

Eusociality in History

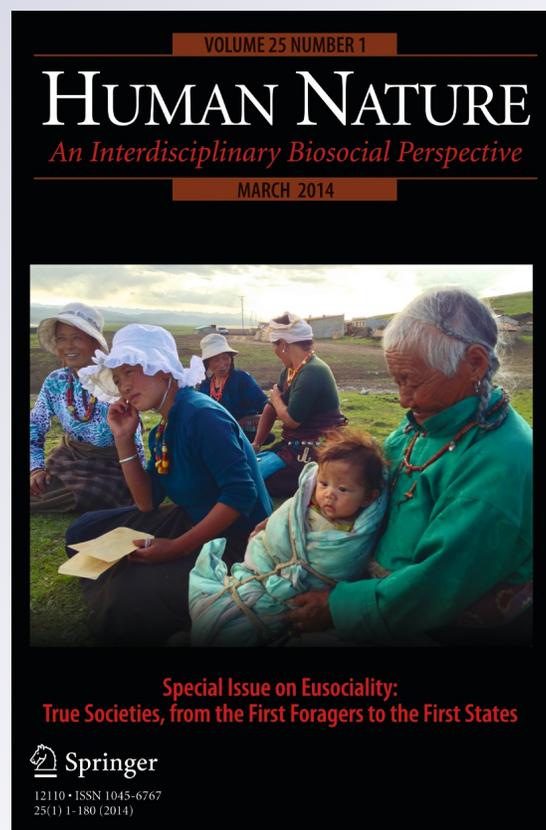
Laura Betzig

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Eusociality in History

Laura Betzig

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Abstract For more than 100,000 years, *H. sapiens* lived as foragers, in small family groups with low reproductive variance. A minority of men were able to father children by two or three women; and a majority of men and women were able to breed. But after the origin of farming around 10,000 years ago, reproductive variance increased. In civilizations which began in Mesopotamia, Egypt, India, and China, and then moved on to Greece and Rome, kings collected thousands of women, whose children were supported and guarded by thousands of eunuchs. Just a few hundred years ago, that trend reversed. Obligate sterility ended, and reproductive variance declined. For *H. sapiens*, as for other organisms, eusociality seems to be an effect of ecological constraints. Civilizations rose up in lake and river valleys, hemmed in by mountains and deserts. Egalitarianism became an option after empty habitats opened up.

Keywords Eusociality · Cooperative breeding · Reproductive variance · Reproductive suppression

Definitions of “eusociality” are both continuous and discrete (Batra 1966; Wilson 1971). Continuous definitions include the wide range of species in which some individuals care for others’ young and measure eusociality by an index of reproductive variance, or skew (Lacey and Sherman 2005; Sherman et al. 1995). Discrete definitions restrict eusociality to a few species with obligately sterile castes (Costa and Fitzgerald 1996; Crespi and Yanega 1995). In practice, these definitions overlap: in societies where some individuals are obligately sterile, reproductive variance will usually be high, and in societies without sterile castes, variance will usually be low. By either definition, *Homo sapiens* should qualify, in some cases, as eusocial.

Foraging societies tend to be fairly egalitarian. Dominants may inhibit the fertility of subordinates by hormonally suppressing ovulation, by hormonally inducing abortion, by killing or eating eggs, and by killing or eating young (Choe and Crespi 1997; Koenig and Dickinson 2004; Mann et al. 2000; Solomon and French 1997; Stacey and Koenig 1990; Wolff and Sherman 2007). But reproductive variance is usually low.

L. Betzig (✉)
URL: www.laurabetzig.org
e-mail: lbetzig@gmail.com

Helpers often become breeders on their own nests, after empty habitats open up (Clarke and Faulkes 1997; Pruett-Jones and Lewis 1990; Tibbets and Reeve 2008).

Inequality goes up with a settled life. All roughly 12,000 species of ant, a variety of bees and wasps (Hölldobler and Wilson 2008), most of the roughly 2,600 species of termite (Thorne 1997), an assortment of aphids (Aoki 1997; Aoki and Kurosu 2010) and thrips (Crespi 1992), a beetle (Kent and Simpson 1992), several snapping shrimp (Duffy et al. 2000), and a couple of mole rats (Bennett and Faulkes 2000) have obligately sterile castes. Workers feed and defend breeders' young, so reproductive variance is high. But dispersal options are usually low.

Many eusocial colonies are large (Hölldobler and Wilson 1990, 2008). Australian gall thrips and Australian ambrosia beetles produce dozens of sons and daughters; social aphids produce an order of magnitude more. Colonies of sponge-dwelling shrimp can hold several hundred young by a single queen. Damaraland mole rats live in colonies with as many as 40 members; and naked mole rat colonies run to the hundreds—with queens that give birth every 2 or 3 months, to as many as 27 pups in a litter, for as long as 32 years. Termite colonies can number in the millions, with one or more breeding pairs. Honeybee colonies hold tens of thousands of daughters by just one queen, and *Atta* ant colonies hold a single queen, with hundreds of thousands, or millions, of her young.

Most of those colonies subsist in permanent habitats (Alexander et al. 1991; Crespi 1994). Some eusocial animals live and breed in their food. Thrips and aphids live in galls in their host plants or trees; termites and ambrosia beetles excavate galleries in trees or fallen logs; snapping shrimp scavenge in the sponge cavities on coral reefs; naked mole rats forage on tubers that grow through the roofs of their burrows. Other eusocial animals produce food in or near their nests. Honeybees forage up to 12 km for plant nectar but live on the honey they process and store in their hives; butterfly caterpillars, treehoppers, mealybugs, scale insects, and aphids are herded like cattle by tropical forest canopy ants, who feed on the “honeydew” at the ends of their alimentary canals; other plant ants cultivate ant-plant gardens, then harvest their nectar and pulp; and at least 220 known species of Attine ants, 330 known species of termites, and one eusocial ambrosia beetle live on fungus they grow in their nests (Mueller et al. 1998, 2005).

For more than 100,000 years, *H. sapiens* lived as foragers in small, extended family societies. Obligate sterility was absent, and reproductive ranges and variances, usually correlated, were low. The best demographic data on contemporary foragers suggest mean completed fertilities of around 2–8; variances lie at around 4–8 for women and 8–16 for men (Betzig 2012). Good hunters father on the order of just 50–100% more surviving children than poor hunters do (Hill and Hurtado 1996; Smith 2004). Some men, and some women, would have helped others raise their children, as helpers-at-the-nest (Hawkes et al. 1989; Hrdy 2009; Kramer 2005a,b; Sear and Mace 2008; Turke 1988). But most adult prehistoric foragers would have been mothers and fathers.

That changed around 10,000 years ago, with the origin of agriculture. In every one of the primary, or autochthonous, civilizations in Mesopotamia, Egypt, India, and China, and later on in Western civilizations from Greece to Rome, emperors collected as many as 100,000 women, who bore hundreds of children. There is evidence of high reproductive variance across the Old World—from the fragments of Assyrian harem inventories in Ashurbanipal's library; to requests for women by New Kingdom pharaohs

in the [Amarna letters](#); to instructions in the *Kamasutra* and other Sanskrit classics; to a widespread Y chromosome cluster arguably carried by descendants of the Yuan dynasty founder Kublai Khan; to the hordes of *nothoi*, or bastards, who were born to Greek slave women; to the thousands of *Augusti liberti*, or imperial freedmen, commemorated on Roman tombs.

As in any “truly” social species, those emperors and their families were supported and guarded by sterile castes. There is some evidence of eunuchs from the Near East to the Far East—from the beardless attendants carved into the thirty-second-century BCE alabaster Warka Vase; to myths about the Egyptian desert god, Seth, on Old Kingdom pyramid texts; to the “third genders” and “rain holders” written about at India’s Maurya and Gupta courts; to the 100,000 eunuchs who ran the government in Ming Dynasty China; to the handful of eunuchs in Plato’s *Protagoras* and Aristotle’s *Politics*; to the keepers of the imperial purse, managers of the imperial estates, generals, and members of 8 out of 18 administrative ranks reserved for the “beardless” in imperial Rome.

This paper reviews the evidence for reproductive variance and sterile castes in human groups. And it argues that eusociality is an effect of ecological constraints. Most civilizations began in lake or river valleys surrounded by mountains and deserts—from Mesopotamia to the Nile Delta, from the Indus and Ganges to the Yellow River, then around the Mediterranean Basin—on fertile but circumscribed land. In *H. sapiens*, as in other organisms, eusociality followed sedentism.

The Near East

In the first histories written into the Bible, patriarchs like Abraham had a handful of sons by a handful of wives and their *shephachot*, or maids. Judges like Gideon had dozens of sons by their *pilagshim*, or concubines. And kings like Solomon collected hundreds of women and may have raised hundreds of children—with help from the revenue collectors and army commanders who belonged to sterile castes. The Bible is backed up by records about other ancient Near Eastern emperors from Assyria to Babylon to Persia who raised children by hundreds of women, who were protected and provided for by hundreds of unmanned men.

Virgin Companions

Since soon after the first written records were scratched into clay or stone, ancient Near Eastern emperors kept many women. There were *nins*, or “queens,” and there were *lukurs*, or “king’s fallow” (virgins)—“because I am a proud man rejoicing in his loins,” bragged the emperor Shulgi after a trip to Nippur ([King of the Road](#), line 27; see [Michalowski 1979](#); [Steinkeller 1982](#); [Postgate 1992](#)). The names of at least 54 *dumu lugal* (princes, or “royal sons”) and *dumu munus lugal* (princesses, or “royal daughters”) survive from Shulgi’s twentieth-century BCE Ur III Dynasty reign ([Gelb 1979](#); [Crawford 2013](#)).

By the Biblical period, women were being collected at Assyrian, Babylonian, and Persian courts, and many were captured in war. The Assyrian emperor [Sennacherib](#)—whose ancestors had collected boxwood, wool garments, and “200 maidens” as tribute from Hatti—carried off 200,150 men, women, and children from 46 fortified cities in

Judah, and Hezekiah threw in “his daughters, his harem, his male and female musicians” (Ashurnasirpal, *Annals*, 6th year; Sennacherib, *Annals*, 3rd campaign). Sennacherib’s son, Esarhaddon, had his own son, Ashurbanipal, crowned in a harem—which he later rebuilt on a “magnificent” scale; inventories in Ashurbanipal’s 20,000-plus clay tablet library list 13 governesses, 145 weavers, 52 maids, and 260 miscellaneous women (Rassam *Cylinder*; Fales and Postgate 1992).

When Nebuchadnezzar invaded Jerusalem in 597 BCE, he captured “the king’s mother, the king’s wives” from Jehoiachin; and 10 years later when Nebuchadnezzar invaded again, he took “all your wives and your sons” from Zedekiah and burned Jerusalem with fire (2 Kings 24:15; Jeremiah 38:23). A House of the Palace Women in Nebuchadnezzar II’s Babylon had provisioners and overseers for the slave girls, and one of Nebuchadnezzar’s successors had gold and silver vessels from Jerusalem’s temple brought out for his own wives and concubines to use at his table (Court of Nebuchadnezzar II; Daniel 5:2).

There were more harems in Persia, of course. When Darius III went to war with Alexander the Great, he took along the queen mother, the queen, 365 woman companions (one for each day of the year), their children, a herd of eunuchs to guard them, 200 *propinqui* (close kin), and 15,000 *cognati* (more remote kin). Some would have descended from his grandfather, Artaxerxes II, who fathered 118 *sons*, and others would have descended from Xerxes I (Curtius 3.3, 10.5; Diodorus 17.77; Justin 10.1.1). In the story of Esther, Xerxes issued this order: “Let beautiful young virgins be sought out for the king.” They were “basted” for 6 months with myrrh and another 6 months with spices, then herded into his palace. “In the evening she went, and in the morning she came back to the second harem in custody of Sha-ash’gaz the king’s eunuch who was in charge of the concubines; she did not go in to the king again, unless the king delighted in her and she was summoned by name” (Esther 2:2–14; cf. Brosius 1998; Kuhrt 1995).

Other women filled the harems of Hebrew kings. “Virgin companions” surround David in the Psalms (45:14), and Solomon assembled 700 noble women (“far more precious than jewels”) and another 300 common women (“man’s delight”) in the bronze and cedar palaces he built in Kings (Ecclesiastes 2:8; Proverbs 31:10; 1 Kings 11:3; Song of Solomon 6:8). Solomon’s son Rehoboam, who ruled over a divided kingdom from the south, was the father of 60 daughters and 28 sons (2 Chronicles 11:21–23), and Ahab, who ruled from the north later on, had 70 sons in Samaria alone (2 Kings 10:1; see Betzig 2005, 2009a and Halpern 1988, 2001).

Beardless Attendants

These families were supported and defended by sterile castes. By as early as the thirty-second century BCE, beardless attendants waited on bearded kings in reliefs from Erech, or Uruk, on the alabaster Warka Vase (Collon 1999), and by the eighteenth century BCE, Mother Earth had made a body “who has no male organ, who has no female organ, to stand before the king, decreed as his fate,” according to a Sumerian creation myth (*Creation of Man*).

By the Biblical period, hundreds of eunuchs worked for emperors at Assyrian, Babylonian, and Persian courts. After the twelfth century BCE, they showed up in Assyrian palace decrees: eunuchs patrolled palace corridors or watched the front doors

(Tiglath-Pileser III, *Middle Assyrian Palace Decree*). And by the eighth century BCE, they'd taken over. Eunuchs worked in the imperial bodyguard, they commanded armies, they administered the “inner” and “outer” courts at the palace, and they governed provinces from Rimusu to Arrapha to Calah (Grayson 1995). Sennacherib sent his chief eunuch, or Rab'saris, to fetch tribute from Hezekiah, and when Nebuchadnezzar sent another army against Zedekiah, Sar'sechim the Rab'saris was in Jerusalem (2 Kings 18:17; Jeremiah 39:3).

Toward the end of the sixth century BCE, Nebuchadnezzar II had another chief eunuch, Ash'penaz, round up Judah's “youths without blemish, handsome and skillful in all wisdom, endowed with knowledge, understanding learning, and competent to serve in the palace” and bring them to Babylon (Daniel 1:3–4). One of Nebuchadnezzar's chief eunuchs, Nabu-sharrussu-ukin, recorded on a tiny clay tablet a gift of gold to the god Marduk; that Nabu-sharrussu-ukin “sat in the middle gate” when Jerusalem was taken (Jeremiah 39:3; Resig 2007).

Others worked as chief prefects or satraps in Persia. Boys were “chosen for castration” as war prisoners, or assessed as tribute: Persian emperors ordered 500 eunuch boys a year from Assyria and Babylon alone (Herodotus 3.92, 6.32), and some had “great influence” at court (Ktesias fr. 6; cf. Daniel 2:48, 5:16, 6:2; Nehemiah 1:11). Xenophon, who was an admirer of Cyrus, thought his courtiers became “gentler when deprived of desire,” but Diodorus, who admired Alexander, knew that Bagoas, “a eunuch in physical fact but a militant rogue in disposition,” had turned on Artaxerxes III and killed his sons (Diodorus 17.5; Xenophon, *Cyropaedia*, 7.5).

Other סריסים, or *sarisim*, from a root meaning “to castrate,” worked as provisioners and protectors for Hebrew kings (Retief et al. 2005; Tadmor 2005). They show up dozens of times in the Bible, as treasurers, messengers, and military commanders—variously rendered as officers, chamberlains or eunuchs, under King James. Samuel used these words to warn the people of Israel about choosing a monarch: “He will take the tenth of your grain and of your vineyards and give it to his sarisim,” and a generation later, when David named his son Solomon as his successor, he assembled the most powerful men in his kingdom—mighty men, seasoned warriors, princes, and sarisim (1 Samuel 8:15; 1 Chronicles 28:1). They were there to the end. After the siege of Sennacherib, Hezekiah was warned that “some of your own sons, who are born to you, shall be taken away; and they shall be eunuchs in the palace of the king of Babylon,” and when Nebuchadnezzar set siege to Jerusalem again, he had the eunuch “in command of the men of war” put to death, but he brought Jehoiachin and his mother, his wives, and the rest of his sarisim back to his palace on the Euphrates (2 Kings 24:12–15, 25:19; Isaiah 39:7; cf. Parpola and Whiting 2002; Tougher 2002).

Egypt

In Egypt, harems are as old as the hieroglyphs; and the hieroglyphs are almost as old as the cuneiform from Sumer. Fragments of Old and Middle Kingdom evidence suggest pharaohs collected many women and raised many children; and in the New Kingdom, Ramesses II had close to a hundred *sons*. But some of the civil servants set over Egypt may have been like the desert god, Seth, whose genitals were crushed.

Women Who Have Not Yet Given Birth

Even in the Old Kingdom, pharaohs were surrounded by women. In a story on the Westcar Papyrus the twenty-sixth century BCE, Fourth Dynasty founder and pyramid builder Sneferu goes out for a row on his private lake, with “20 women with the shapeliest bodies, breasts and braids, who have not yet given birth,” dressed in fishnets (*Westcar Papyrus*, 3). And a line on Unas’ Fifth Dynasty, twenty-fourth century BCE pyramid calls him a crocodile god who “takes women from their husbands, whenever Unas wishes, as his heart urges,” and spreads his seed (*Pyramid Texts*, no. 222; cf. Tyldesley 1994).

Middle Kingdom pharaohs were remembered as promiscuous in foreign languages as well. The Hebrew writers of Genesis remembered that when Abraham and his wife went to Egypt to avoid a famine, Sarah looked good to pharaoh’s scouts, “and the woman was taken into pharaoh’s house” (Genesis 12:15). And Manetho would remember in Greek that the Twelfth Dynasty, Middle Kingdom pharaoh Amenemhet I was murdered in a harem plot. “Had discord been fostered within the palace?” he asked (Manetho frs. 34–36; cf. Redford 2002; Kanawati 2003).

But the best evidence of Egyptian harems comes from the New Kingdom. Toward the end of the fifteenth century BCE, the Eighteenth Dynasty pharaoh Amenhotep II raided Asia for 323 princes’ *female* children and 270 princes’ *favorite* women—“plus their paraphernalia for entertaining the heart” (*Asiatic Campaigning of Amen-hotep II*, A). They came home to make music in his harem gardens, where the girls smeared on moringa oil and sang: “Put a lotus flower to your nose, Amenophis; spend eternity in joy for us!” (*Kenamun Tomb Inscription*, 6).

Other women were requisitioned in the Amarna letters—382 clay tablets dug up from the House of the Correspondence of Pharaoh associated with Amenhotep III and Akhenaten, his son. One Amarna letter writer promises to deliver 20 girls with 500 oxen. In another letter, pharaoh orders 40 “extremely beautiful females” from the prince of Gezer, at 40 shekels of silver apiece. Some Amarna correspondents are asked to send their daughters along (“prepare your daughter for the king, your lord, and prepare the contributions”); others offer their wives (“how, if the king wrote for my wife, how could I hold her back?”). And when Amenhotep III married Gilukhepa, a daughter of the king of Mitanni, she brought along 317 marvelous harem women—with their hand-bracelets, foot-bracelets, earrings and toggle-pins (*Amarna Letters*, nos. 25, 99, 254, 301, 369; *Marriage with Kirgipa Scarab*).

The thirteenth-century BCE, Nineteenth Dynasty pharaoh Ramesses II remembered the day his father gave him a crown. “He spoke of me, his eyes filled with tears, so great was the love for me within him; he furnished me with a household from the royal harem, comparable with the beauties of the palace”—wives and other women from all over the land (*Great Abydos Inscription*, cols. 48–49). And when Ramesses’ beautiful Hittite bride, the last of his eight wives, showed up with her own attendant women, they were left in a harem at the mouth of the Faiyum, with their own herds and storehouses, overseers, and scribes (Gardiner 1953; Kitchen 1982). Those women bore many children. In the corridors and chambers of his tomb in the Valley of the Kings at Thebes (KV5), places were saved for Ramesses’ sons (Weeks 2006); and on bas reliefs and ostraca, statues, and scarabs from all over his empire, the names of 49 “king’s sons” and “bodily king’s sons”—counts, chiefs of secrets, generals, scribes—survive from

Ramesses' reign. Another 50 inscriptions are associated with his unnamed *sons*, and there would have been roughly as many daughters (Fisher 2001).

Men with Their Genitals Crushed

The evidence for Egyptian eunuchs is more ambiguous. There are hints in old myths about the desert god, Seth—who shows up on a limestone macehead from the tomb of the Scorpion King, roughly contemporary with the thirty-second-century BCE Warka Vase. Seth had a man's body but a desert animal's head; he was lord of the barren Sahara, and of the foreigners who lived on Egypt's borders. As early as the Old Kingdom pyramid texts, a story is told that Seth killed his older brother Osiris, then fought against Osiris' son Horus. Horus lost sight in one eye, and Seth's testicles became "impotent" (Pyramid Texts, no. 1463). That story had staying power. "Seth threw filth in the face of Horus, but Horus crushed the genitals of Seth," remembered the New Kingdom *Book of the Dead* (chap. 17).

Other bodies without genitals, and genitals without bodies, are represented in Egyptian art. Beardless attendants with effeminate silhouettes wait on women in Middle Kingdom sarcophagus reliefs, and heaps of phalluses cover Medinet Habu and other New Kingdom temples: the captives attached to them might, or might not, have become eunuchs (Jonckheere 1954; Murnane 1980).

The translators who produced the Greek Septuagint from the Hebrew Bible in Egypt used the word εὐνοῦχος, or eunuch, in their version of Genesis. They believed that pharaoh's chief butler, his chief baker, and Potiphar, the captain of his guard, had all been castrated men (Genesis 39:1, 40:2, 7; cf. Kadish 1969). Roughly three centuries later, an Alexandrian named Philo, who knew Hebrew but wrote in Greek, took it for granted that Potiphar, who was Joseph's master, had been "deprived of all requisite power of generating," which made him more "skillful in state affairs." He added that Joseph—whose long robe with sleeves was the one worn by virgin daughters, and who was sold by his brothers as a slave—could have been a eunuch, too, "castrated and mutilated of all the masculine and generative parts of the soul" (Philo of Alexandria, *On Joseph*, 58 and *On the Unchangeableness of God*, 111; cf. Abusch 2002).

India

In the years after Alexander the Great crossed the Hindu Kush, Chandragupta Maurya became the first emperor to bring the Indus and Ganges together. Sanskrit evidence suggests that emperors on the subcontinent collected thousands of women, and their children were cared for with help from *varshadharas* (rain holders) and *shandhas* (effeminate), *tritiya prakritis* (third genders), and *klibas* (the impotent)—who might have been members of sterile castes.

Women in Closed Apartments and Pleasure Orchards

Kautilya, who was remembered as Chandragupta Maurya's advisor, is supposed to have put together an *Arthashastra*, or Text on Gain. "The king shall construct his harem consisting of many compartments, one within the other, enclosed by a parapet and a

ditch, and provided with a door,” he wrote; emperors were to outfit their women’s quarters with maternity wards and residences for princes and princesses (Kautilya 1.20). And Chandragupta Maurya’s grandson, Ashoka the “Sorrowless” emperor, is supposed to have won his throne over the bodies of 99 brothers by other mothers (Dipavamsa, 6.22; Mahavamsa, 5.20–21). Then he reassured subjects in rock edicts across his empire that he would look after their welfare—“whether I am eating or in the closed female apartments, in the inner chamber, in the royal rancho, on horseback or in pleasure orchards” (Ashoka, *Rock Edicts*, 6).

By roughly six centuries later, Vatsayana’s *Kamasutra*, or Love Threads, advised Gupta emperors to rub certain ointments on themselves “to enable them to enjoy many women” in one night; and it instructed consorts to solve riddles, do arithmetic, act, sculpt, speak multilingually, and make parrots talk in order to keep an emperor interested, even though he had “thousands of other women” around him (Vatsayana 1.3, 5.6). The *Manusmriti*, or *Laws of Manu*, which would have been available to imperial Guptas, suggested that *vaishyas* (men of the next-to-lowest caste) should have access to both *vaishya* and *shudra* (lowest-caste) women; that *kshatriyas* (men of the next-to-highest caste) should have access to *kshatriya*, *vaishya*, and *shudra* women; that *brahmins* (highest-caste men) should have access to all women; “but for the *shudra*, the *shudra* alone has been ordained” (*Manusmriti*, 3.13). Other harems fill the Hindu epics, probably completed at the Gupta courts. In the *Ramayana*, Ravana steals Rama’s bride Sita away and hides her in “an array of palaces and mansions with thousands of women” of his own; but the monkey Sugriva helps Rama get Sita back, even though Sugriva himself is “addicted to sensual behavior and relegating duties to his ministers” (*Ramayana*, 3.53.7–8, 4.28.1–8). So it goes in the *Mahabharata*, where there are harems in heaven (the moon has 27 wives), in the oceans (rivers “like rivaling concubines” run into them), and on earth—where pretty girls drink choice liquor and dance by the thousands when Arjuna marries the princess Draupadi (*Mahabharata*, 1(5)19, 1(7)60, 1(13)191).

There were harems in India before the Mauryas. Bimbisara, who ruled over a south Ganges kingdom at Magadha, was a patron of Siddhartha Gautama—the Shayka prince who left home and wandered for six years, then became the Enlightened One, or Buddha, under a pipal tree. The *pitakas* (or “baskets” of Buddhist knowledge) remember that Bimbisara kept 500 women (*Mahavagga*, 8.1.15). And the *Buddhacarita* (or “acts”) of the Buddha remembers that Gautama’s women waited at the window to see him (“crowded together in the mutual press, with their earrings ever agitated by collisions and their ornaments jingling”), or surrounded him as he walked in his gardens (“like an elephant through the Himalayan forest, accompanied by a herd of females”) (*Asvaghosa* 3.18, 4.27).

Rain Holders and Third Genders

Many of those harems may have been guarded by eunuchs. The first part of Kautilya’s *Arthashastra* had *varshadharas*, or “rain holders,” regulate affairs so that they were conducive to the happiness of Mauryan emperors, their masters. And other passages asked *pandakas*, or “deviants,” to spy on the houses of enemy kings (Kautilya 1.20, 6.1).

Vatsayana’s *Kamasutra* asked Gupta emperors to have *tritiya prakritis*, or “third genders,” who often dressed as women, keep their “desires secret” when they

dressed as men (Vatsayana 2.9); and the *Laws of Manu* called a Brahmin without knowledge “as fruitless as” a *shandha*, or effeminate man (see *Manusmriti*, 2.158, 4.205, 211, 9.79, 201). There are ambiguous genders in the *Rayamana*—where Rama, after wandering for 14 years, finds followers who are “neither man nor woman” waiting when he comes home to be crowned (*Ramayana*, 6.49). And there are *klibas*, or “impotents,” in the *Mahabharata*—where Arjuna, the hero of the *Bhagavad-Gita*, is cursed by the goddess Urvashi and ends up as Brihannala, or “Big Rod,” the unmanned dancer (*Mahabharata*, 3(41), 4(45)10; reviewed in Gannon 2011).

China

Asia has been continuously inhabited by people of the Middle Kingdom, or *Zhongguo ren*, since the beginning of recorded time. They lived under five apocryphal emperors from as early as the third millennium BCE—within a few centuries of the first emperors in Mesopotamia or Egypt. By the third century BCE—within a few centuries of Chandragupta Maurya—they’d raised up the First August Emperor of Qin. His successors filled palaces with tens of thousands of women; and their sons passed Y chromosomes on to 1 in 200 of *all* late-twentieth-century men.

Many Consorts

Before there were emperors, there were harems. Shang Dynasty (ca. 1600–1046 BCE) kings asked diviners about their women’s health (“the many consorts will have no illness”), and Zhou Dynasty (ca. 1046–256 BCE) kings collected women in the classics (see Keightley 1978, fig. 12; Shaughnessy 1991, 3.4.2.2). They brought along entourages (“the virgins, her companions, followed the lady, leisurely like a beautiful cloud”) in the *Shi jing*, or Classic of Odes; they brought along relatives (“the returning maiden with consorts turns around, and returns with younger sisters”) in the *Yi jing*, or Classic of Changes; and they made men “reckless in lust” in the *Shu jing*, or Classic of Documents (*Shi jing*, 21, 261; *Yi jing*, 29; *Shu jing*, 3.1.6, 5.1.5).

After Qin Shihuangdi, the First August Emperor of Qin, unified China in 221, he connected 270 palaces together and filled them with 10,000 women—“beautiful women and bells and drums that he’d taken from the feudal rulers,” said China’s first historian, Sima Qian (*Shi ji*, 6). The Han Dynasty (206 BCE–220 CE) reformer, Wang Mang, sent out Palace Grandees Without Specified Appointments and Government Agents, 45 of each, to select virtuous young ladies; Former Han emperors collected 3,000, and Later Han emperors collected 6,000 (*History of the Former Han Dynasty*, 99C.13b). The Sui Dynasty (581–618 CE) emperor Yangdi—who built the Grand Canal, and rebuilt Qin Shihuangdi’s Great Wall—is supposed to have kept 100,000 women at Yangzhou alone; and the long-lived Tang Dynasty (618–907 CE) emperor Xuanzong had palaces for 3,000, 8,000, and 40,000 women. The *Song Shi* names 65 children of the Song Dynasty (960–1279 CE) emperor Huizong, but there were probably others: he was presented with a virgin every 5 to 7 days (Ebrey 2002).

A Y chromosome linkage common in Mongolia and northern China, carried by an estimated 3.3% of contemporary East Asian men, may be descended from the imperial Qing (Xue et al. 2005); and another Y chromosome linkage, represented in roughly 8% of contemporary populations from the Pacific to the Caspian Sea, and in up to 1 in 200 of *all* late-twentieth-century men, has arguably been borne by the Yuan Dynasty (1279–1368 CE) descendants of Genghis Khan (Zerjal et al. 2003). Thousands of women would have summered at Xanadu, or Shangdu, under the Yuan Dynasty founder Kublai Khan: six consorts went in to that emperor every three nights, “and so, throughout the year, there are reliefs of maidens by six and six,” remembered Kublai’s Venetian friend (*Book of Ser Marco Polo*, 2.8; Steinhardt 1999).

Those without Balls

Those women were protected and provisioned by a sterile caste. There are insolent eunuchs in Zhou Dynasty *Shi jing* odes (“wives and those without balls bleat with similar voices”); and the inscription “cannot be entered,” with ideographs for male reproductive organ and knife, has been found on Shang Dynasty oracle bones (*Shi jing*, 264, 265; Shizuka 1975:552; references in Jay 1993).

The first emperor, Qin Shihuangdi, set up a new eunuch agency, the Central Imperial Depot, or *Zhongchangshi*. Han emperors had at least 2,000 court eunuchs put to death. Tang emperors invested a eunuch nobility: one prince, 27 dukes, 4 marquises, 2 earls, 4 viscounts, and 7 barons; and the *Song shi*, or Song dynastic history, included 53 eunuch biographies—some, palace administrators; others, army commanders (Tsai 1996, 2002).

The sterile caste expanded as time went on. Taizu, the Ming Dynasty (1368–1644 CE) founder, knew eunuchs were too influential, so he put up an iron plaque outside his palace that said: “Eunuchs are forbidden to interfere in government affairs; and those who try will be killed.” But when the last Ming emperor gave way to the Qing, Beijing held an estimated 70,000 castrates, with another 30,000 scattered all over the empire. Ming eunuchs filled four departments, eight bureaus, twelve directorates, and the *Dongchang*, Eastern Depot, or secret police. Obligately sterile soldiers, like the admiral Zheng He, explored the Indian Ocean and the Persian Gulf; and obligately sterile administrators, like the architect Nguyen An, designed the Forbidden City in Beijing—which held more than 900 buildings, and almost 9,000 rooms (Anderson 1990; Holdsworth 1998).

Greece

Eusociality was already ancient before it got to the West, but the English word *eunuch* comes from εὐνοῦχος, or bedkeeper, in Greek. Millennia after Seth’s testicles were crushed in an Egyptian myth, and beardless attendants were carved into the Warka Vase; within centuries of the castrates in the Chinese classics and the “deviants” and “rain holders” in the *Arthashastra*; eunuchs were written into the philosophies of Plato and Aristotle. They looked after housefuls of women, and their homeborn daughters and sons.

Courtesans and Concubines, Wives and Slaves

Before Greek historians wrote about promiscuous pharaohs or Persian emperors, they told stories about the Trojan wars. In the *Iliad*, Priam loses Paris and his other 49 sons—19 by his wife, and the rest by the women of his house. Those boys are slaughtered, their children are smashed on the ground, “and their wives are dragged away by Achaean hands” (*Iliad*, 22.64–65, 24.495–496). And in the *Odyssey*, Odysseus sails home to Penelope, his long-suffering wife—and to the 50 wool-carding maids that he’d captured on earlier raids. “You dogs!” he says to the suitors lying about his house, “you courted my wife, and slept with my servants by force.” Every one of those maids ends up with a noose around her neck (*Odyssey*, 14.203, 264, 22.421–473).

There may have been 100,000 slaves in Classical Athens—close to half the population. Some of the men worked on the farms or in the silver mines. But the women, as usual, worked indoors, and most were concentrated in rich men’s houses. Aristotle thought slavery was part of the natural order: “the first and fewest possible parts of a family are master and slave” (*Politics*, 1253b), and Plato thought well-to-do citizens might be masters of 50 slaves (*Republic*, 9.578d). Unmarried, but sexually accessible to their masters, they raised *οικογενεῖα*, their homeborn daughters and sons (Bradley and Cartledge 2011; Rawson 2011).

The usual arrangement was laid out in an Athenian speech. “We have *hetairai* (courtesans) for pleasure, *pallakai* (kept women) to care for our daily needs, and *gynaikes* (wives) to bear us legitimate children” (Demosthenes, *Oration*, 59.122). On the side there were *pornoι*, or whores, and “multitudes” of *douloi*, or slaves (Athenaeus, *Deipnosophistae*, 6.13). They gave bastards, or *nothoi*, to their masters: Aristonothos (“excellent bastard”), Notharchos (“leading bastard”), Kleinothos (“glorious bastard”) and Philonothos (“loving bastard”) were some of their names (Davidson 1998; Ogden 1996; Pomeroy 1975, 1999; Scheidel 2009a,b).

Bed Guards

Many of those slaves and bastards were guarded by eunuchs. As early as the eighth century BCE, Hesiod—who might have beat Homer in a singing contest—had Kronos “harvest his father’s genitals” with a long, jagged sickle (*Contest of Homer and Hesiod*, lines 80–94; *Theogony*, lines 178–182), and Homer—who might have gone blind after a visit to Ithaca—had Odysseus take care of his treacherous goatherd by “ripping away his genitals as raw meat” for his dogs (Pseudo-Herodotus 6; *Odyssey*, 22.476–477). By the fifth century BCE, in his tragedies, Aeschylus had Clytemnestra “brutally mangle” her husband’s corpse; and Orestes was threatened with “mutilation” and the destruction of his seed (*Choephoroi*, 439–40; *Eumenides*, 185–190; see Bardel 2002). A little later, in his histories, Herodotus remembered a tyrant from Corinth who sent 300 boys from the best families in Corfu to be “turned into eunuchs,” and a trader from Chios who made a living “by the unholy trade of castrating any good looking boys” he could find (Herodotus 3.48, 8.105).

There were other eunuchs in Athens. In his *Politics*, Aristotle had a eunuch kill the tyrant of Cyprus in order to avenge an insult (*Politics*, 1311b), and Plato’s *Protagoras* had Callias, the most prosperous man in town, keep a eunuch guard at his door, who “overheard” the sophists inside (*Protagoras*, 314c). There would be more eunuchs in Rome.

Rome

Under the emperors, eunuchs worked as governors or generals, managed the imperial estates, or kept the imperial purse. They looked after the slave women who were sexually accessible to the emperors, and then they raised the homeborn slaves, or *vernae*, who would have included the emperors' illegitimate children.

Mothers of the *Familia Caesaris*

There were an estimated 6 million slaves in a population of 60 million in the Roman Empire by Augustus' time (Scheidel 2011), and most were owned by rich women and men. Great men saved places for hundreds of slaves in their family tombs, and many of those slaves were women (Treggiari 1975, 1976). In papyri from Roman Egypt, the ages of female slaves at the time of sale hovered around a median of 19 (Bradley 1978, 1991), and in Justinian's law book, the *Digest*, slave women, who were legally unmarried, were rewarded for bearing healthy bastards (*Digest*, 1.5.15, 21.1.14–15, 34.5.10(11)0.1). Those children were often freed, and they were lovingly commemorated on Roman tombs (Hopkins 1978; Rawson 1986). Many grew up to become knights, or sat in the senate (Tacitus, *Annals*, 13.27), and hundreds of *Augusti vernae* (*Aug Vern*) and *Augusti liberti* (*Aug Lib*)—slaves and freed slaves, members of the imperial family or *Familia Caesaris*—worked in the emperors' civil service (Weaver 1972; reviews in Betzig 1992, 2010; Liu 2013; Scheidel 2009a,b; Treggiari 1992).

For centuries, republican rhetoric reamed randy emperors in Rome. Tacitus lit into Tiberius: “He regained his secluded sea cliffs, for his criminal lusts shamed him. Their uncontrollable activity was worthy of an oriental tyrant” (*Annals*, 6.1). Seneca disapproved of Caligula: “At a banquet, this is at a public gathering, using his loudest voice, Gaius taunted a senator with the way his wife behaved in sexual intercourse. Ye gods! What a tale for the ears of a husband! What a fact for an emperor to know!” (*On Constancy*, 18.2). Dio remembered that Claudius, who grew up sick and weak on the Campanian coast, was pimped for by his mother and grandmother, who provided slaves (Dio, 60.2.6, 61.31.1). And Suetonius had fun with the last Caesar. Nero hosted soirées that lasted all night and all day; he threw parties in the Campus Martius, with prostitutes from all over the city; he raped one of the vestal virgins; and he committed incest with his mother—or a “spitting image” of her (Suetonius, *Nero*, 27–28).

The numbers increased after the empire moved east. After Constantine settled in Constantinople, women were added to the imperial *gynaeceum*, or women's rooms (Eutropius, *Abridgement*, 9.25; Zonaras 12.23). The fifth-century CE register of dignitaries, or *Notitia Dignitatum*, listed imperial *gynaecea* in Italy at Rome, Apulia, Aquileia, Ravenna and Milan; at Carthage in North Africa; at Winchester in Britain; at Pannonia and Dalmatia in the Balkans; and at Arles, Lyons, Rheims, Tournay, Trier, Autun and Vienne in Gaul; further east, there were *gynaecea* in Caesarea and Tyre (*Notitia Dignitatum*, 11). These women made cloth, and were sexually accessible to their masters (Lactantius, *On the Deaths of the Persecutors*, 38.1–4).

Governors of the Sacred Bedchamber

Eunuchs were attached to every emperor after Julius Caesar. Maecenas, who worked as a regent for the first emperor, Augustus, was “attended in public” by a pair of eunuchs; and both a *rarus eunuchus* and a *decurio* (head of 10 *cubiculiorum* (probably a eunuch) were interred in Augustus’ wife Livia’s tomb (Seneca, *Moral Letters*, 114; *Corpus Inscriptionum Latinarum*, 6.3957–3961, 4231, 4238). The eunuch Lygduus may have had Drusus, the second emperor’s son, done in (Tacitus, *Annals*, 4.10); and Helicon, his Egyptian *cubicularius*, was especially close to the third emperor, Gaius—he played ball with him, had dinner with him, was with him “when he was going to bed,” and advised him on foreign affairs (Philo of Alexandria, *Embassy to Gaius*, 27.175). Claudius, the fourth emperor, had a eunuch, Posides, who was honored at his British triumph (Suetonius, *Claudius*, 28); and Nero sent out his *cubicularii* to start the Great Fire in Rome, then put up “gangs of eunuchs” in the Golden House he built on the ruins (Tacitus, *Histories*, 2.71).

Over time, their numbers and influence grew. By the end of the first century CE, there were “troops of eunuchs” at court (Suetonius, *Titus*, 7); and by the start of the second century, another eunuch, Favorinus, debated with Hadrian: the interest was “universal” when he gave speeches in Rome (Philostratus, *Lives of the Sophists*, 1.8). By the third century, eunuchs were treasurers and tax collectors (*Historia Augusta*, Severus Alexander, 23.6–7), and after 311, when Diocletian was done in, eunuchs “who had chief authority at court and with the emperor” were slain (Lactantius, *On the Deaths of the Persecutors*, 14–15).

Then Constantine moved his capital to Constantinople, and his bureaucracy was filled with eunuchs. There were a thousand cooks, barbers, butlers and waiters, and “eunuchs more in number than flies around the flocks in spring” soon after the time of Constantine I (Libanius, *Orations*, 18.130); and six centuries later, they “swarmed around the grand palace like flies around a cowshed in summer” under Constantine VII (Theophanes Continuatus, 318). By the tenth century, 8 of 18 administrative ranks were reserved for members of a sterile caste, and eunuchs consistently outranked the “bearded” civil service. Among others, a *praepositus sacri cubiculi*, or grand chamberlain, was set over the emperor’s “sacred” bedchamber; a *comes sacrae vestis* kept the sacred wardrobe; a *sacellarius* was keeper of the purse; and a *castrensium sacri palatii* managed the sacred treasury, “for the property of the treasury is as it were the private property of the emperor,” by law (*Digest*, 43.8.2.4). Others ended up as governors or generals, counselors or consuls; and “eunuchs for the kingdom of heaven” were patriarchs and bishops in the Eastern Church (Claudian, *Against Eutropius*, 1.417–462, 2.342–344, with reference to Matthew 19:12; reviews in Dunlap 1924; Hopkins 1963, 1978; Jones 1964; Tougher 2004, 2008).

After Mehmed II conquered Constantinople in 1453, he built Topkapi palace and filled it with women and eunuchs. There were 150 of “the most splendid, well kept and beautiful women that could be found in the world,” thought the Genoese merchant, de Campis (*Aufzeichnungen*, 44). Privy purse records suggest those numbers grew to 436—with another 531 at the Old Palace—by 1652 (Peirce 1993). Centuries after Hindus, Hebrews, Buddhists, and Christians installed harems in the Near and Far East, Islamic emperors from Iberia to Indonesia collected believing women and two, three, or

four wives (Quran 4:3, 33:50), who were often looked after by sterile castes (Marmon 1995).

Conclusion

In any society, three variables contribute to reproductive variance: (1) the ecological benefits of group membership, (2) the social benefits of group membership, and (3) the relatedness of group members (Vehrencamp 1983a,b).

In *H. sapiens* or any other social species in which subordinates delay or forfeit direct reproduction, relatedness can lower the costs of altruism. And as expected, average relatedness in most skewed societies is high (Hamilton 1964, 1972). But high relatedness within a group may be an effect, as well as a cause, of high reproductive variance: where just one or a few individuals reproduce, group members will often be siblings; and where societies are philopatric, relatedness may go up over generations as a result of inbreeding. Haplodiploidy is a poor predictor of eusociality: a number of diploid groups have sterile castes (Hebers 2009; Hölldobler and Wilson 2008), and some workers—like termites in fused groups, and slave ants—are unrelated to other group members (Hölldobler and Wilson 1990; Korb and Schneider 2007). That would be true of most human societies, where workers often include immigrants or distant relatives.

Social benefits—including cooperative foraging and cooperative defense—can also contribute to reproductive variance. Among other things, group members may benefit each other as alarm callers or guards, groomers, or foragers, and subordinates may be willing to limit their own direct reproduction as a result. But what looks like cooperative foraging can be mutualism, or an effect of manipulation by dominants who prod subordinates into action (Reeve 1992; Ratnieks and Wenseleers 2008); and the importance of cooperative defense—including alarm calling and the destruction of parasites—may be an effect, at least in part, of living in larger societies (Clutton-Brock 2006, 2009). Again, that's often been the case in human groups.

Ecological benefits—including habitats safe from predation, and those with plenty of food—may most effectively compensate subordinates for becoming facultatively or obligately sterile helpers or workers (Brown 1987; Emlen 1982, 1995, 1997). Eusocial species take advantage of resource patches across taxa, from arthropods to mammals. Some eusocial animals live in their own food: termites colonize decaying logs, aphids occupy plant galls, snapping shrimp fill sponge cavities on coral reefs, naked mole rats burrow into 30 kg tubers. Other eusocial animals produce food in their nests: bees make honey, ants cultivate fungus (Mueller et al. 1998, 2005; Betzig 2013). The fact that eusocial species dominate the central, more stable areas of habitats, while solitary species flourish in the peripheral, more ephemeral areas, may indicate that high variance is often an effect, rather than a cause, of finding a good food source (Hölldobler and Wilson 1990; Wilson and Hölldobler 2005). For *H. sapiens*, that seems to have been the case.

For the long stretch of prehistory, we lived in foraging societies, and reproductive variance was low. It was higher where seasonality was low and resources were abundant, especially near rivers or coasts—from California's Channel Islands, to the Alaskan Panhandle, to southwest Florida's Gulf, to Hokkaido Island in Japan (Keeley

1988; Kelly 2013). But most forager families were small, and most men and women were able to raise children (Betzig 1986, 2012).

That changed with the origin of farming. By around 12,000 years ago in the Levant, Natufians had started to craft cereal harvesting sickles to go with their mortars and pestles, and soon afterward, there were planters and harvesters from Tepe Guran on the Karkheh River in Iran to Catal Hüyük on the Anatolian Plains of Turkey. By the ninth millennium BCE, people near the Persian Gulf were using cylinder seals and cuneiform texts to keep accounts, and by the fourth millennium, they'd started to write history. Every form of writing and accounting began in a river valley—from Sumerian cuneiform, on the Tigris and Euphrates to Egyptian hieroglyphs on the Nile, to logophonetics on seals at Harappa on the Indus, to pictographs on Shang Dynasty bronzes and oracle bones along the Yellow River and its tributaries (Schmandt-Besserat 1996; Powell 2009). As Robert Carneiro proposed a generation ago, every ancient civilization began on “areas of circumscribed agricultural land” (Carneiro 1970, 1986). And in every one of those civilizations, a small minority of men collected up to 100,000 women; and up to 100,000 eunuchs filled sterile castes.

Then just 500 years ago, history reversed itself. Egalitarianism, or democracy, has been attributed to a variety of causes—from wealth distribution to parasite loads (Vanhanen 2003; Thornhill et al. 2009). Another plausible hypothesis is the discovery of two nearly empty continents (Betzig 2009b, 2013). 157 years after Columbus' first trip across the Atlantic, the execution of King Charles I was ordered by members of England's House of Commons; 144 years later, the French National Convention had Louis XVI guillotined. By then, millions of French and British immigrants had already been guaranteed “the blessings of liberty to ourselves and our posterity,” as they looked out on the vast, sparsely populated expanse of the American West.

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Laura Betzig (BA, PhD) studies sex, politics, and religion as gene competition.