Brother-Sister and Parent-Child Marriage in Premodern Societies

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Abstract

This paper examines empirical evidence of legally and socially condoned marital unions and matings between very close kin. What are by far the most common type of marital unions between parents and children and between brothers and sisters are known as 'royal incest': often practised in the context of polygamy, marital and/or sexual relations of rulers with close relatives were maintained for political purposes and could be supplemented by non-consanguineous polygynous matings. In some societies, incestuous acts were occasionally performed in order to benefit from their supposed supernatural consequences. In either scenario, 'incest' was staged by rulers and other privileged individuals as a deliberate transgression of universal norms for the sake of emphasizing the extraordinary and often god-like nature of their position (thereby reaffirming the validity of the incest taboos for 'ordinary mortals'), and did not normally constitute their only or even principal means of reproduction. Only two major possible exceptions remain: Zoroastrian Persia and Roman Egypt. In sources ranging from the fifth century BCE into the Middle Ages, parent-child and brother-sister unions were consistently attributed to members of the Zoroastrian religious community in the Middle East and repeatedly extolled in Zoroastrian writings. However, given that Zoroastrian doctrine classified such relations as special and associated them with supernatural benefits, and assuming that they were primarily practised in polygynous elite circles, Zoroastrian nuclear-family unions may arguably likewise be classified as a form of royal/magic 'incest'. Egypt shortly before and under Roman rule (first century BCE to third century CE) is the only known society in which marriage between full siblings was commonly practised among monogamous commoners, and which produced quantifiable documentary data for that custom. In the Egyptian city of Arsinoe during the second century CE, approximately 25 to 30 percent of all marriages were between siblings. In the absence of contemporaneous accounts, the causes for this unique pattern of mate choice remain controversial. Large age gaps between a substantial proportion of sibling spouses and prolonged fostering by unrelated wetnurses appear to have interfered with mutual sensitization in early childhood that might otherwise have triggered aversion to sexual relations at mature ages. In other cases, sibling couples appear to have experienced elevated rates of conjugal dissolution. These observations make it possible to reconcile the temporary success of sibling marriage with biosocial predictions concerning evolved inbreeding avoidance.

1. 'Royal/magic Incest'

Consanguineous marriage usually involves cousins or uncles and nieces (Bittles 1998, this volume), whereas sexual relations between individuals who share 50 percent of their genes through common descent—parents and children, brothers and sisters—are commonly regarded as 'incest' and condemned as an aberration, crime, or sacrilege. Mythological traditions are a major exception: primordial gods, as well as human founding figures, are frequently depicted as engaging in 'incestuous' liaisons, be it of necessity (in the absence of unrelated partners) or to emphasize their superhuman or liminal status. In the medieval Ethiopian *Book of Adam and Eve*, to name a lesser-known example, Adam and Eve's plans to wed their son Cain to Abel's twin sister Aklemia, and Abel to Cain's twin sister Luluwa, are frustrated by Abel's death and Cain's subsequent marriage to his own twin sister.

In reality, by contrast, such unions have always been rare and often limited to exceptionally privileged individuals seeking to raise themselves above the level of ordinary mortals. In an arrangement conventionally known as 'royal incest', absolute and god-like rulers are known to have established marital associations with their own mothers, sisters, and daughters. Though far from typical of any particular type of monarchical rule, this custom could at one time or another be found on most continents. The oldest surviving evidence comes from Egypt, reaching back to the third millennium BCE. Other cases include various ancient Near and Middle Eastern dynasties, the late Inca in Peru, Mixtec rulers in Mexico, chiefs in pre-contact Hawaii, and East African kings as recently as a century ago (Bixler 1982; Christensen 1998; Davenport 1994; De Heusch 1958).

From a cross-cultural and Darwinian perspective, two main questions deserve our attention: why did this practice emerge in some contexts but not in others, and what were its consequences for the fitness of 'incestuous' rulers? The first problem defies easy solutions. In some cases, extreme elevation and worship of the ruler appear to have been an essential ingredient, as for instance among the Egyptian Pharaohs, the Inca, or certain African kings. In other scenarios, dynastic isolation and fear of rivals may have been the most powerful motive, as among the Ptolemies (see below). However, no single factor seems to account for the existence or absence of 'royal incest'. Anthropologists have so far failed to establish a cross-cultural typology of this fashion.

Attempts to demonstrate that royal incestuous matings *per se* enhanced reproductive success may well be unnecessary (cf. van den Berghe & Mesher 1980). It would seem more reasonable to allow for indirect fitness benefits, in so far as extreme endogamy secured a ruling family's grip on power with all its attendant privileges and polygamous and/or extramarital reproductive opportunities (for which see Betzig 1986). Moreover, the reproductive potential of 'royal incest' must not be overrated. Recorded scenarios range from celibate unions meant to deprive competitors of marital association with members of the ruling family, as at some African courts (De Heusch 1958), to intensely polygynous arrangements that

marginalised sexual relations with close kin in quantitative terms (though not in terms of prestige), as among the Inca (Betzig 1986). Hence, 'royal incest' was inevitably adaptive whenever the rewards of additional nonconsanguineous procreation exceeded the cost of selective celibacy or inbreeding depression.

The ritual act of what might be dubbed 'magic incest' is structurally related to 'royal incest'. In this case, 'incestuous' matings are staged for their supposed supernatural benefits and the special powers they are thought to confer. Much of the pertinent evidence comes from tribal societies (references in Scheidel 1996b: 326 n.2). Again, powerful individuals seek sexual relations with very close kin precisely because of their extraordinary and otherwise illicit character, and again, indirect fitness benefits can be expected to justify these transgressions. However, unlike 'royal incest', which usually mimics marriage, these 'incestuous' encounters are isolated, one-off rituals divorced from marital relations.

2. Zoroastrian 'Close-kin Marriage'

From a biosocial perspective, it is historical evidence of habitual marital unions between parents and children or between brothers and sisters outside royal circles that poses the most vexing problems. On a previous occasion I identified two conspicuous examples, Roman Egypt and Zoroastrian Iran (Scheidel 1996b). Brother-sister marriage in Roman Egypt (first to third centuries CE) is almost exclusively known from primary documentary records in the form of census returns. At the same time, contemporaneous literary sources do not contain any extended discussions or interpretations of this custom. Normative statements are completely missing. Zoroastrian 'close-kin unions'—between fathers and daughters, mothers and sons, brothers and sisters—by contrast, are only attested in literary texts, the most elaborate of which are normative accounts glorifying the practice. Here, quantifiable or indeed any kind of documentary sources are unavailable. As a consequence, there is no single instance of a society for which both the actual incidence of 'incestuous' unions and their ideological background are reliably documented. Despite these unfortunate information deficits, the existing data are consistently of considerable value. For Roman Egypt, the primary documentary evidence of the census returns provides reliable snapshots of actual conditions in individual households. These records constitute 'primary' evidence in the sense that the original texts or transcripts have been preserved on papyrus as they were written almost two thousand years ago. Hence, this information remains unaffected by the corrupting effects of intervening copying and scribal transmission. These documents were drawn up and filed every fourteen years at the behest of the central authorities for the purpose of tax assessment. While some information may have been intentionally omitted (for the sake of concealing potential taxpayers), there is no indication that anything stated in these records was manufactured in order to mislead the authorities. In the case of Iran, matches between accounts of close-kin unions produced within the Zoroastrian community and those gener-

ated by outside and often hostile observers provide controls that are critical in confirming the validity of the tradition.

'Royal incest' had long been a familiar feature of either society: sibling marriage in particular was practised by the Pharaohs in the third and second millennia BCE and later by the Macedonian kings of Egypt (the Ptolemies, fourth to first centuries BCE), and by members of the three major royal dynasties of ancient Iran, above all by the Achaemenids (sixth to fourth centuries BCE). However, once unions of this kind spread into the general population, 'royal incest' loses its special character and thus its raison d'etre. Widespread close-kin unions subvert the principle that 'royal incest' is 'special' and therefore meaningful only as long as it remains the exclusive prerogative of ruling families or narrow elites.

The Zoroastrian material covers the customs of the religious community founded by Zardusht (Zoroaster) at some time between the late second millennium and the sixth century BCE in eastern Iran. This religion entered the historical stage with the rise of the Achaemenid dynasty (550 to 331 BCE) which established a heterogeneous empire ranging from the eastern Mediterranean to the Indus, and experienced a revival under the Sasanian dynasty (224 to 651 CE). Most of the surviving Zoroastrian texts were written—or given their final form—well after the Muslim conquest of Iran, primarily in the ninth and tenth centuries CE. These tracts—mostly religious exhortations, laws and rulings—repeatedly extol the virtues of an institution called *xwedodah* and fervently urge the faithful to embrace it. A number of passages make it clear that the term *xwedodah* denotes sexual relations between parents and children and between brothers and sisters. The following extracts are taken from my unpublished database of relevant sources from western Europe to China, which currently contains 108 different literary, legal, and epigraphic texts, some of them with multiple references to this custom.

According to ancient Zoroastrian doctrine, close-kin unions are meritorious: they extirpate mortal sin (*Shayist ne-shayist* 8.18; c. 7th-9th centuries CE), and indeed '*xwedodah* is so miraculous, it is the salvation from Hell, from the most grievous sin such as death-deserving sorcery' (*Pahlavi Rivayat Accompanying the Dadestan i Denig* 8b1; 9th/10th century CE). In the *Dadestan i Menog i Xrad* (9th/10th century CE), the ninth of thirty-three means of getting into heaven is *xwedodah* (37), whereas among the thirty worst sins, the breaking off of *xwedodah* ranks fourth, behind 'unnatural sexual intercourse' (presumably involving animals), male homosexual intercourse, and the murder of a righteous man (36). These merits arise from supernatural benefits: thus, in a fictional dispute between a Jew and a Zoroastrian priest, the latter is made to claim that 'the demons are enemies of men and their desire to die is particularly strong when *xwedodah* is practised' (*Denkard* 3.80; early 10th century CE). Sex with very close relatives is thought to trigger supernatural phenomena: 'And this, too, that thereupon they shall excite a brother and a sister with mutual desire, so that they shall perform *xwedodah* with unanimity; and before noon they generate a sublime radiance, centered in the face, and trembling passion; and they make the radiance, which is openly mani-

fest, grow up to an altitude of the height of three spears of a length of three reeds each [i.e., c.12.8 meters]'. (*Denkard* 9.41.27; early 10th century CE).

The most comprehensive account of *xwedodah*, the anonymous *Pahlavi Rivayat Accompanying the Dadestan i Denig*, establishes a hierarchy of different types of relationships. 'This also is revealed, that a man practises one *xwedodah* with his mother and one with his child (i.e., daughter). The one with his mother is superior to the other; the spiritual authorities say it is because he who has come from her body is nearer to her. (...) Assuredly a daughter who was born of his own mother, when the father practises *xwedodah* with the daughter who was born from his own copulation, then it is superior to that when he is not her brother.' (8d1 and 4; for a graphical representation, see Williams 1990: 135).

For the modern observer, it is interesting to note that the most 'extreme' varieties are considered the most beneficial. In genetic terms, the father-brother is more closely related to his daughter-sister than an ordinary father is to his daughter. And although there is no genetic difference between the degree of kinship of mother and son and of father and daughter, sexual relations between mothers and sons are much rarer than between fathers and daughters. The religious authorities appear to have had some understanding of the varying degrees of instinctive aversion to 'incestuous' matches, making sure to associate the intuitively least attractive or most far-fetched unions with the highest degree of piety and religious observance. Thus, *xwedodah* seems to have been deliberately designed to force those striving to belong to the in-group to confront and overcome their own instincts. In proving capable of mastering their human urges, the truly faithful—most likely an elite among ordinary believers—were encouraged to exult in their own determination and devotion, and able to extract kudos from the wider community.

Even so, a number of passages specifying the incidence of sexual intercourse or addressing doubts and criticism suggest that doctrinal insistence on *xwedodah* may well have raised the bar too high even for many devout Zoroastrians. In the *Pahlavi Rivayat Accompanying the Dadestan i Denig*, a series of four instances of consummated *xwedodah* is already deemed remarkable: 'For it is revealed that the first time he approaches her (i.e., has intercourse), 1,000 demons and 2,000 sorcerers and witches die; when he has intercourse twice, 2,000 demons and 4,000 sorcerers and witches die; when he has intercourse three times, 3,000 demons and 6,000 sorcerers and witches die; when he has intercourse four times, manifestly the man and woman are righteous' (8f3). The suggested low frequency of actual genital intercourse puts *xwedodah* much closer to 'magic incest' (see above) than to regular marital relations, and renders it highly ineffectual for reproductive purposes. The sexual act, denoted by the phrase 'approaches her', is distinguished from the underlying marital union: 'He who maintains *xwedodah* in marriage for one year, it is as though one-third of all this world (...) has been given by him as a gift to a priest; (...) [and two-thirds and three-thirds for two and three years, respectively]; when he maintains it in marriage for four years, and he has performed worship, then manifestly his soul goes to Heaven, and if

not, it goes to Paradise' (8h1-3). Are we meant to deduce that consanguineous spouses did not need to have sexual intercourse more than once a year to obtain privileged spiritual status?

It is similarly noteworthy that intent could be said to count as much as actual outcome: 'Q: If *xwedodah* is with a mother or a sister for whom there is no hope of producing any children, would the meritorious deed of *xwedodah* be perfect? (...) A: *Xwedodah* with any of the three, whatever age they are, is a perfect meritorious deed of *xwedodah*. For this reason, if there is no child, the merit of *xwedodah* does not decrease.' (*Rivayat i Hemet i Asawahishtan* 28; early 10th century CE). According to the same source, attempted *xwedodah* that fails due to male impotence is likewise meritorious, though less so than successful intercourse (ibid. 30). We are led to conclude that it was the completed sex act that was of paramount importance.

The Zoroastrian priest debating the Jew is also made to acknowledge outside criticism: 'And if it be said that, in spite of all this which you explain, there is a group of people who claim that this is a hideous thing to think of, one ought to consider that hideousness and pulchritude mostly do not exist in and of themselves, but (only) in views, opinions and beliefs' (*Denkard* 3.80). This relativistic argument, proferred centuries after the collapse of the last Zoroastrian empire, betrays the weakness of the defenders of the doctrine, who are compelled to appeal to the tolerance of nonbelievers. Yet doubts about the rightness of extreme consanguinity likewise appear to have emerged within the Zoroastrian community. The following exchange between the Zorostrian supreme god Ohrmazd and his prophet is a choice example: This also is revealed in the Religion: Zoroaster said to Ohrmazd: 'In my view it is bad and hard and distressing that I should make *xwedodah* so prevalent among mankind.' Ohrmazd said: 'In my view also so it would be as in yours, except for this reason, that it is the most excellent thing of all; then let it not be difficult and hard for you. Be diligent in practising *xwedodah*, and others, too, will practise diligently.' (*Pahlavi Rivayat Accompanying the Dadestan i Denig* 8o1-3).

From these passages, it is clear that sexual relations between very close kin were considered exceptionally praiseworthy and thus almost by definition rare. The custom did not only arouse revulsion among outsiders, but also faced resistance among the faithful. Only the most devoted members of the community appear to have been expected to practise *xwedodah*. The extant sources lack consistency regarding the desired frequency of close-kin matings: the fact that four instances were sufficient to render a couple blessed not only distinguishes *xwedodah* from ordinary marital congress, but is hard to reconcile with the expectation that such unions result in offspring (which would later provide further mating opportunities). Even within a single text—the *Pahlavi Rivayat Accompanying the Dadestan i Denig*—we encounter an unresolved tension between the concept of *xwedodah* as a finite series of religious-magical rituals and the vision of fully-fledged close-kin marriage for reproductive purposes.

This ambiguity makes it even more difficult for us to estimate the actual dissemination of *xwedodah* in the Zoroastrian population. While we do know of royal sibling couples that produced children, cases of 'royal incest' may be a poor guide to the impact of Zoroastrian doctrine on general marriage customs. It might be tempting to dismiss the exhortations of medieval Zoroastrian priests as desperate rearguard actions and deluded propaganda. Against this notion, we must note that legal sources also deal with close-kin unions, beginning with the *Madayan i Hazar Dadestan*—a civil law code that predates the Muslim conquest—and continuing with the much later *Rivayat i Hemet i Asawahishtan*. What is more, sexual and marital relations between brothers and sisters and between parents and children had been attributed to the Zoroastrian Persians by Greek, Roman, and other outside sources from the fifth century BCE onwards. The oldest surviving texts of the Zoroastrian community already refer to *xwedodah* (first in Yasna 12.9, no later than the 6th century BCE), although without defining its nature. Taken together, these different strands of evidence leave little doubt that close-kin unions did actually occur over the course of many centuries.

At the same time, their incidence beyond the circles of polygamous rulers remains uncertain. The priestly caste of the Magians, prime candidates for *xwedodah*, would often have been polygamous as well. Foreign allegations that all Persians, i.e., Zoroastrians, engaged in 'incest' are of little value, akin to the impossible claim that each Persian had multiple wives. Even so, it might be overly cautious for us to conclude that merely the polygamous elite engaged in *xwedodah* alongside nonconsanguineous relationships. At the very least, the Roman Egyptian evidence of widespread sibling marriage among monogamous commoners discussed below raises the possibility that less privileged Zoroastrians also followed suit. In any event, we cannot be sure whether close-kin unions were a significant—let alone the principal—means of reproduction for a significant proportion of the total Zoroastrian population of ancient Iran and the Near East, and whether in this respect the Zoroastrian community resembled the population of Middle Egypt under Roman rule.

3. Roman Egyptian Sibling Marriage

The practice of sibling marriage in Roman Egypt receives only passing notice in a few contemporary works of literature and is primarily known from documentary sources. Every fourteen years, each head of a household in Egypt had to file a return listing all members of his household (including kin, lodgers, and slaves) with their names, ages, kinship affiliations, and further specifics. About three hundred of these texts have survived on papyrus, mostly from the urban centers and some villages of Middle Egypt. Of 121 marriages attested in these documents, twenty are between full siblings and four between half siblings (Bagnall & Frier 1994). Although just two unions are between first cousins, this relative dearth of cases is entirely a function of the evidence: only if the parents of both spouses

resided in the same household is it possible to identify this type of marriage on the basis of a census return alone. Thus, we must assume that many couples that did not consist of siblings were actually somewhat less closely related. (It strikes me as exceedingly implausible that Egyptians would have alternated between sibling unions and nonendogamous marriages while avoiding intermediate degrees of consanguinity.)

Statistical analysis must be confined to visible close-kin couples. At this point, I can only summarize the main findings of my previous study (Scheidel 1997). No additional data have since been published, and it is highly unlikely that future generations of scholars will be able to add more than occasional stray finds which would leave the general picture largely unchanged. Brother-sister marriage was significantly more common in the cities than in the villages (16 of 43 urban and 8 of 78 rural unions were between full or half siblings), and appears to have peaked in the second century CE. In the best-documented district capital, Arsinoe, 37 percent of all known unions (n=46) are between siblings. Under the prevailing conditions of low life expectancy, only about 40 to 60 percent of mature sons had a marriageable sister, and only half of them had a suitable younger sister. (We can observe a strong preference for younger wives in both kin and non-kin unions.) As a result, the actual incidence of brother-sister marriage must have been closer to 20 or 30 percent than to the biological maximum of 40 to 60 percent. This estimate is consistent with the attested rate of 37 +/-14 percent ($p > 0.05$, z-test).

For a variety of reasons, it is impossible to calculate with precision the average level of inbreeding (F) in this census population; I have proposed a value of F=0.15-0.2 as a rough estimate (see Scheidel 1997 for the supporting argument). This range is much higher than in any other known inbred population. Thus, inbreeding depression (i) ought to have been considerable: even a low rate of 1.4 lethal gene equivalents per individual (Bittles & Neel 1994) translates to rates of i=16 percent after one full sibling mating and of close to 30 percent after three consecutive generations of brother-sister marriage (Scheidel 1997). None of these effects are visible in the census material; instead, sibling couples sometimes produced exceptionally large numbers of children (Scheidel 1996a; see below). Nevertheless, owing to the frequent interruption of 'incestuous' lines when no suitable sibling-spouses were available and the possibility of adulterous conceptions, sibling marriage cannot have significantly reduced the genetic load of the source population (Scheidel 1996a).

The underlying motivation remains obscure. Precedent was unlikely to be of great importance in a society in which sibling marriage had previously been limited to 'royal incest' within the ruling dynasties (by the Pharaohs and more recently the Ptolemies: Carney 1987) or some elite families (Cerny 1954). While the possibility cannot be ruled out that common Egyptians took up brother-sister marriage only after the downfall of their Ptolemaic rulers and the Roman takeover, it is far from clear why these events should have prompted this remarkable change in marital strategies. Moreover, the earliest literary reference to this custom—dating from before the Roman conquest—fails to support this

chronology. The suggestion that siblings simply loved and desired each other (Hopkins 1980) flies in the face of anthropological evidence from around the world. By contrast, the more recent hypothesis that only the socially and legally privileged hellenic or hellenized segment of the Egyptian population—an essential mediator of Roman control—resorted to sibling marriage to close the ranks and preserve their status (Shaw 1992) is superficially appealing but founders on the fact that most registered inhabitants of the city of Arsinoe who could marry a sibling did so; there is no sign of narrow exclusivity.

Moreover, first-cousin or uncle-niece marriage would have offered similarly suitable but less extreme opportunities for the preservation of resources and status. Uncritical reliance on outdated scholarship that used to exaggerate signs of decline and deprivation in early Roman Egypt mars Parker's attempt to explain brother-sister marriage in a similar way to Shaw, evoking intense pressure on city-based landowning families to maintain their privileged position (Parker 1996). He also considers the legal independence of Egyptian women that made sister-wives more reliable partners and encouraged parents to arrange matches between their own children. However, in each system of partible inheritance it would have been attractive for parents to wed their children to one another, yet they never did so elsewhere. Sibling marriage deprives families of the chance to benefit from marriage alliances with other families: female inheritance is as much a way of obtaining as of losing resources. The usual solution has been to try to play the marriage game well rather than to abandon it altogether. The substantial size of the Egyptian population concerned also deserves attention: while we cannot be certain which proportion of the several tens of thousands of inhabitants of a city such as Arsinoe was covered by the census, there is no good reason to assume that many of them managed to evade the count. Extreme exclusivity makes sense for tiny and isolated elites. But why would thousands of families in a single city engage in brother-sister marriage when judiciously arranged matches between families of comparable standing might have ensured similar long-term benefits?

Because of the paucity of census data from the first century CE, sibling marriage rather suddenly emerges in our sources as a widespread institution of the second century. During the first half half of the third century, by contrast, the frequency of these unions appears to have declined; for later generations, no census data are available. As a consequence, both the beginnings and the end of this custom remain shrouded in mystery. It is interesting to note that a newly published census register from a city in Upper Egypt that is based on records from the last decade of the first century CE contains no trace of brother-sister marriage (Bagnall, Frier & Rutherford 1997). However, since our data for this practice mostly pertain to a different time and place—*viz.*, Middle Egypt in the following century, we cannot be sure whether these earlier data point to abiding regional variation or to change over time. In the former case, sibling marriage would have been limited to the northern reaches of the Nile Valley; in the latter, it would have 'taken off' only from the early second century onwards.

Historians have so far been unsuccessful in identifying environmental conditions that were likely to persuade families to choose brother-sister marriage over alternative strategies of reproduction and the transmission of property. At the same time, the Roman Egyptian census data enable us to test against empirical evidence some of the most critical assumptions of the biosocial theory of incest avoidance. In a recent article, Hendrix and Schneider review various logical deficiencies of the standard sociobiological view that the aversion to sexual intercourse at mature ages between close kin that supposedly arises from early childhood association results in the instinctive avoidance of close-kin matings and encourages corresponding cultural norms (Hendrix & Schneider 1999). If the seeds of later avoidance are planted in a 'sensitive period' of early childhood, unilateral aversion ought to be far more common than mutual reluctance. Parental aversion would have to be explained with reference to different imprinting mechanisms, and in premodern families, wide birth-spacing and high mortality conspired to keep the 'sensitive periods' of individual siblings from overlapping.

Under these circumstances, the question of the length of these 'sensitive periods' assumes particular importance. In the most recent survey, Bevc and Silverman reveal considerable disagreement, reporting published guesses ranging from 3 to 6 and 10 years or up into adolescence (Bevc & Silverman 2000). The results of their own study of genital intercourse between siblings highlight the significance of separation during the first three years of life. In his contribution to the present volume, Wolf redefines the Westermarck effect as 'a remarkable absence of erotic feelings between people who live together and play together before age ten', which is 'particularly marked among couples brought together before age three'. However, an innate sensitising mechanism that was at its most powerful between birth and age three was bound to be fairly ineffective throughout most of human history.

The Egyptian evidence illustrates this elementary point. The fertility schedule that can be reconstructed from the census returns is best consistent with a model predicting a Total Fertility Rate of close to 6 live births per woman surviving to menopause (Bagnall & Frier 1994). The corresponding Total Marital Fertility Rate has been calculated to be 8.4 (Frier 1994). Under natural fertility, which appears to have prevailed in this population (ibid.), the average number of births per woman rises from 1.25 between ages 15 and 19 to 1.67 between ages 20 and 24, and 1.63 between ages 25 and 29 before dropping to 1.5 between ages 30 and 34, 1.31 between ages 35 and 39, and 0.83 between ages 40 and 44. Hence, during the peak period of fertility from ages 20 to 29, the average married woman gave birth every three years. (In reality, of course, female marriage was frequently interrupted by the husband's death or divorce, and actual birth intervals would have been greater.) Owing to high pre-reproductive mortality (of the order of 50 to 60 percent), the mean age gap between siblings surviving to mature ages was considerably wider. This fact is well brought out by the documented brother-sister couples. The difference in age between sibling spouses attested in census documents is precisely known in only twelve cases, where it

averages 6.75 years. It drops to 6.06 years if four additional cases from other papyrus texts are included. The documented mean difference of 6 to 7 years is reasonably close to the mean age gap of approximately 7 years between opposite-sex siblings surviving to maturity suggested by the Total Marital Fertility Rate. (In 58 non-kin unions in which the ages of both spouses have been preserved, the corresponding mean is 8.3 years.)

The average age difference for full sibling couples conceals considerable variation: the individual gaps are 1, 2, 3, 3, 3, 4, 4, 4, <6, 6, 8, 8, 8, 8, 8, 10 and 17 years (Scheidel forthcoming). If we allow for a 'sensitive period' of 3 years, mutual sensitization could have been achieved in only 2 instances (11.8 percent); with a 6-year period, in 10 cases (58.8 percent); with a 10-year period, in all but 2 (88.2 percent). In any event, 7 out of 17 sibling couples (41.2 percent) were separated by 8 years or more, and judging by Wolf's findings, would have been only mildly or not at all conditioned by the 'Westermarck effect.' As a consequence, on average, close to half of all sibling couples may have been have spared strong feelings of sexual aversion.

Next to constraints on early childhood association imposed by age differences between siblings, the specifics of the socialisation of opposite-sex siblings who did grow up together are also of considerable relevance. Hendrix and Schneider remind us that 'a crucial consideration would be how intimate siblings were in Graeco-Roman Egypt during the sensitizing period of early childhood,' and complain that 'discussions of Egyptian brother-sister marriage generally fail to explore the degree of sexual segregation during the siblings' early years' (Hendrix & Schneider 1999: 213-214). The earlier claim that 'there are no data on the closeness of opposite-sex sibling socialization during the early years' (Parker 1996: 373-374) is not entirely correct. First, the recorded age gaps between sibling spouses provides indirect evidence of the frequent lack of such 'closeness.' Second, there is no evidence of sexual segregation of siblings in early childhood. Judging by the census returns, Roman Egyptian households were fairly large, especially in the cities where brother-sister marriage was common. One estimate puts 7.34 persons in the average household and 11.27 residents in the average house (Hobson 1985). There would not normally have been sufficient living space to ensure the physical separation of future sibling spouses. In addition, frequent coresidence of married brothers would have fostered close physical proximity between coeval cousins (ibid.).

Is it possible to discover peculiarities in the marital or reproductive history of sibling spouses who had been exposed to their future partners from early childhood? Two observations may help to reconcile Roman Egyptian brother-sister marriage with biosocial predictions. First, the unions of 3 out of 10 sibling couples who had been born between 1 and 4 years apart are known to have ended in divorce. Since no completed life histories are available, the actual frequency may have been higher. Conversely, no divorces are recorded for 10 sibling couples in which the partners were separated by 6 years of age or more (Scheidel forthcoming). It goes without saying that this statistical base is impossibly small. Even so,

the observed pattern, however anecdotal, is fully consistent with the central trend of Wolf's Fertility/Divorce Index for 'minor marriages' in Taiwan (see Wolf this volume). Based on this comparative evidence and general considerations, one would expect the incidence of marital dissolution to be positively correlated with the intensity of early childhood proximity of future spouses. At the very least, the Egyptian material cannot be shown to deviate from this principle.

Second, Hill Gates' hypothesis—discussed in Wolf (this volume)—that breastfeeding by the same woman may be instrumental in triggering the 'Westermarck effect' makes it easier to account for 3 prolific full sibling couples with small spousal age differences: a 46-year-old brother/husband and a 42-year-old sister/wife with 5 living children, a 46-year-old brother/husband and a 43-year-old sister/wife with 6 or 7 living children, and a 50 to 59-year-old brother-husband and his 54-year-old sister/wife with 8 living children. In these 3 families, of 15 birth intervals between living children that can be determined with precision, 1 is as small as 1 year and 5 others amount to 2 years each. Thus, 40 percent of their children were separated by no more than 2 years of age. In this environment of very low life expectancy even in the most privileged segments of the population (cf. Scheidel 1999), and generally high rates of endemic infectious disease among adults and parasitism-induced malnutrition (Scheidel 2001) that were likely to enhance the contraceptive properties of breastfeeding, short birth intervals of this kind must have been facilitated by the employment of wetnurses. Wetnursing contracts from that period have frequently survived on papyrus. In the majority of cases, these services were obtained for 2 or 2.5 years, though a few contracts for 3 years are also known (Drexhage 1991; Tawfik 1997). Two or 3 years of maternal breastfeeding are hardly compatible with birth intervals of 1 or 2 years. It seems reasonable to suspect that these sibling couples not only hired wetnurses for at least some of their own children, but in their own infancy had likewise been breastfed by women other than their own mothers. (The documented presence of lodgers and/or slaves in these three households leaves no doubt that the necessary financial means were available.) If the breastfeeding sensitizes babies to the major histocompatibility complex of the feeder, biologically related children nursed by unrelated women may be less likely to face olfactory barriers to mutual sexual attraction at mature ages. I have developed this argument in more detail in Scheidel forthcoming.

A final point merits mention. In Roman Egypt, brother-sister marriage is not known to have been supplemented by parent-child unions. Had estate or status preservation been a pivotal objective, widowed or divorced fathers might have elected to marry daughters who lacked suitable brothers. Arrangements of this kind never occur in the census returns and are unknown to the literary tradition. This may lend support to the view that sibling marriage was a coercive measure, arranged by parents for young children but deemed inappropriate for mature grown-ups. The contrast to the religiously motivated and often cross-generational close-kin unions of the Zoroastrian community is striking. What matters here is that

in neither case, closely related spouses were necessarily expected to derive sexual pleasure from their unions. Parental coercion in Egypt and religious commandments in Iran may well have been rewarded with the kind of limited and often short-lived success that is so well attested for the 'minor marriages' of China discussed by Wolf (this volume).

References

Bagnall, R. S. & Frier, B. W.

1994. *The Demography of Roman Egypt.* Cambridge: Cambridge University Press.

Bagnall, R. S., Frier, B. W., & Rutherford, I. C.

1997. *The Census Register P.Oxy 984: The Reverse of Pindar's Paeans.* Brussels: Fondation Egyptologique Reine Elisabeth.

Betzig, L.

1986. *Despotism and Differential Reproduction: A Darwinian View of History.* Hawthorne, NY: Aldine de Gruyter.

Bevc, I. & Silverman, I.

2000. Early separation and sibling incest: A test of the revised Westermarck theory. *Evolution and Human Behavior* 21: 151-156.

Bittles, A. H.

1998. Empirical estimates of the global prevalence of consanguineous marriage in contemporary societies. Stanford: Morrison Institute for Population and Resource Studies, Working Paper Series, Paper number 74.

Bittles, A. H. & Neel, J. V.

1994. The costs of human inbreeding and their implications for variations at the DNA level. *Nature Genetics* 8: 117-121.

Bixler, R. H.

1982. Sibling incest in the royal families of Egypt, Peru, and Hawaii. *Journal of Sex Research* 18: 264-281.

Carney, E. D.

1987. The reappearance of royal sibling marriage in Ptolemaic Egypt. *La Parola del Passato* 237: 420-439.

Cerny, J.

1954. Consanguineous marriage in Pharaonic Egypt. *Journal of Egyptian Archaeology* 40: 23-29.

Christensen, A. F.

1998. Ethnohistorical evidence for inbreeding among the pre-Hispanic Mixtec royal caste. *Human Biology* 70: 563-577.

Davenport, W. H.

1994. *Pi'o: An Enquiry into the Marriage of Brothers and Sisters and Other Close Relatives*

in Old Hawai'i. Lanham: University of America Press.

De Heusch, L.

1958. *Essais sur le symbolisme de l'inceste royal en Afrique.* Brussels: Université Libre.

Drexhage, H.-J.

1991. *Preise, Mieten/Pachten, Kosten und Löhne im römischen Ägypten bis zum Regierungsantritt Diokletians.* St. Katharinen: Scripta Mercaturae Verlag.

Durham, W. H.

1991. *Coevolution: Genes, Culture, and Human Diversity.* Stanford: Stanford University Press.

Frier, B. W.

1994. Natural fertility and family limitation in Roman marriage. *Classical Philology* 89: 318-333.

Frye, R. N.

1985. Zoroastrian incest. In G. Gnoli and L. Lanciotti (eds.). *Orientalia Iosephi Tucci Memoriae Dicata*, Vol. 1, 387-418. Rome: Istituto Italiano per il Medio e Estremo Oriente.

Hendrix, L. & Schneider, M. A.

1999. Assumptions on sex and society in the biosocial theory of incest. *Cross-Cultural Research* 33: 193-218.

Hobson, D. W.

1985. House and household in Roman Egypt. *Yale Classical Studies* 28: 211-229.

Hopkins, K.

1980. Brother-sister marriage in Roman Egypt. *Comparative Studies in Society and History* 22: 303-354.

Parker, S.

1996. Full brother-sister marriage in Roman Egypt: Another look. *Cultural Anthropology* 11: 362-376.

Scheidel, W.

1996a. *Measuring Sex, Age and Death in the Roman Empire: Explorations in Ancient Demography.* Ann Arbor, MI: Journal of Roman Archaeology.

Scheidel, W.

1996b. Brother-sister and parent-child marriage outside royal families in ancient Egypt and Iran: A challenge to the sociobiological view of incest avoidance? *Ethology and Sociobiology* 17: 319-340.

Scheidel, W.

1997. Brother-sister marriage in Roman Egypt. *Journal of Biosocial Science* 29: 361-371.

Scheidel, W.

1999. Emperors, aristocrats and the Grim Reaper: Towards a demographic profile of the Roman élite. *Classical Quarterly* 49: 254-281.

Scheidel, W.

2001. *Death on the Nile: Disease and the Demography of Roman Egypt.* Leiden: Brill.

Scheidel, W.

Ancient Egyptian sibling marriage and the Westermarck effect. In W. Durham and A. Wolf (eds.). *Inbreeding, Incest, and the Incest Taboo.* Stanford: Stanford University Press. (forthcoming)

Shaw, B. D.

1992. Explaining incest: Brother-sister marriage in Graeco-Roman Egypt. *Man* 27: 267-299.

Sidler, W.

1971. *Zur Universalität des Inzesttabu: Eine kritische Untersuchung der These und der Einwände.* Stuttgart: Enke.

Tawfik, Z.

1997. Wet-nursing stipulations in Greek papyri and Arabic texts. In B. Krämer et al. (eds.). *Akten des 21. Internationalen Papyrologenkongresses Berlin,* 13-19. 8. 1995. Vol. 2, 939-953. Teubner: Stuttgart & Leipzig.

Van den Berghe, P. L. & Mesher, G. M.

1980. Royal incest and inclusive fitness. *American Ethnologist* 7: 300-317.

Williams, A. V.

1990. *The Pahlavi Rivayat Accompanying the Dadestan i Denig, Part 2: Translation, Commentary and Pahlavi Text.* Copenhagen: Det Kongelike Danske Videnskabernes Selskab.