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Swinging and Rocking: Two Millennia of Debating the Cradle

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Abstract
In most societies, devices evolved to enhance the mother's working capacity. This article depicts the cradle's development in some countries and delineates the scientific debate that led to its demise in the 19th century. A few basic forms of infant cots survived the centuries from antiquity: the carrying board, trough, hammock, sling, transverse rockers, and forward rockers. Romans discerned 2 types: the cuna stood on the floor and was moveable by wooden rockers. Lecti pensiles were suspended beds. Cradleboards of Native Americans revealed remarkable variety of shapes and decorations. The cradle's hood was a 16th century development, intended to protect the baby's face from flies, sunlight, and the evil eye. Already in the second century CE, Galen mentioned controversies about rocking. A fervent debate began in the 18th century. Propagators reasoned that rocking perpetuates habitual fetal movement, exercises the child, and avoids the need for somniferous drugs. Opponents claimed that rocking is dangerous, producing an unnatural sleep harmful to the brain, and impeding milk digestion. In the 20th century, cradles were replaced by pushchairs and prams, but they did not disappear. Despite centuries of debate, robust studies have never been conducted, and it remains unclear whether rocking has any benefit or harm for the infant.

Introduction

In all times and cultures, the newborn infant's first cradle was its mother's arm. Worldwide, human infants resided at their mothers' body – sitting on her hip or carried on her back. However, in most societies, devices evolved seeking to facilitate the mother's working capacity. Adapted to regional lifestyle, the cradle served various purposes: a nest for the helpless infant, providing warmth and isolation; vehicle in which the infant could be transported, chiefly on the mother's back, and primarily in nomadic tribes; device shaping the body, especially the head. A hood was attached to many cradles to protect the infant against flies, domestic animals, or predators, against falling, direct light, and the evil eye. Most cribs could be set in rhythmic motion with a string to promote the baby's sleep. Focusing on art history, Pflug [1] and Zglinicki [2] assembled and classified hundreds of cradles. The aim of the present study was to depict the cradle's development in some countries and to delineate the scientific debate that led to its demise in the 19th century.

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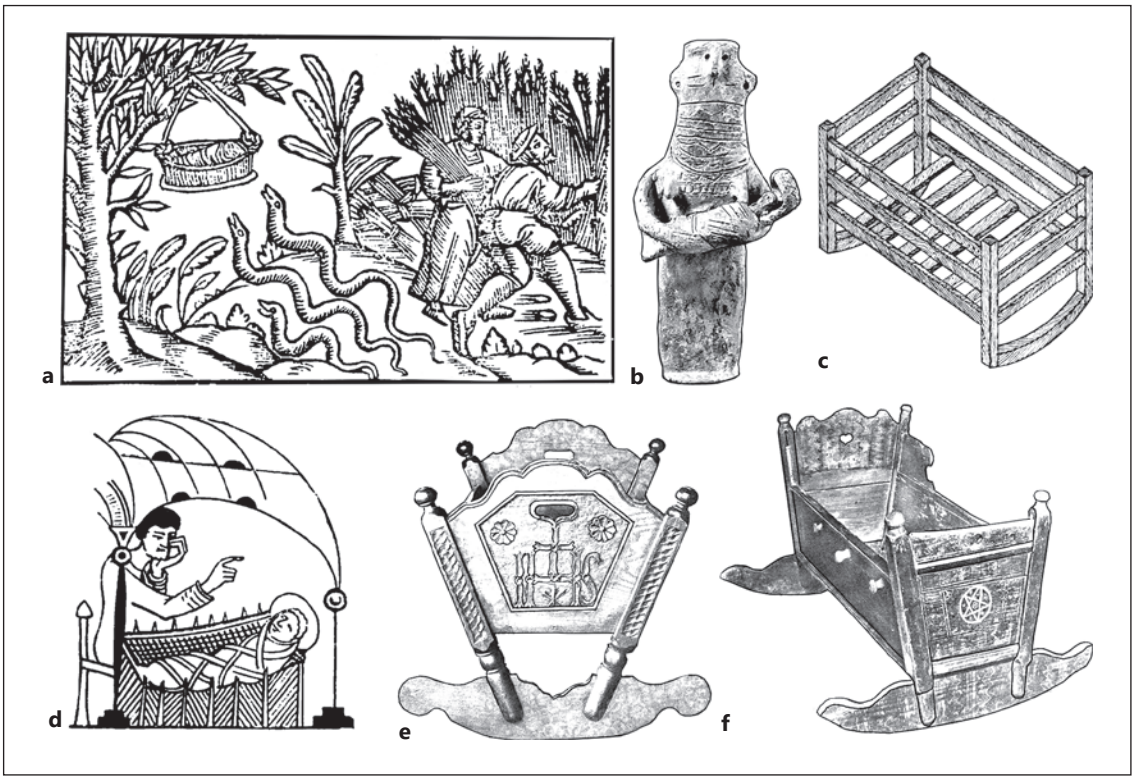

Fig. 1. Antique and medieval cradles: **a** basket suspended from a tree to protect the infant from snakes, depicted by Olaus Magnus in 1555 [12]. **b** Terracotta figurine from Cyprus, ca. 2000–1600 BCE showing a mother carrying a cradle with face hood; [redrawn from a specimen at the Louvre, Paris]. **c** Carbonized wooden cradle from Vesuvius eruption, Herculaneum, 79 CE, redrawn from Mols [57]. **d** Basket cradle from a 9th century miniature, depicted by Viollet-le-Duc [58]. **e** Tyrolean cradle with IHS-monogram, 18th century, redrawn from Zglinicki [2]. **f** Encircled pentagram believed to protect the infant in the cradle, described by Praetorius 1666 [13].

Antique and Medieval Cradles

Multiple terracotta figurines are preserved from Cyprus dating from 2000 to 1600 BCE (Fig. 1b). The mothers typically held the infant in a cradleboard. These figurines were buried in babies' tombs and may have served to worship the Greek deity *Kourotrophos* [the child nurturer]. Greeks used different devices for carrying and swinging: the *caetis* [bed on rollers] and the *skaphe* [boat] [3, 4]. Plato [5] claimed around 370 BCE: "nursing and moving about by day and night is good for them all, and that the younger they are, the more they will need this; infants should live, if that were possible, as if they were always rocking at sea." Athenaeus [6] wrote around 50 BCE: "The nurse put the child in the cradle … and beat away the flies with the bundle. And whenever the child wept, … would rock the cradle and lull it to sleep."

Romans also discerned 2 types [7]: the *cuna* stood on the floor and was moveable by wooden rockers. A charred wooden cradle of this type – with carbonized baby bones – was excavated in Herculaneum, from the ashes of the Mount Vesuvius eruption in 79 CE (Fig. 1c). The *cuna* had trough or ship form [8]. Wealthy patricians hired a *cunaria*, who was trained to gently move the sleeping baby in the cradle. The second type called *lecti pensiles* was a kind of suspended bed from canvas or fleece [3]. In Plautus' comedy *Truculentus* [220 BCE], Phronesia lamented the high cost of raising babies [9]: "We stand in need of fire; we want coals, too; we want swathes, napkins, the cradle, the cradle-bed; oil we want; the child requires flour, for pap; all day we are wanting something." In the second century CE, Soranus recommended [10]: "Exercise in the form of rocking should be performed in proportion to the condition of the body, at first a little, by shaking the crib or by suspending the cradle or by balancing it upon diagonally opposed stones. Later on the infant should be rocked in a litter; moreover, when it is 4 months old, the wet nurse should hold it in her arms and walk

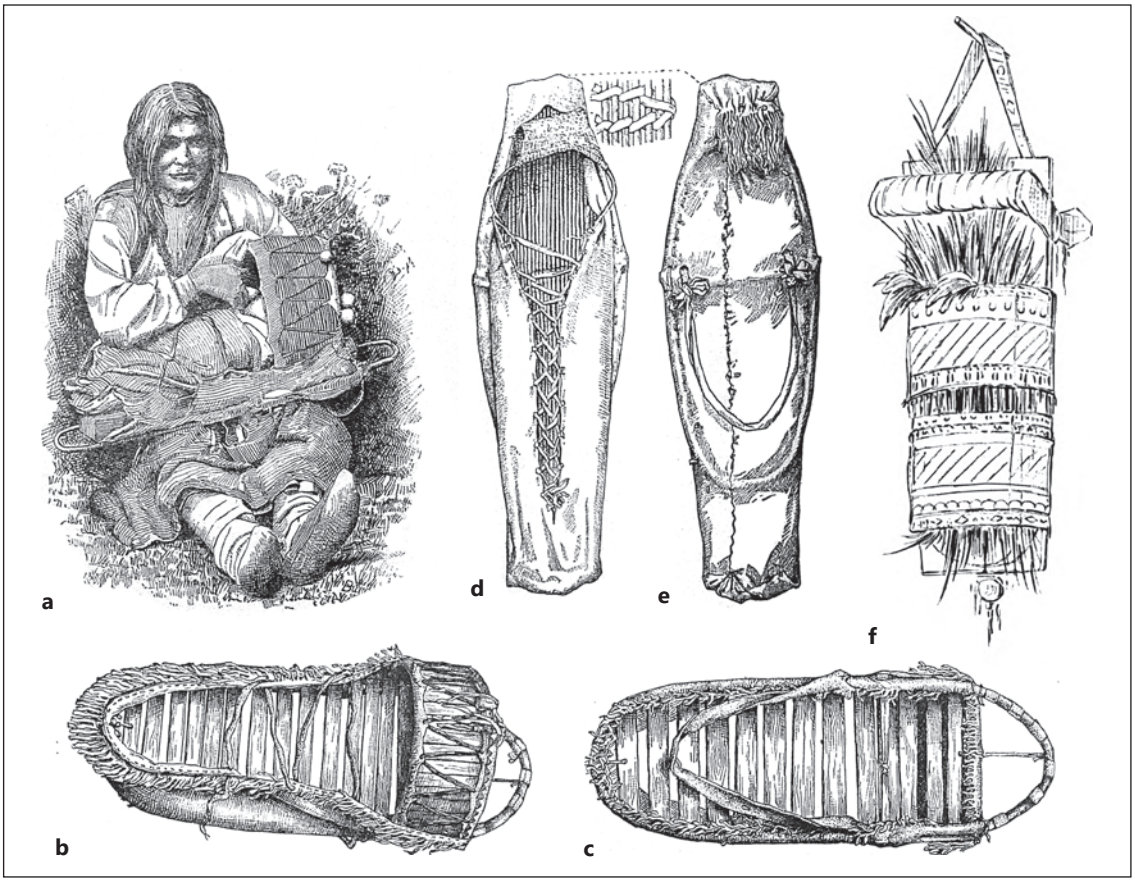

Fig. 2. Cradles of Native Americans, early 19th century: **a** Apache mother with baby. **b** Front view. **c** Back leather cover of Apache cradle. **d** Slat frame. **e** Buckskin cover of Ute cradles [19]. **f** Sioux' mourning cradle, filled with black feathers, from Catlin 1841 [17].

about or be rocked in a carriage drawn by animals." In the 4th century CE, church father Lactantius [11] complained that Romans still venerated the goddess *Cunina* "who protects the baby while in the cradle and keeps witchcraft away." In his "History of the Northern Peoples," Olaus Magnus [12] depicted in 1555 how "during field work the mothers suspended the cradles in a tree, 7–10 palms above ground, to protect the sleeping infant from snakes and poisonous worms" (Fig. 1).

Typology and Distribution

A few basic forms of infant beds evolved in antiquity and survived the centuries are as follows: a carrying board, trough, hammock, sling, transverse rockers, forward rockers, and others. Cradles were painted or carved in regional styles. Decorations symbolized protection, as did the IHS monogram (Fig. 1e), latinized name of Christ [Jesus Hominum Salvator], the Virgin Mary's monogram, or the Star of David. Also the rosette (Fig. 1e) was meant for religious protection. With heathenism and witchcraft omnipresent, many cradles conveyed the encircled pentagram (Fig. 1f), time-honored by Babylonians, Etruscans, and Celts [Celtic knot and Truttenfuß]. Associated with satanism and occultism, this charm was attributed magic functions and protection from evil spirits, as Praetorius [13] recounted in 1666: "based on age-old superstition, this Druidic sign is carved into the wooden baby cradles to repel the specters of the night." In addition to being an everyday utensil, ornamented cradles documented the family's wealth, especially among the nobility. Juvenal [14] reported around 105 CE: "When a babe, she [Hippia] had been pillowed in great luxury, in the down of her father's mansion, and in a cradle of richest workmanship." Olaus Magnus [12] reported in 1555 that the Northern peoples were "rich in gold, silver, and

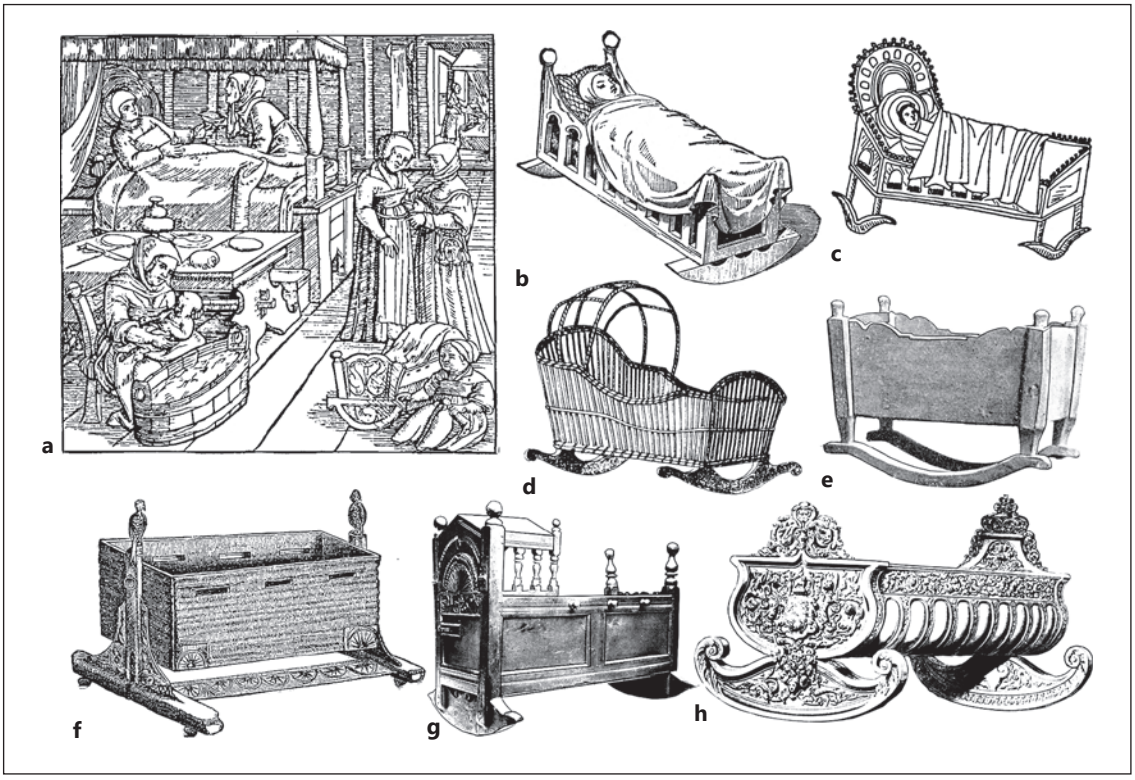

Fig. 3. Cradles of European origin. **a** Rueff 1554 childbed scene, frontispiece [59]. **b** Wooden cradle with transverse rockers, France, ca. 13th century depicted by Viollet-le-Duc [1872]. **c** Redrawn fresco showing Mary's birth, Milutin Monastery, Serbia, ca. 1314. **d** Basket cradle with hood, Netherlands [2]. **e** Norwegian cradle with lengthwise runners [1]. **f** So-called "cradle of Henry V",1387; each side has 3 openings to lace the swaddling bands [21]. **g** English roof cradle, 19th century [1]. **h** Boxwood rocking cradle for Princess Louise, 1850 [60].

other treasures, with which they decorated … the infants' cradles in a most precious way."

The regional distribution of different cradle types has been mapped [1, 15, 16]. It is tempting to investigate the theory of the earth's humanization [out of Africa] by comparing cradle forms of different societies and times. Pflug [1] approached a consistent theory but did not overcome the intrinsic problem: as willow, basketwork, straw, and bark do not keep for centuries; therefore, we know of no prehistoric remnants, and antique specimens are rare, whereas wooden or metal devices abound, as they resisted the infants' body fluids.

American Cradleboards

Painter George Catlin "traveled among the wildest tribes of Indians in North America from 1832 to 1839" and depicted Native Americans and their customs. Usually, the mother carried the cradleboard in a piggyback manner. But it also participated in the tribes' rituals and myths, such as the mourning ritual of the Sioux' near St. Anthony's Falls [Lakota] [17]: "If the infant dies during the time allotted to be carried in this cradle, it is buried, and the disconsolate mother fills the cradle with black quills and feathers, in the parts which the child's body had occupied, and in this way carries it around with her wherever she goes for a year or more, with as much care as if her infant were alive and in it." (Fig. 2f).

Cradleboards used to shape the infant's head have been described elsewhere [18]. Otis Mason, Curator of the United States National Museum from 1884, assembled a collection of cradles from Native Americans in a stunning variety of forms and rich decorations deriving from 2 basic forms, trough or board, as shown in Figure 2 for the Apache and Ute [19].

The Aztecs, whose Mesoamerican culture flourished from 1300 to 1510, used the cradle during postnatal rites

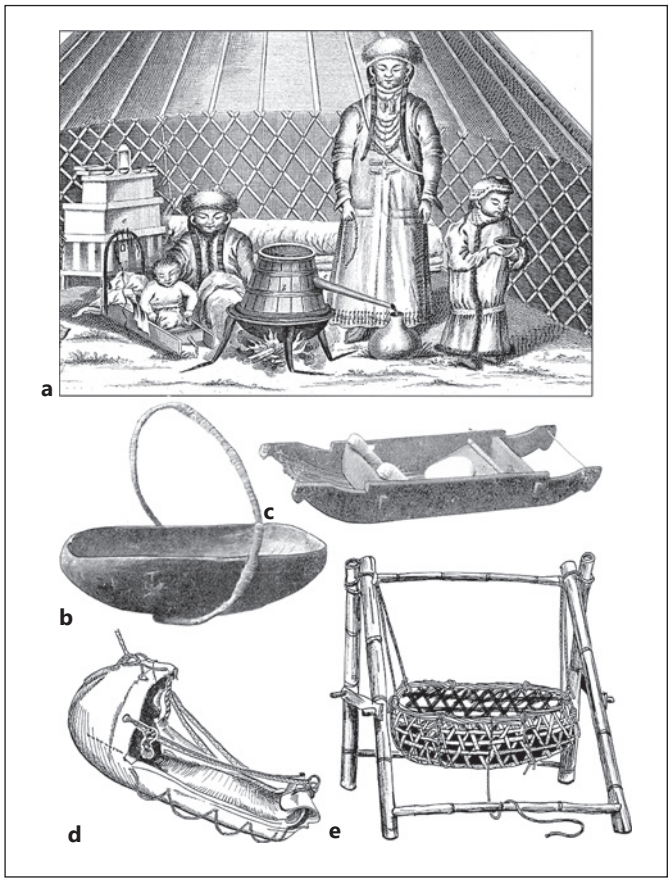

Fig. 4. Cradles of Australian and Asian origin: **a** Kalmuc cradle with urine drainage, 1776 [61]. **b** Antique wooden carrying trough from Australia. **c** Wooden cradle from Borneo [1]. **d** Antique leather Sami cradle. **e** Traditional Taiwanese bamboo cradle.

of passage. The richly painted Codex Mendoza [20], translated into Spanish in 1534, shows in Folio 57r how the midwife takes the baby in its cradle for ritual bathing and naming 4 days after birth. Some days later, the cradle is depicted again at a ceremony where mother and father together with the head priest decide on the infant's educational options.

European Rocking Cradles

Cots built before the 16th century are rare and survived only when made of wood, whereas paintings suggest that wickerwork baskets were the predominant form (Fig. 3d) [16]. Figure 3f shows the so-called cradle of Henry V (born in 1388), depicted by Old [21], a swinging bed suspended from a frame. Several early authors depicted cradles with horizontal runners in book frontispieces, as did Metlinger [22] in 1497, Ryff in 1554 (Fig. 3a), and Völter [23] in 1687. The cradle hood seems to be a 16th century development to protect the baby's face. Felix [24], city physician in Basel, reported dangers associated with the hood in 1563: "about covering of children's faces to keep the flies from them. Some lay a white cloth over them; others double such clothes, enough to stifle the child under it, which in my opinion is an ill custom. Others set bows over the cradle and hang clothes over them, which I hold to be good because the children are not touched, neither can they well be frightened of them." Paré [25] explained in 1573: "[Dimming the light] is the reason that Nurses, being taught by experience, caus over the head of the child lying in the Cradle, an arch or vault of Wickers covered with cloth to be made, thereby to restrain, direct, and establish the uncertain and wandering motions of the child's eies." Cradles with wooden rockers originated all over Europe, in Sweden, with transverse rockers in the south and longitudinal rockers in the north of the country [15]. In Italy, the crib was suspended from the roof joist, so that the mother could move the baby by pulling a string without leaving her housework. In the south of Italy, rockers stood on the floor [26].

Asiatic and Australian Cradles

Nomadic peoples adapted the cradle to their lifestyle. During the Bronze Age [2400–800 BCE], deceased infants were buried in their cradle in the Ural and Siberian regions [27]. The Kalmuc crib, used in the felt hut, was a wooden box equipped with a pipe draining excretions out of the infant's bed (Fig. 4a). The Australian cradle was a trough-shaped carrying device (Fig. 4b). The Lapponian *komsio* was a wooden trough covered with soft reindeer calfskin and equipped with transport belts (Fig. 4d).

Scientific Debate

Already in the second century CE, Galen mentioned controversies about rocking [28]:

"Three forms of rocking for babies have been devised by nursemaids, in cradles, in swings, and in their own arms. Now when we must consider whether any other exercise is essential for the preservation of health, although Asclepiades is opposed and clearly condemns exercises, and although Erasistratus cautiously approves but otherwise agrees with Asclepiades, almost all other physi-

cians approve them not only for satisfaction but for health." Avicenna, teaching in Persia, cautioned in 1010 [29]: "The infant is laid to sleep after feeding, but its cradle must not be rocked vigorously as otherwise one would churn the milk in its stomach. The rocking must be quite gentle." Simone Martini's 1324 Agostino altarpiece of an infant falling out of a suspended cradle drastically depicted a then common accident. Rösslin [30] warned in 1513: "When the child is laid in cradle to be rocked, rock not too fast, lest through overmuch rocking and stirring, the child's stomach turn, and the milk there corrupts for lack of rest." Vallambert [31] repeated Avicenna's advice in 1565: "To make the baby sleepy, it should be gently rocked, in a steady motion, and not vigorous because strong movement excites the milk in the stomach and troubles the brain … The baby falls asleep, such as it does from soft rubbing and from singing lullabies." Mercurio [32] cautioned in 1652: "The cradle with the infant must be placed so that no sunlight can shine into it, which makes the child squint … Therefore an arch must be formed over the baby's head, covered with a white cloth."

Rocking remained controversial, and a fervent debate began in the 18th century. Propagators reasoned that rocking perpetuates habitual fetal movement, exercises the child, and reduces the need for somniferous drugs [33]. The Nurse's Guide of 1729 [34] insisted that the baby "required a moderate exercise to rouse and quicken him … his first exercise is to be rocked, laid down in his cradle, which, for that end, is suspended or plac'd upon a foot, turn'd half round." In 1764, Zückert [35] recommended: "Rocking is the easiest way to put the child to sleep by gentle shaking the body and mild numbing … In addition, moving the body promotes the circulation and eases digestion of the milk."

Opponents claimed that rocking is risky, producing an unnatural sleep harmful to the brain, and impeding milk digestion. The highly influential philosopher Rousseau [36] stated in 1762: "I am convinced that it is never necessary and often harmful to rock children in the cradle." Uppsala professor Rosenstein [37]: "I wish to abandon entirely the bad custom of rocking the infants. It congests their head as if they were drunk. The milk rapidly coagulates in the stomach. Therefore, the sleep caused by the cradle is worthless." In Paris, obstetrician Deleurye [38] wrote in 1774. "The child should never be rocked. It's a reprehensible custom to rock crying infants … It causes a sleep they don't need … a kind of opium. Shaking the delicate body can ruin its harmony. In many, their mental abilities developed later than in other infants." In 1795, Faust [39] claimed that rocking makes the children "numb, drunk, dizzy, and dumb," but praised a vertically swinging device he himself constructed.

Nineteenth century authors held even stronger opinions on rocking, usually based on no data. Propagators alluded to fetal movements, as did Underwood [40] in 1801: "There is something so truly natural, as well as pleasant, in the wavy motion of a cradle, and so like what all children are used to before they are born, being gently swung in a soft fluid, upon every motion of the mother. I cannot but give an opinion rather in favour of the cradle." Frank [41] proposed in 1804: "Cradles are the most comfortable beds for newborn infants. The movement, if moderate, is very healthy for the infant." August Hecker [42] wrote in 1805: "[rocking] compensates the child's shortage of movement, and particularly that to which it is accustomed before birth due to maternal movements."

Nineteenth century opponents claimed rocking to harm the infant's brain. Königsberg philosopher Kant [43] wrote in 1803: "The cradle is hung by a cord to the rafter, and, when the cord is pulled, the cradle rocks of itself from side to side. Rocking, however, is altogether objectionable, for the swinging backwards and forwards is bad for the child. We see this among grown people, in whom swinging often produces a feeling of sickness and giddiness."

In 1804, Buchan [44] attacked "an ill-tempered nurse, who, instead of soothing the accidental uneasiness or indisposition to sleep of her baby … endeavours, by the impetuous rattle of the cradle, to drown the infant's cries." Meissner [45] demanded in 1844: "Physicians should seek to thwart rocking … it is neither necessary nor advantageous." And Schreber [46] wrote in 1858: "It must be warned to put the child to sleep by carrying or by cradles … Cradles have the disadvantage that they force unto the infant an artificial sleep, or giddiness … which can give rise to serious brain diseases."

The Cradle's Demise

The 3,000-year-old belief that rocking promotes sleep was substantiated once monitoring the vestibular system became possible. Sato [47] reported in 1903 that at birth, the semicircular ducts have the same angles and position as the labyrinth of an adult. They record rotational movements, and the otoliths mediate linear acceleration. In mice, Kompotis [48] and Franken proved that rocking promotes non-REM sleep. The vestibular apparatus is one of the earliest sensorial systems that mature in intrauterine life. It begins to form on day 30 of embryonic life, and

by day 49, its morphogenesis is complete [49]. The fetal vestibular system is stimulated when the mother moves. During the 1970s, it was speculated that preterm birth deprives the infant of the vestibular and proprioceptive stimulation required for development. Clark et al. [50] detected accelerated reflex maturation after 4 weeks' vestibular stimulation in term infants. Vestibular stimulation by rocking horizontally soon began [51] in human preterm infants. Clinical trials showed that rocking cradles or oscillating waterbeds reduced the frequency of apneic spells [52, 53], but a long-term benefit was not proven [54]. Suffocation ["cot death"] was attributed to suspended rocking cradles in the 1990s [55, 56], but all those infants, in addition to being placed in a cradle, had been found in prone position, later recognized as the major cause of cot death. Cradles were replaced by pushchairs and prams in the 20th century, but they did not disappear: a Google patent search reveals >2,000 rocking devices patented after World War II, many of them with motors or sensors.

Conclusion

In virtually every sedentary culture outside the African continent, solid cradles were built, often remaining in the same family for generations. They were obviously meant to maintain or exploit the mother's capacity for work in the house or field. The lightweight portable device of wandering peoples gradually evolved into a solid piece of rocking furniture once populations began to farm and settled down. Despite a scientific debate lasting several centuries, no robust studies have been conducted; it remained unclear whether rocking has any benefit or harm for the infant.

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Conflict of Interest Statement

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