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Early Background of Mermaids: From Myth to Science

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ABSTRACT: Mermaids – enigmatic beings that are half human and half fish – can be traced back to the Neolithic period, which spanned approximately 10,000 BC to 2,000 BC during the worship of the Mother Goddess. Understanding this historical context can shed light on the medical and cultural connections surrounding these creatures. This essay examines compelling evidence of mermaids from Bronze Age civilisations, particularly in Assyrian-Babylonian, Hindu, and later Graeco-Roman cultures, as well as their representation in medieval bestiaries. It also discusses a connection between mermaids and a rare congenital malformation known as sirenomelia or caudal regression syndrome in modern medical classifications. The study is based on medical observations and research conducted from the 16th century onward, which began to identify congenital malformations among so-called “monsters”, as science shed new light on ancient myths.

KEYWORDS: Mermaids, Sirenomelia; Caudal regression syndrome; Monsters; History of Mythology, Medical and Cultural Anthropology

INTRODUCTION

This essay explores the connection between fish-human beings and sirenomelia, framed within the context of medical observations and research on congenital malformations in human infants. Sirenomelia is a rare condition characterised by the fusion of the legs, as well as abnormalities in the genitourinary and gastrointestinal systems, lumbar-sacral spine anomalies, and agenesis or atresia of the kidneys. The condition affects males more frequently than females, with an incidence ratio of approximately 2.7:1. While the exact prevalence is unknown, it is estimated to occur in about 1 in 60,000 to 100,000 births.

MATERIALS AND METHODS

We examined depictions of fish-human creatures from the Neolithic period onward and consulted historical, mythological, and iconographical sources, as well as medical reports on sirenomelia dating back to the 16th century. Historically, such conditions have been labeled “monsters” – a term derived from Latin meaning “to show” or “to warn,” often interpreted as divine punishments or warnings against nefarious events.

The earliest Fish-Goddesses

The earliest artistic expressions of Homo sapiens, dating back 120,000 years, mark the emergence

of symbolic thought used to convey knowledge. Understanding their role in early societies is essential. Representations of women are more common than those of men, highlighting the significant role of women in these cultures.

Enigmatic figures of mermaids are prominent in the Neolithic cult of the Mother Goddess, which existed between 10,000 and 3,000 BC across various cultures worldwide. Several animals were associated with her, with fish symbolising the Goddess's uterus as the source of life and fertility. During the Epipaleolithic and Mesolithic periods (around 10,000 BC), the Fish Goddess was revered as the Mistress of Life and Death, embodying generative and nurturing forces. Archaeological excavations in various locations have uncovered traces of her cult, linked to symbols representing her renewing womb or the egg, which signifies the source of life. Neolithic art also showcases rare malformations, such as duplications of the head, including conditions like Parapagus Dicephalus (double heads) and Diprosopus (facial duplications). These depictions indicate an awareness of congenital malformations. One of the earliest examples of a Fish Goddess was discovered near Trento, Italy, dating back to approximately 7000 BC. This artefact, known as the Venus of Gaban, is a bone sculpture depicting a human upper body with the abdomen and legs represented as a fish tail. (Fig. 1)



Fig 1. Venus from Gaban. Neolithic goddess statuette from the Gaban shelter (front and back). Trento, Italy, dated ca 5000-4700 BC. Picture by Paolo Chistè/Laboratorio Bagolini, Università di Trento. Form Benedetti et alii (2012). Science Museum. Trento. Italy.

At the end of the Calcolitic (3500-2300 BC) in the Oriental states, a region encompassing ancient Mesopotamia, there was an acceleration of mental progress, leading to the invention of writing systems, such as Sumerian cuneiform and Egyptian hieroglyphs. In India, a similar development occurred.

With the rise of male warrior dominance during the Bronze Age, masculine and warrior symbolic values gradually replaced the feminine worldview. Even as the patriarchal ideology gained ground, faint traces of the Mother Goddess and her realm of feminine deities and rituals managed to survive. In 1919, William Crook's meticulous and thorough research traced vestiges of surviving cults and rituals of the Mother Goddess in the Bronze Age (c. 3200-900 BC). The archaeological complementary findings leave no doubt about the existence of a former gynaeocracy. However, feminine deities became more slender and were often depicted as the wives of the emerging male gods, reflecting the growing dominance of male figures in society (Fig. 2a). A representation similar to the previous one is a surviving vestige of the Mother Goddess iconography. (Fig. 2b).

This figure from the Indus Civilization, Pakistan, dating from 3000-2500 BC, also possibly provided some of the earliest prototypes for mermaids in later mythologies. This image takes us to the pathological anatomy books, since, although embellished, it recalls sirenomelia or mermaid syndrome as hypothesised by the German gynaecologist Christian Friedrich Schatz (1841-1920). (Fig. 2c).

Congenital malformations in the Assirio-Babylonian culture

Magic was a fundamental aspect of early societies in their pursuit to uncover the secrets of the supernatural world. The Babylonians and Assyrians established early centres of magic based on astrology, hepatoscopy, and the registration of human and animal congenital malformations, which they interpreted as birth omens due to their rarity and the weight of their significance in foreshadowing the future of the royal family. They established rules and structured systems that significantly influenced later traditions, including those of Graeco-Roman authors as well as Jewish and Arab cultures, thereby creating a profound and enduring legacy. The series *Šumma Izbu* (*If a malformed fetus*), recorded on clay tablets from the library of Ashurbanipal (reigned 669–631 BC) but dates



Fig. 2a – Seated Mother Goddess. Terracotta sculpture. 3000–2500 BC. Indus civilization, Mehrgarh style, Pakistan (Baluchistan). Metropolitan Museum of Art, New Yorl. Accession Number: 2001.305.



Fig. 2b – Seated Mother Goddess. Terracotta sculpture. 3000–2500 BC. Indus civilization, Mehrgarh style, Pakistan (Baluchistan). Metropolitan Museum of Art, New Yorl. Accession Number: 2001.306.



Abb. 150. Menschliche Sirene oder Najade (Aus Schatz 604a)

Fig. 2c – Sirenomelia in Schatz, F. 1901, p. 12, fig. 8.

from at least 2000 BC, constitutes the earliest catalogue of human and animal malformations in human history. Many of these descriptions correspond with common congenital disabilities, including conjoined twins, possibly conveying the earliest written record of sirenomelia. These records from cuneiform tablets were translated into English by the Assyriologist Morris Jastrow (1861-1921):

“If a woman gives birth to a bird or a fish-being, the rule of the king will prosper, and the gods will return to the land.”

While most malformations were seen as negative, this particular one is considered a good omen, possibly because it retains connections to the beneficial worship of the Mother Goddess. These traits may have influenced later myths featuring mermen. The emerging patriarchal narratives in various cultures often drew inspiration from symbols associated with the Mother Goddess, transforming these symbols into ideologies that favored male dominance. This cultural shift was instrumental in shaping mythological figures like the first merman. Among the notable figures in the earliest pantheon of Sumerian-Assyrian deities is

Ea (known as Oannes in Greek), the sea god. (Fig. 3a). Additionally, Oannes, or Bel, is represented alongside two fish gods on an Assyrian carnelian cylinder from Sir William Ouseley’s collection (1767-1842). (Fig. 3b).

Mermen and Mermaids in the Greek Mythology and the Middle Ages

Merman appear in Greek mythology as sea gods or monsters, as depicted on a Greek limestone pediment fragment from c. 300 BC from Tarento, South Italy. (Fig. 4a) Sirens (or mermaids) appear more frequently as birds with human features in Greek mythology than as half fish-human creatures, as depicted on a Greek terracotta bowl from Boeotia, dating to the mid-6th century BC: (Fig. 4b)

During the Middle Ages in Europe, mermaids take full shape as half human-half fish creatures, as depicted in medieval bestiaries. A notable example is a miniature created between 1230 and 1240, which reflects their Greek misogynist origins. Like in the *Odyssey* where their appearance is not described, mermaids were portrayed as beautiful and alluring but also dangerous to men, as depicted on a manuscript from the British Library: (Fig. 5)



Fig. 3a – The sea-god Ea (Oannes in Greek). Illustration from Brockhaus and Efron. Jewish Encyclopedia (1906–1913).

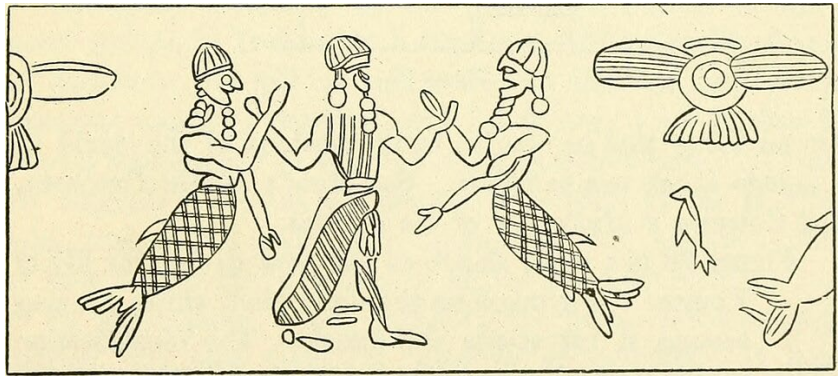


Fig. 3b – Oannes or Bel and two fish gods. Assyrian carnelian cylinder. Collection of Sir William Ouseley. In Inman. 1922, p. 67.



Fig. 4a – Sea god- Greek limestone pediment fragment from c. 300 BC. Tarento, South Italy. Metropolitan Museum of Art, New York. Object Number:1992.11.1.



Fig. 4b – Siren. Greek terracotta bowl from Boeotia (Greece). Mid-6th century. Metropolitan Museum of Art, New York. Object Number 51.11.9.



Fig. 5 – Mermaid and sailors protecting themselves from her alluring chant. Medieval manuscript. British Library. Accession number: Harley 4751, f.47v.

“A Siren, portrayed with a fish’s tail like a mermaid, lulls sailors to sleep with her song. One sailor stops his ears with his fingers to avoid hearing her.”

Mermaids and medical science

In 1542, the physician Nicholaus Rocheus (active in mid-16th century) made a remarkable discovery on a stillborn child. He identified a malformation that resembled the figure of a mermaid. This finding not only brought the mermaid from the realm of myth into the fields of medicine and natural sciences but also represented a significant shift in how myths could be interpreted through a scientific lens. Rocheus, inspired by the mythical figures of sirens or mermaids, named this malformation as sirenomelia (of which there are various forms, depending on the degree of limb fusion). His description reads as follows:

“On the eighth day of February in the year of our Lord, 1541, in the castle of the noble Amadi of Allifer in the Bourbon country, from an unknown provenance, a monster was born, resembling a man from the head to the navel, and from the navel below, with a tail like a mermaid, in the place of legs, feet, and toes, in the shape of a pyramid, but as wide as the size of a foot. This monster was baptised and lived only for an hour after birth.”

“Octauo die februarii anni domini.1541.in castro diui Amãdi alliferi in folo borbonico ex iuu cu quadam nihi notifiima natum est monfrum hominis effigiem à

capite ad vmbilicum vfque referens, ab vmbilico infra, crurum pedúmque ac digitorum pedis loco fubftituta erat cauda fyrenum modo, pyramidali figura, in latum tamen pedis magnitudine definebat. Tinaum fuit hoc monfrum chriftianorum lauacro, horanique à partu duntaxat vixit.” (Fig 6a, Fig. 6b)

Étienne Geoffroy Saint-Hilaire (1772-1844) was a French zoologist, anatomist, and teratologist, recognised as a significant figure at the Muséum National d’Histoire Naturelle in Paris. He made noteworthy contributions to comparative anatomy, palaeontology, and embryology, earning him great respect in the scientific community.

Interestingly, his contemporaries honoured him with a publication featuring him on the cover, with a thoughtful expression and his left hand resting on his chin. He holds some books in his left hand, and beneath them lies a sculpture of the Greek goddess Artemis from Ephesus, notable for its rows of multiple breasts, which have often been interpreted as inspired by ectopic breasts. (Fig. 7) This sculpture exemplifies how mythological figures were subject to teratological and symbolic interpretations, illustrating the intersection of art, mythology, and medical symbolism in ancient religious contexts.

Etienne’s son, Isidore Geoffroy Saint-Hilaire (1805-1861), is regarded as the founder of teratology. He coined the term “teratology,” derived from the Greek

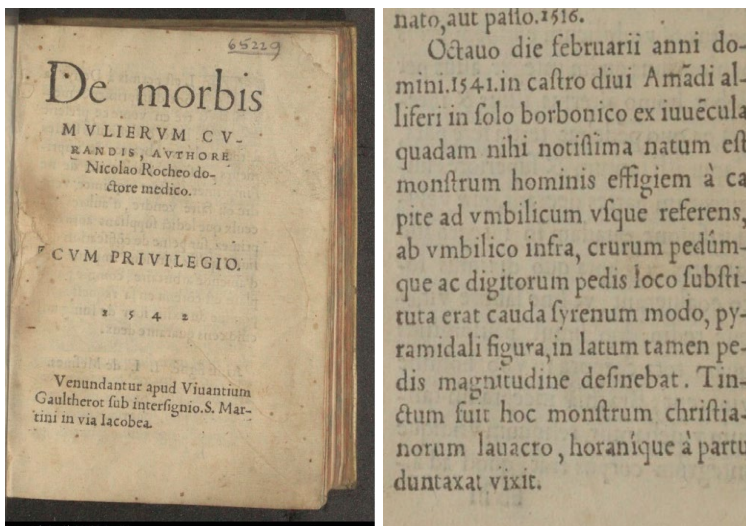


Fig. 6 (a) and 6 (b) – Rocheus, N. 1542. De morbis mulierum curandis. Paris: V. Gaultherot. Titelpage and detail of p. 203.

words *téras* (meaning “sign sent by the gods”) and *logos* (meaning “speech” or “discourse”) and published the treatise *Histoire générale et particulière des anomalies de l'organisation chez l'homme et les animaux* between 1832 and 1837. His work was a collaborative effort involving physicians and veterinarians who sent him malformed specimens of both humans and animals for identification and description. Additionally, he developed the first classification system for congenital malformations. Within this system, he described conditions such as *symeles monstrosities* and *sirenomelia*, related to ancient depictions of mermaids or sirens.

He described various forms of *symeles*:

“Of all the monsters in this family, symeles are those that deviate least from the standard type: it is in them especially that the pelvis is always more or less imperfect and deformed in symeles. It is constantly very narrow and elongated, the pubic bones being incomplete and directed downwards, and sometimes touching at the back, near their articulation with the ileum, as well as at their symphysis, which gives the upper opening of the pelvis the shape of a figure eight. These modifications of the pelvis, the median tendency of the two limbs, are the most manifest and appear in the simplest form.”

He further described the anomalies of pelvic organs and *sirenomelia* as the most severe and rare form:

“Although the various symeles monstrosities have never been distinguished from one another, and the name “siren” could not therefore be specifically attributed to the form I am about to discuss, it can be said to belong to it in a special way, and that it has already received the sanction of usage. The monsters of this group are indeed those that the ancient authors almost all called sirens, by a comparison whose accuracy cannot be denied: for we will find in them almost exactly the mixed and bizarre forms that Homer and Ovid lent to their sirens, and which Horace recalled in this oft-quoted verse: “Desinit in piscem mulier formosa supernè.” (The beautiful woman above ends up as a fish.)

He provided drawings of five types of *symeles*, distinguished by the fusion of the legs and the presence or absence of abdominal and pelvic organs, including agenesis or atresia. One of these types is known as *sirenomelia* (Fig. 5). Notably, the infant in the drawing is male (Fig. 8)

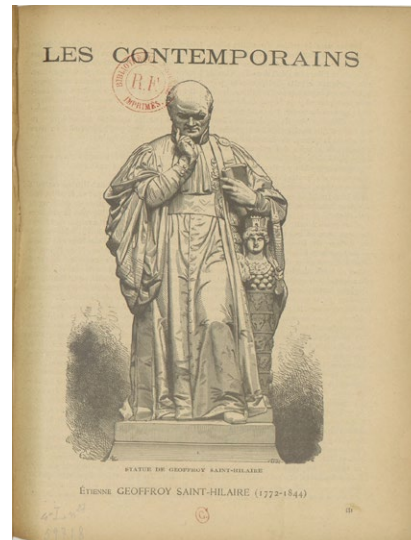


Fig. 7 – Statue of Etienne Geoffroy Saint-Hilaire (1772-1849) by Elias Robert (1821-1874), 1857 in Fulgence Girard. *Le Monde illustré* n°19, p. 4, le 15/08/1857.

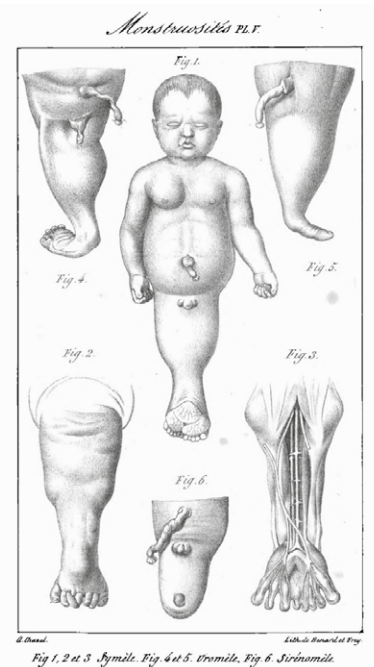


Fig. 8 – *Symeles* and *sirenomelia* in Saint Hilaire, I. G. 1837. Tome 3. Planche V.

August Förster (1822-1865), a physician and a professor of Pathological Anatomy at Würzburg University, in the chapter focusing on conditions such as deficiency, atrophy, and abnormal smallness of the lower extremities, followed Saint Hilaire's descriptions, with minor changes in terminology, describing symphus, sympodia, and siren formation. He added more related cases and the illustrations of Figures 4 and 8-15 on Plate X. It's notable how fig. 1 resembles the Venus from Gaban from Fig.1. (Fig. 9)

In our time, the condition was called "syndrome of caudal regression" by pediatric surgeon Bernard Duhamel with 5 types. Type 5 represents the most extreme form of this condition. Most reported cases have resulted in the infants dying shortly after birth due to visceral anomalies that are incompatible with life.

Tamene et al. documented a unique case of a child with Type I sirenomelia, the mildest form, who survived for 11 months and underwent successful separation of the lower limbs, as well as perineal reconstruction.

Cases of sirenomelia are featured in Portuguese and foreign Anatomy Museums. (Fig. 10)

CONCLUSION

The connection between mermaids and sirenomelia is clear, highlighting the significance of studying congenital malformations and suggesting that this condition may have influenced the myth. The anomalous and curious have undoubtedly captivated human curiosity since early times, ultimately leading to the knowledge we now recognise as science. As stated by the physicians George Milbry Gould (1848-1922) and Walter Lyttle Gould and Walter Pyle (1871-1921):

Truly it has been said, facts are stranger than fiction. In monstrosities (...), we seem to catch forbidden sight of the secret work-room of Nature, and drag out into the light the evidences of her clumsiness, and proofs of her lapses of skill, — evidences and proofs, moreover, that tell us much of the methods and means used by the vital artisan of Life, — the loom, and even

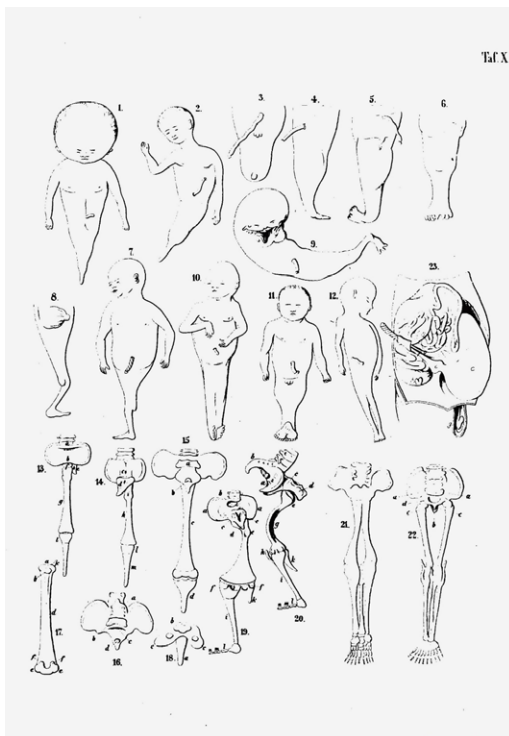


Fig. 9 – Symphus, sympodia, and siren formation. In Förster, A. 1865, Tafel X.



Fig. 10 – A: Sirenomelia. Museum of Anatomy, Faculty of Medicine, University of Porto. Photo credit José Paulo Andrade; B: Sirenomelia. RSU Anatomy Museum, Riga, Latvia. Photo credits: Ieva Libiete.



the silent weaver at work upon the mysterious garment of corporeality.

In our day the taste seems to be insatiable, and hardly any medical journal is without its rare or unique case, or one noteworthy chiefly by reason of its anomalous features. A curious case is invariably reported, and the insertion of such a report is generally productive of correspondence and discussion with the object of finding a parallel for it.

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