ritual" or purely sporting interactions of a rather lethal form.

Human skeletal remains recovered in 1985 from surface collecting at 46HM73, after a disastrous flood, and from the 1986 excavations were analyzed before being returned to the property owners (Becker 1987; cf., Angel 1969; Bass 1979). Through comparisons of these craniometric data (Howells 1973) and non-metric observations (cf., Sjøvold 1973) it may be possible to relate this population to the other Susquehannock populations in ways similar to those employed for the Arikara (Key and Jantz 1981; see also Musgrave and Evans 1980; Becker 1982, 1985). The goal of this study is to focus on the stature of the population from 46HM73 as related to the John Smith observations and to create a model for further study of Susquehannock skeletal biology.

John Smith's first encounter with "sixtie of those gyant-like people" whom he called "Sasquesahanocks" took place during the summer of 1608 (Smith 1624:60). Earlier in his account Smith (1624:29–30) described some of the "naturall Inhabitants of Virginia" as "being very great as the *Sasquesahanocks*; others very little, as the *Wighcocomocoes*: but generally tall and straight." Smith's "Map of Virginia," compiled in 1612, was published with Smith's observations of those Susquehannock who had brought gifts for exchange in 1608. "Such great and well proportioned men are seldome seene, for they seemed like Giants to the English, yea and to the neighbors, . . . The picture of the greatest of them is signified in the Mapped. The calfe of whose leg was 3 quarters of a yard about, and all the rest of his limbes so answerable to that proportion, that he

seemed the goodliest man that ever we beheld" (Barbour 1969:342–43).

The Robert Vaughan engraving at the end of "Book 1" of *Smith's History* (1624), featuring several cuts clearly derived from John White's drawings, has two elements showing Smith capturing the kings of Pamunkee and Paspahegh. In both engravings Captain Smith is depicted as much shorter than his prisoners, clearly violating artistic conventions but strongly reinforcing Smith's desire to indicate that these Native Americans were quite tall (see Feest 1967). The figure on Smith's map of Virginia (1624: facing p. 40; Barbour 1969: 342) is captioned "The Sasques=ahanougs are a Gyant like peo=ple & thus a-tyred." Clearly the Susquehannocks were the standard for "tall" in Smith's eyes, but were they actually taller than other Indians in this region?

That not all Native American people were seen by European immigrants to be unusually tall is indicated by the 1644 observation of Johannes Megapolensis on the stature of the Mohawks. "The people and Indians here in this country are like us Dutchmen in body and stature; . . ." (Megapolensis 1909:173). However, the great structure of the Susquehannock came to be seen as a part of the fictitious writings regarding "Natives" of the New World (see Appendix I and Feest 1987: 609).

Several excavations of cemeteries of Susquehannock populations and of related peoples (see Dragoo 1976) have been conducted within recent years. Kent (1984: Table 19) lists 1100 interments from 10 sites. Fortunately, the tradition of seeing skeletal remains only in terms of intact skulls (see Morton 1839) had long been replaced. The remains collected from these many Susquehannock burials have been given serious and respectful attention. Programs to inventory collections in the State Museum of Pennsylvania (Harrisburg) and at the North Museum of Franklin and Marshall College (Lancaster, Pennsylvania) have

begun (Stephen Warfel 1990, pers. comm.), and specific studies using these materials are being planned. This report may be considered as a prototype for studies of stature using the collections of The State Museum.

MATERIALS AND METHODS

A total of 10 burials of adults plus a series of flood-scattered adult long bones were among the human remains from site 46HM73 selected as suitable for this review (see Becker 1987:50–3). Although the excavations resulted in the listing of 18 burials, only 12 actually were derived from excavated interments. Numbers 1 and 5–7 represent clusters of human bone later identified as bones redeposited by the flood, number 8 was a burial seen in the river bank but not recovered, and number 11 consists of two redeposited bits of a child. Number 18 was assigned to the entire collection of surface remains which had been washed downriver from the settlement area (Becker 1987:39,44). Two of the 12 burials recovered (numbers 4 and 9) are young children not included in the present study.

Aside from flood damage, preservation of the remains was moderately good. Limitations in the time during which this material could be studied restricted the research program to basic age and gender evaluations, plus study of the collection of craniometric data and non-metric cranial observations. No data concerning the stature of these people were included in the initial publication. Since these robust Susquehannock populations consumed high protein diets (Brashler 1987), the formulae used for calculating stature of white Americans established by Trotter and Gleser (1952) have been employed in generating the figures for this study.

The selection of appropriate regression formulae to calculate stature was a critical issue in this research. Although all Native

Americans did originally derive from Asia, the connection is via a proto-Mongoloid stock. El-Najjar and McWilliams (1978:92-93) briefly discuss this problem, noting that the Trotter and Gleser formula for Mongoloids generally is inaccurate because the population from which it derives was heterogeneous (including Americans of Japanese ancestry, Indians, Filipinos, etc.). Perhaps the best area-specific New World set of formulae was generated by Genovés (1967) for Mesoamericans using a modern Mexican population, but these are inappropriate for the meat eating peoples of the Eastern Woodlands. Similarly, using the Trotter and Gleser (1958) formula for "male mongoloids" severely distorts the statures calculated for females in such samples (e.g., Melbye 1983). Steele and McKern (1969:221) discuss this problem and agree with Genovés (1967) that population-specific formulae are needed.

Krogman and İşcan (1986:239, 335) modify the data from Steele and McKern, recognizing that the Trotter and Gleser formula for "Mongoloids" is not appropriate to Native American populations. For the purposes of this paper, where relative stature is the principal concern, the use of any standard set of formulae might be sufficient. As S. R. Saunders (1990, pers. comm.) points out, regardless of which regression formulae are used as standard, the calculated "stature" will show a greater metric difference than will simple comparisons of lengths of individual long bones from which the calculations are made. Thus the formulae selected were those calculated by Trotter and Gleser for White Americans (1952).

The bone measurements from the West Virginian Susquehannock population (Becker 1987: Tables 4 and 5) are the basis for calculations of stature for that population, the results of which appear in Tables 1 and 2 of this report. No age adjustments have been calculated for these statures since the interest was only in relative stature and not solving forensic problems involved in

Table 1
Stature calculated for each individual excavated from burials at the Susquehannock site 46HM73

Burial	Age	Gender	Long bones used	Stature (in cm.)
1	65+	F	L. ulna	174.32 ± 4.32
2	55?	M	L. femur	174.70 ± 3.27
3	60	M	L. femur & tibia	180.03 ± 2.99
10	65+	F	L. hum., fem., & tib.	160.115 ± 3.51
12	60+	M?	R. ulna	179.13 ± 4.32
13	70	F	L. hum., fem., & tib.	167.737 ± 3.51
14	48	M	L. hum., fem., R. tib.	170.215 ± 2.99
15	22±	F	L. hum., fem., & tib.	159.681 ± 3.51
16*	38	F??	L. hum., fem., & tib.	167.361 ± 3.51
17	65+	F	L. femur	160.063 ± 3.72

FEMALES (N=6)

Range of Statures = 159.68-174.32cm.
Average stature = 164.88 (5 ft. 4.9 in.).

MALES (N=4)

Range of Statures = 170.22-180.03cm.
Average stature = 176.02 (5 ft. 9.3 in.).

*Burial 16, previously identified (Becker 1987) as a female, at this time is less certainly identified as to gender. This person now is noted as "F??" to indicate less certainty in the gender identification.

the identification of specific known individuals. Although age at death can be calculated for those individuals recovered from graves (Table 1), this cannot be computed with ease for those individuals represented by scattered remains recovered from the surface. The Trotter and Gleser (1958) revised formulae for males have not been employed.

The size of the total sample has been increased to 17 by including bones recovered from the surface. Among these remains are 26 tibia, or large fragments thereof, and 19 femora (Becker 1987: Table 5). Maximum lengths can be evaluated for five left and six right femora (Steele and McKern 1969; Krogman and İşcan 1986: 335, Table 8.28). Pairing the femora on the basis of length as well as eight other mea-

surements suggests that at least seven adults are represented. Individual "D" has a difference of 7mm in his femur lengths, but other measurements suggest that these may be a pair. The individual "surface" bone measurements, gender evaluations, and stature calculations (based on the left femur where applicable) for seven individuals appear in Table 2. When combined with data from the 10 adults from grave contexts the total sample size is 17.

DISCUSSION OF THE DATA FROM 46HM73

At least three considerations must be noted with regard to the data summarized at the bottom of Table 2, particularly as it relates to the "statures" derived from the flood-disturbed bones found on the surface which have been added to the figures calculated from intact burials. First, at least one of the burials noted in Table 1 (Bu. 1, a female) was missing its legs, probably due to flood damage. Those "missing" leg bones may be included in the figures for Table 2. This would mean that one of the females may be represented twice, once as Burial 1 and a second time as a set of femora (see Table 2).

Second, the actual origins of the surface remains are less clearly known than those of the burials. All of the excavated burials derive from graves located *inside* the village palisade at the site (Brashler 1987: Fig. 3). This conforms to an observation made in 1666 by George Alsop, who noted that the Susquehannock buried their dead within the village palisade (see Cadzow 1936:96). Susquehannock burials, however, are generally found outside the palisade (Witthoft *et al.* 1959:101; Kent 1984). Stephen Warfel (1990 pers. comm.) suggests that burials "found inside the village palisade are usually aberrant." Brashler (1987:9) recognized that the burials from Site 46HM73 were at variance with Schultz

Table 2
Statures in cm. as calculated from femora found on the surface of 46HM73* and average stature for all 17 "individuals from the site (separated by gender)

Person/Bone No. and length	Gender	Stature
A: L1 (439) & R1 (441)	Male	165.89 ± 3.27
B: L7 (444c) & R4 (439e)	Female	163.77 ± 3.72
C: L2 (462)	Male	173.37 ± 3.27
D: L3 (467e) & R2 (454)	Male	172.56 ± 3.27
E: L6 (429e) & R3 (434e)	Female	160.06 ± 3.72
F: R5 (399e)	Female	152.65 ± 3.72
G: R6 (395e)	Female	151.67 ± 3.72

FEMALES (N=4)

Range of Statures 151.67-163.77cm.
Average 157.04 (5 ft. 1.8 in.).

MALE (N=3)

Range of Statures 165.89-173.37cm.
Average 170.61 (5 ft. 7.2 in.).

*Age changes are not factored. An "e" after the bone length indicates slight damage to one or more condyles. Lengths, therefore, are estimated (possible error under 2 mm.).

Average stature for 17 "individuals" noted above (Tables 1 and 2).

FEMALES (N=10)

Range of statures 151.67-174.32cm.
Average 161.74 (5 ft. 3.7 in.).

MALES (N=7)

Range of statures 165.89-180.03cm.
Average 173.70 (5 ft. 8.4 in.).

and other Late Prehistoric Susquehannock sites. However, some of these surface bones from 46HM73 could derive from burials from outside the palisade, and therefore with different cultural associations.

The third consideration relates to the bimodality in the statures calculated for the surface bones as distinct from those from excavated burials. These sets may reflect burials which were on opposite sides of the palisade, or from graves which had been dug to different depths. Shallow graves were more likely to have been flood

Table 3
Long Bone Data and Statures from the Ibaugh Site Peoples (using Trotter and Gleser 1952)

"SUSQUEHANNOCK BURIALS"				
Burial No.	Gender (Becker)	Bones and lengths (Kinsey 1960)	Stature	
			Cms. /	Ft. & Inches
3c	F	{L. fem. (423) {L. hum. 293	158.58 ± 3.72 /	5 2.4
5c	M	L. fem. (463)	171.60 ± 3.27 /	5 7.6
7c	F	R. fem. (432??)	160.80 ± 3.72 /	5 3.3
8c	F	R. hum. (282)	152.72 ± 4.45 /	5 0.1
13c	F	{R. fem. (445??) {R. tibia (368)	166.034 ± 3.55 /	5 5.4

Females (N = 4)
Range 152.72–166.03 cm.
Average 159.534 cm. (5 ft. 2.8 inches)

Male (N = 1)
"Range" 171.60 cm (5 ft. 7.6 inches)

"SHENK'S FERRY"?

Stature				
Burial	Gender	Bones and Lengths	Cms. /	Ft. & Inches
"Extended Burial"	Male (after Kent & Boyd)	R. fem. (487) L. tib. (410)	168.70 ± 2.99	5 6.4

disturbed. The considerable differences in the averages in the statures of those individuals recovered from excavated burials, when compared with those recovered from the surface (nearly 8 cm. for females and 5.4 cm. for males) may reflect different mortuary programs operative within an incipient ranked society. Within Susquehannock society intracultural variables may be reflected in these two archaeological contexts, with higher status individuals being buried in deeper graves. Although burial depth may relate to season of the year, or to soil conditions, the individuals buried in shallow graves may reflect lower social status within the community, as is the case among the historic Lenape (cf., Becker 1980). Stephen Warfel (1990, pers. comm.) knows of no such depth correlation from Susquehannock burials in the lower Susquehanna Valley. If women, in gen-

eral, held lower status than men at Site 46HM73, then burial depth might explain why more women than men were found "washed out" of their original loci (although women are better represented in the total population as well). The deeper graves, those which survived the flood, held the bones of taller individuals of both genders who also may have been of higher status. The figures are far too small to permit a statistical analysis at this point, but these data do form an interesting basis for future study.

Regarding the appropriate regression formula to be used for the calculation of stature, clearly a set should be devised which is specific to this area, and preferably for specific groups. The evidence here demonstrates this need, since Burials 1 and 12 (Table 1) lacked legs and stature has been calculated using the ulna alone. The

Table 4
Neutral Stature from the MacPherson Site (via S. R. Saunders, recalculated using the Trotter and Gleser formulae for the statures of whites)

Burial	Age	Gender	Long bones used	Stature (in cm.)
A	20–35	M	Fib. (341)	163.17 ± 3.29
B	"middle-aged"	F	Fem. + Tib. (423,344)	159.81 ± 3.55
C	35–39	F	Fem. + Tib. (393,326)	152.14 ± 3.55
D	18–20	F	Fem. + Tib. (384,334)	153.00 ± 3.55
F	44–59	F	Fib. (357)	164.21 ± 3.57
G	30–47	F	Fib. (360)	165.09 ± 3.57
H	23–39	M	Fib. (334)	161.29 ± 3.29
H2B2	18–19	F	Fib. (356)	163.92 ± 3.57
H3B1	18–20	M	Fib. (357)	167.46 ± 3.29
H3B2	20	M	Fib. (336)	161.89 ± 3.29
H4B2	40–44	F	Fem. (390)	150.43 ± 3.72
H13B1	60+	M	Tib. (413)	182.70 ± 3.37
H15B1	19±	F	Fem. + Tib. (449,372)	167.40 ± 3.55
H17B1	21–30	F	Radius (232)	164.90 ± 4.24

Females (N = 9)
Range of statures: 150.43–167.40 Average: 160.1 cm.

Males (N = 5)
Range of statures: 161.29–182.70 Average: 167.30 cm.

results are both near the upper end of the ranges for males and females, suggesting that allometric variations in the forearms may be present.

This small population shows a wide range of variation in a number of characteristics not noted in the non-metric observations (Becker 1987). For example, the gonial configuration varies considerably, with several individuals manifesting everted gonial angles and several others being turned inward. Maxillary canine length also appears to vary, with many individuals having unusually long sets. At least two dental pearls appear (Bu. 12). One "frequent" non-metric trait which merits comment is the doubled anterior condylar canal, at the ventral aspect of the cranial articulation with the atlas. Some 17 examples of condylar canals were found intact in this population, of which four were double. In these few cases the canals were not simply divided as in most populations but rather they were quite divergent and the canals were separated by

large boney pillars. The meaning of these variations remain unknown, but they must be considered as a factor in any attempt to do comparative studies.

COMPARATIVE DATA: SUSQUEHANNOCK SKELETAL MATERIAL INVENTORY

The craniometric data and non-metric observations recorded from this population provide the basic evidence for describing this West Virginia group and for comparing it with other Susquehannock or related peoples. The ideal populations for comparison include the early Susquehannock populations resident along the Susquehanna River (see Kent 1984:197–201; also introduction above) and their immediate ancestors from areas closer to the present New York-Pennsylvania border. Programs for the study of these groups, with a focus on stature, are now being developed. Although the focus in this paper

is on stature, degrees of cultural affinity which will give meaning to this evidence can be determined only through cranio-metric or non-metric studies and related techniques (see Smith and Bettinger 1987).

Many skeletons from Susquehannock sites in Pennsylvania have been excavated since 1960. Nearly 200 have been recovered by The Pennsylvania State Museum, from sites such as 36LA52, the Conoy site excavated in 1970 (Heisey and Witmer 1962:104). All of the skeletons at The Pennsylvania State Museum are being curated in accordance with standards accepted by the Zuni and other nations or have been returned to their appropriate locations. Much of the Susquehannock skeletal material which was found in fragmentary condition during recent excavations, was simply left in place, since it was determined to be too delicate for effective removal and appropriate curation (Barry C. Kent 1990, pers. comm.).

Published data derived from Susquehannock skeletal material are minimal, but a brief listing of sources is useful. Some metric data may be extracted from Bon Bonin and Morant (1938). Cadzow's slightly earlier survey of Susquehannock archaeology included excavation of graves at the Shenk's Ferry site. The outstanding preservation of the burials (Cadzow 1936: 42, 44) is confirmed by the illustrations (Cadzow 1936: 45) illustrations. However, Cadzow describes the skeletons as "broken and decomposed." Craniometric data are available from Burial 5 at the Shenks Ferry site (Cadzow 1936:47-48).

In the same volume cited above Cadzow (1936:154-55) provides important Susquehannock craniometric data for Burials 1 and 2 at the Frey Farm Burial site. While Cadzow's data are sparse, they do offer some basis for comparison and for modern verification. Although no metric data has been published from the Ibaugh site (Witthoft *et al.* 1959), Kinsey (1960): Table 2) provides metric data from some Ibaugh crania. More important here, Kinsey pro-

vides measurements from a few of the long bones from that population as well as similar information from a proximal burial which Kinsey identifies as a member of the earlier Shenk's Ferry population.

COMPARATIVE DATA: NON-SUSQUEHANNOCK

The Iroquoian origins of the Susquehannock are generally acknowledged (Kent 1984) and considerable archaeological evidence has been gathered to support this thesis. Osteological confirmation of the relationship, however, has not been generated despite a vast accumulation of information from the Seneca (Sublett 1965; Lane and Sublett 1972) and the other Five Nation affiliates. In a recent dissertation L. P. Saunders (1986) tabulated 46 non-metric traits from skeletons recovered at most of the early historic period and from several of the prehistoric Seneca sites in New York to demonstrate biological affinities among them (see also O'Connor 1987). These data provide an outstanding basis for comparison with the Susquehannock evidence now being assembled.

Comparative data from the Lenape realm is not available, primarily due to the paucity of excavated sites and also to the poor condition of the skeletal material (Becker 1980). Lindeström (1925:191) noted that in the mid-1600s the people living along the Delaware River were of varying stature, suggesting that nothing unusual will be discovered among these remains. Similar limitations in the analysis of skeletal remains exist in New Jersey, where burials from across the state clearly are recognized as "not a biogenetic population, but a politico-geographic unit of modern times" (Clabeaux 1973:24). Clabeaux reviews data from the 49 Native American burials then known from New Jersey, noting that little postcranial material was recovered and concluding that no estimates of stature are possible. The basic evidence

from New Jersey, however, should be reviewed.

Spacially proximal to the Susquehanna valley but temporally earlier than the Contact Period Susquehannock are the people represented by skeletal populations from central Delaware. These skeletons from the Island Field site (7K-F-17), newly dated at approximately A.D. 700 to 1,000, are being published by K. Rosenberg at The University of Delaware (see Table 7, and also Neuman and Murad 1970). The Island Field people were a non-agricultural but relatively sedentary Native American population. While temporally removed from the Susquehannock population being studied, but spacially located just to the southeast of central Pennsylvania (Robbins and Rosenberg 1989), this sample provides important comparative information from an area distinct from the better known Iroquoian speaking peoples noted below, but from a population closer in space to the Susquehannock.

Data from Canada relating to protohistoric and historic Neutral and Huron peoples from the area around Toronto provide a useful comparison for the Susquehannock figures. A male and a female from the Draper site (an early proto-historic Huron village located 48 kilometers east of Toronto; Williamson 1979) plus samples from the MacKenzie site (AkGv-2, also known as the Woodbridge Site; S. R. Saunders 1986), a village dated to A.D. 1520±15 (Johnson 1980) just northwest of Toronto which probably is Neutral, as well as the MacPherson site (mid-16th century Neutral village just west of Hamilton; S.R. Saunders 1988), the Keffer site (Huron site from about A.D. 1500 near Toronto; M.W. Spence 1990, pers. comm.) and the Ball site (also Huron from about A.D. 1500, Knight and Melbye 1983; Melbye 1983) are listed in Tables 5 and 6.

Metric data from the skeletons from the MacPherson site, probably closest in date to site 46HM73, have been recalculated from Saunders' (1988) report, using data which

Table 5
Stature at the Mackenzie Site, AkGv-2
(S. R. Saunders 1986)*

Burial	Age	Gender	Long bones used	Stature (in cm.)
A.1	36	F	Femur + Tibia	162.71 ± 3.55
B.1	Adult	F	Radius	160.632 ± 4.24
B.2	25 ± 5	M	Femur + Tibia	173.258 ± 2.99
B.3	24 ± 2	M	Radius	173.51 ± 4.32
B.4	22	F	Radius	172.956 ± 4.24
D.2	47[?]	M	Femur + Tibia	180.368 ± 2.99

Females (N = 3)

Range of statures: 162.71-172.956
Average: 165.43cm.

Males (N = 3)

Range of Statures: 173.258-180.368
Average: 175.712cm.

*Stature as noted below is based on the metric data provided by Saunders (1986:22) but computed using Trotter and Gleser (1952) formulae for white males and females.

she has provided. The regression formulae used by Melbye (1983) to calculate stature for both males and females from the Ball site, those which Trotter and Gleser (1958) derived for "male mongoloids," have been recalculated.

Seneca osteometric data from the Culbertson (ca. 1560-70) and Adams (ca. 1563-1576) sites are not yet available. Wray (*et al.* 1987:22) provides some stature information from the three Adams site cemeteries, but only as ranges. The Culbertson site information (Wray *et al.* 1987: 179-85) is even more limited, although three individuals *did* have one or more measurable long bones. Two Early Contact Seneca sites (Tram and Cameron, ca. 1570-1585; Wray *et al.*, in press), provide significant information of use in demographic and other studies of Native American biology. Sublett (1965) provides data on the Cornplanter cemetery (Seneca, ca. 1800) and provides stature for 28 adults. The absence of the long bone measurements in each case prevents standardizing this information for the present study.

Table 6
Huron stature from 3 Sites

A. Draper Site (Williamson 1979:56)

Burial	Age	Gender	Long bones used	Stature (in cm.)
2	24	F?	L. Femur, tibia	165.59 ± 3.55
6	40+	M	L. Femur, tibia	172.09 ± 2.99

B. Keffer Site (via M. W. Spence: personal communication)

Burial	Age	Gender	Long bones used	Stature (in cm.)
B3	45-60	M	L. Hum., fem., tib.	169.973 ± 2.99
B5	20-24	M	R. Fem. and R. Tib.	170.41 ± 2.99

C. Ball Site (Knight and Melbye 1983, Melbye 1983: recalculated).

Burial	Age	Gender	Long bones used	Stature (in cm.)
2	46	M	Femur and tibia	173.53 ± 2.99
4	24	F	Fibula	153.37 ± 3.57**
5	32	M	Femur and tibia	182.63 ± 2.99

COMBINED DATA (from 2 Neutral plus 3 Huron sites):

Females (N = 14) Average stature = 161.154 cm. (5' 3.45")
Males (N = 13) Average stature = 171.714 cm. (5' 7.60")

*Williamson (1979) believes Bur. 2 to be male, but notes gender "was difficult to determine." Postcranial metric data suggests a very robust young woman, or a young man not as robust as Bur. 6.

**Melbye (pers. com.) considers a woman only 153cm. tall to be short "by Iroquoian standards" and suggests that the woman in Burial 4 is in the bottom 1% of the sample (citing Anderson 1964:36 and Melbye 1967:26), and considers the male of Burial 5 to be in the top 1% of the sample.

DISCUSSION AND CONCLUSIONS

Despite numerous excavations during the past century the analysis of human skeletal material from Native American (and also from Colonial) sites in the north-eastern United States remains largely unstudied. Table 8 provides a summary of the information from seven sites which may be compared with the data from the Susquehannock site 46HM73. Information from the Fairty site (Anderson 1964) has not been evaluated.

The limited evidence now available suggests that Susquehannock males of the 16th century were taller than other Native American males in that region. Since the higher status males who met Captain John Smith in 1608 probably were at the taller end of this range and well above the average of 173.7 cm. calculated here, Smith's

observations may be accepted as accurate. Comparable data on the stature of English males from the period ca. 1550-1620 is still being sought. However, in 1608 these Susquehannocks may have averaged 10 or more centimeters taller than Smith and other urban English males of the time, which certainly would merit comment in Smith's journal.

Susquehannock females, on the other hand, have here been calculated to have had a lower average stature than two of the other comparative "populations." The considerable differences in the relative stature of Susquehannock males and females suggests that the diet of Susquehannock males (and possibly male food intake patterns) were distinct from the dietary patterns of males in other populations noted. While these Susquehannock males appear to have been particularly well

Table 7
Island Field Site (7K-F-17), Delaware, A.D. 700-1,000 (K. Rosenberg, pers. com. Excludes 1 person of unknown gender from "Group A")

Burial	Gender	Long bones used	Stature (in cm.)
1	M?	L. Radius	174.266 ± 4.32
7	F	L. Femur*	161.792 ± 3.72
8A	M	R. Humerus	174.554 ± 4.05
11	M	L. Femur	173.984 ± 3.27
12	F	L. Femur	164.756 ± 3.72
16	F	R. Hum. & Tib: L. Fem.	159.256 ± 3.51
21	M	L. Femur & Tibia	177.17 ± 2.99
37	F	L. Femur*	155.617 ± 3.72
44	F	L. Humerus	154.0664 ± 4.45
60	F	R. Femur	162.533 ± 3.72
68	F	R. Femur	166.485 ± 3.72
76	F	L. Tibia	168.83 ± 3.66
81	M	R. Humerus	162.85 ± 4.05
82	F	R. Femur	169.943 ± 3.72
95	F	R. Femur	166.732 ± 3.72
98	M	R. Femur	168.272 ± 3.27
105	F	R. Femur	161.792 ± 3.72
107	F	R. Humerus	159.106 ± 4.45
129	M	R. Femur	174.936 ± 3.27

FEMALES (N = 12)

Range of Statures: 154.066-169.943
Average 162.575cm. (5' 4.0")

MALES (N = 7)

Range of Statures: 162.85-177.17
Average 172.29cm. (5' 7.8")

*Bicondylar length used where max. L. not available.

nourished, females do not appear to have enjoyed a parallel diet. S. R. Saunders (1990, pers. comm.) suggests that this finding may be tested by isotopic analysis (cf., Katzenberg and Saunders 1990; but also see Sillen *et al.* 1989). The rather limited numbers of individuals from these populations which are available for study, and the small differences in stature now recognized, need not indicate that the Susquehannock were significantly distinct from their neighbors in stature. That they may have been much taller than their more densely settled neighbors to the south can only be determined by further study.

Table 8
A summary of statural data

A. Susquehannock from a village in West Virginia, ca. 1550.		
Females	(N = 10)	Avg. 161.74cm.
Males	(N = 7)	Avg. 173.70cm.
B. Two other Susquehannock sites.		
Females	(N = 4)	Avg. 159.53cm.
Males	(N = 2)	Avg. 170.15cm.
C. Two Neutral and 3 Huron sites.		
Females	(N = 14)	Avg. 161.15cm.
Males	(N = 13)	Avg. 171.71cm.
D. Island Field Site, in central Delaware.		
Females	(N = 12)	Avg. 162.58cm.
Males	(N = 7)	Avg. 172.29

Since the Susquehannocks were cultivating maize as well as utilizing big game and anadromous fish resources in patterns similar to other horticultural peoples of the Eastern Woodlands, one might ask what combination of food use patterns and genetics may have resulted in a notably greater stature. These preliminary findings can be tested by subsequent studies of better represented Susquehannock populations as well as through other allied techniques.

The use of maize as a dietary staple is believed to be reflected in a number of archaeological situations which can be studied through physical anthropology. A high caries rate, high strontium value, and low C¹² to C¹³ ratio all are considered to be indicators of the use of maize as a dietary staple, rather than as a simple food supplement as was the case among the maize "gardening" Lenape (Becker 1988:80, 1991). If Susquehannock stature, at least of the males, was as distinct from neighboring populations as is indicated by the limited evidence now available, then the etiology of this phenomenon is well worth exploring.

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APPENDIX I

The use of "biological evidence" to answer the question of Susquehannock stature came up 30 years ago (Witthoft *et al.* 1959: 101-18) in a "study" of 13 adult skeletons from the Ibaugh site (Washington Boro, Pennsylvania). Witthoft declared that Captain Smith's statements regarding Susquehannock stature were hyperbole. Witthoft's claim in 1959 to have used Earnest A. Hooton's formulae for calculating stature has no basis and the reference is not included in their bibliography. Witthoft later suggested (in Kinsey 1960:103-05) that the earlier Shenk's Ferry people were large and rugged and speculated that the Susquehannocks were a short and slender people. Kinsey's more informative publication (1960) includes osteometric data, and he cites the 1947 revised edition of Hooton's *Up From the Ape* as a source of formulae for calculating stature. The revised

edition of Hooton records (pages 728-29) that the formulae for the reconstruction of stature were those of Karl Pearson ("Mathematical Contributions to the Theory of Evolution," Section V: On the Reconstruction of the Stature of Prehistoric Races. *Philosophical Transactions* 192 [1899]: 169-244). These formulae had long been superseded by the work of Trotter and Gleser (1952) and even the Trotter and Gleser revisions for males had appeared in 1958, before Witthoft *et al.* (1959) went to press.

The idea that the Susquehannock were a tall people was also noted by Heckewelder (1819:30) nearly 200 years ago in his observation that the "Delaware" [Lenape?] described the Native people whom they met in the Allegheny area as "giants."

Quite commonly estimates of the stature of skeletons made by casual observers, and often of skeletons in the ground, are much higher than indicated by calculations derived from direct measurements of specific bones. Professor Michael Spence has noted that the figures of 72 and 84 inches, which Webb and Snow (1951:29-32) cite for Adena males from the Dover Mound (repeated by Dragoo 1963:249) is not supported by the postcranial information provided (Webb and Snow 1959:41-42, see also 43-44). In subsequent works by these same authors no mention appears of these unusual figures. Webb and Snow (1974:265, 298, and Table V), calculating statures for Adena and Hopewell populations using the Manouvrier formulae of 1893, offer averages which apply only to the high status individuals recovered by these excavations. Even these averages fall below those calculated for the Susquehannock people from Site 46HM73.

The lack of supporting data and a general absence of osteometric information characterizes all previous excavation reports which present information about Susquehannock sites (e.g., Heisey and Witmer 1962). The attention given to these human remains can be characterized by the treatment given the 46 individuals of

the Murry site population, which became the subject of an uncited undergraduate student report (Kinsey and Graybill 1971: 17). The people from 46HM73 almost suffered a similar fate. Reburial requirements,

while speeding the analysis, permitted production of only a limited report on these people (Becker 1987), where the emphasis was on data useful for comparative anthropometric studies.