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Nature's Repository? Pearl Fishing and Environments in the Americas and Asia in the Sixteenth and Seventeenth Centuries

Le dépôt de la nature ? La pêche à la perle et l'environnement aux Amériques et en Asie aux XVI^e et XVII^e siècles

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Nature's Repository? Pearl Fishing and Environments in the Americas and Asia in the Sixteenth and Seventeenth Centuries

Giorgio Riello

Abstract

The early modern period was “the great age of pearls.” Portraits of rulers, aristocrats and elites in both Europe and Asia show the abundant use of pearls in jewellery and clothing. Sought after for their lustre and their symbolism, pearls were a marine material transformed into the most astonishing works of ornamentation. Yet, pearls were also a natural resource produced by oysters harvested by the millions from the warm tropical waters of the Americas and the Indian Ocean. The case of pearl fishing off the coast of Venezuela in the early sixteenth century by the Spanish, highlights two factors: first, the intense fishing of pearls that led to their depletion, and second, the concomitant exploitation of enslaved divers. Technology – both the organisation of labour and the tools used in pearl fishing – depleted the resource rather than protecting or enhancing it. This article argues, however, that the so-called “curse of the commons” – the idea that when a number of people have unchecked access to a finite resource, they will tend to overexploit it – is not fate. A second case study – that of the Dutch East India Company’s pearl fishing in the Gulf of Mannar in the seventeenth century – presents a different understanding of pearls as a resource, one that emphasises profitability over time. The article uses the concepts of “simultaneous” and “sequential” games from economics in arguing that technology can be both a repository of processes and a tool of destruction.

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Keywords

Dutch East India Company, environment, enslavement, India, pearls, pearl fishing, Spanish Empire, Venezuela

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Résumé

Le début de la période moderne a été le « grand âge des perles ». Les portraits de souverains, d'aristocrates et d'élites d'Europe et d'Asie illustrent l'utilisation abondante des perles dans les bijoux et les vêtements. Recherchées pour leur éclat et leur symbolique, les perles étaient une matière marine transformée en ornements les plus étonnants. Mais les perles sont aussi une ressource naturelle produite par les huîtres récoltées par millions dans les eaux tropicales chaudes des Amériques et de l'océan Indien. L'exemple de la pêche aux perles, au large des côtes vénézuéliennes au début du XVI^e siècle par les Espagnols, met en évidence deux facteurs : d'une part, la pêche intensive qui a conduit à leur épuisement et, d'autre part, l'exploitation concomitante de plongeurs réduits en esclavage. La technique – aussi bien l'organisation du travail que les outils utilisés – a épuisé la ressource au lieu de la protéger ou de l'améliorer. Cet article affirme cependant que ce que l'on appelle la « malédiction des communs » – l'idée que lorsqu'un certain nombre de personnes ont un accès illimité à une ressource finie, elles auront tendance à la surexploiter – n'est pas une fatalité. Une deuxième étude de cas – celle de la pêche aux perles de la Compagnie néerlandaise des Indes orientales dans le golfe de Mannar au XVII^e siècle – suggère une compréhension différente qui met l'accent sur la profitabilité maintenue au fil du temps. L'article utilise les concepts de jeux « simultanés » et « séquentiels » de l'économie, en soutenant que la technique peut être à la fois un réservoir de solutions et un outil de destruction.

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Mots-clés

Compagnie néerlandaise des Indes orientales, environnement, esclavage, Inde, perles, pêche des perles, Empire espagnol, Venezuela

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The great age of pearls

Pearls have been used in Afro-Eurasia since ancient times. They were used in jewellery by ancient Roman women and continued to be used in the Christian era. Both Christianity and Islam condemned the use of gold and precious stones, but were less strict about pearls. In various cultures, particularly in late medieval and early modern Europe, pearls came to symbolise purity and virtue. Pearls, known as *margaritae* in Latin, have been associated with Saint Margaret and are often seen to adorn representations of female saints and the Virgin Mary. During the late Middle Ages, pearls became the preferred jewel for newlyweds across much of Europe. Brides were often gifted pearls, as this “stone” – as lapidaries referred to pearls – was linked to female fertility. The symbolism of pearls is derived from their marine origin and the association of the sea with creation, a myth of origin shared by many cultures, including pre-Columbian ones.¹

Marco Polo was an early observer of pearl fishing in China and the Indian Ocean. He was part of a community of merchants who traded between Europe and China in the Later Middle Ages. Pietro Viglioni, a near contemporary of Polo, was a merchant who traded along the caravan routes of Central Asia. When he died in 1263 in Tabriz, Persia, he listed jasper and pearls among his goods. The pearls that Viglioni and other merchants imported from Asia to Europe were used for decoration, in hairstyles, earrings, necklaces and clothing. Portraits from the fourteenth and fifteenth centuries show a dramatic increase in the use of pearls, testifying to a growing

1. Jongh, 1975-1976; Raber, 2011; Domínguez-Torres, 2020.

passion and a more widespread use of pearls than in previous centuries. The use of pearls expanded significantly in the first half of the sixteenth century in particular.² At that time, the established sources of pearls for Europeans were mainly the Persian Gulf and the Gulf of Mannar in southern India. However, by the first decade of the sixteenth century pearls fished off the coast of Venezuela, a territory controlled by the expanding Spanish Empire, provided a new and abundant supply of pearls for European consumers.

A new market for pearls was quickly created. The establishment of the Casa de la Contratación in 1503 meant that all trade between the American colonies and Spain was reserved by law for the sole city of Seville, making the Andalusian city the most important pearl market in Europe during the sixteenth and seventeenth centuries. From here, Italian merchants sent pearls to Venice and Antwerp, where branches of various German companies such as the Fuggers and the Welsers operated. It is estimated that several tons of American pearls arrived in Seville each year. Records show that 636 kilos of pearls were imported into the city in 1558, and as much as 3,3 tons in 1587.³ By the early seventeenth century, pearls were the rage, worn by both men and women. The portrait of George Villiers, Duke of Buckingham, circa 1625, is one of the most remarkable testimonies to this trend (Fig. 1). The portrait shows the Duke wearing a bandoleer of magnificent pearls, which was a great symbol of wealth and prestige. These pearls from Spanish America had captivated the English aristocracy since the times of Elizabeth I.

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This article reflects on the production of pearls in the Americas and in Asia in the sixteenth and seventeenth centuries. I see pearls as a finite resource that is produced over the years by a fragile marine ecosystem. Though technically renewable, pearl oysters have to be collected at the correct time in the lifecycle and through techniques that ensure their sustainability. The fishing of pearls off the coast of Venezuela in the early sixteenth century is a case of resource depletion. The unregulated access to the resource led to its overexploitation and eventual exhaustion. As this case shows, technology did not become a repository of processes but a tool of extraction thanks to the presence of abundant enslaved labour. Yet, a century later when the Dutch East India Company (Verenigde Oostindische Compagnie, also

2. Muzzarelli, Molà, Riello, 2023, p. 204-208.

3. *Ibid.*, p. 220-221.



Fig. 1. – Michiel J. van Miereveld, *Portrait of George Villiers, 1st Duke of Buckingham*, c. 1625

Art Gallery of South Australia, Adelaide.

known as the VOC) engaged in pearl fishing in the Persian Gulf and in the waters of the straight of Mannar, a different logic prevailed in which technologies and the organization of pearl fishing aimed to ensure the continuous profitability and viability of pearl fishing. In the final part of this article, I compare and contrast these two stories to show these different outcomes were the results of diverging social and economic logics.

American pearls

Ecological depletion and the tragedy of commons

Pearls were found in the palace of Montezuma (c. 1466-1520), but the poor archaeological preservation of pearls makes it impossible to estimate their use in pre-colonial America. What is known is that pearl fishing was an

important activity along the coasts of present-day Venezuela well before the arrival of the Europeans in the late sixteenth century.⁴ In the pre-Colonial era in Central America, pearls were a symbol of fertility and the generative power of the sea among the Aztecs, as evidenced by the Mesoamerican manuscript known as the *Relación de Michoacán* (around 1540), which tells the myth of the origin of the world through the story of a primordial ocean from which man emerged as if “from a jar of pearls.” For the Aztecs, pearls were perceived as materialisations of the generative capacity of the sea.⁵

The Spanish conquistadores were more interested in the monetary worth of the pearls of Central America than their symbolic value. Cubagua, Coche and Margarita, the three main islands of the Pearl Coast located a few kilometres off the coast of Venezuela, were particularly rich in pearl banks (Fig. 2). Just a decade after the arrival of Columbus, the Pearl Coast attracted so many adventurers in search of a quick way to become rich that the Spanish Crown suspended all licences for private individuals to travel to the area. In 1505, the Crown itself decreed that the pearl reserves be exploited directly by the state, a measure that soon proved difficult and costly to implement.⁶ As a result, from 1512 onwards, pearl fishing was left relatively free as long as the entrepreneurs – strictly Spanish – paid the ‘quinto’ to the Spanish Crown: a tax of 20 percent of the pearls recovered. Instead of directly coordinating the complex system of fishing along the Venezuelan coast, the Crown granted licences that guaranteed a steady income without the expense or difficulty of coordinating this activity.⁷ This was a compromise that ensured the pearl-fishing entrepreneurs (called *señores de canoa*) an enormous profit. Some of them had more than a hundred pearl divers (*esclavos de perlas* or *negros de concha*) at their command.⁸

What followed was an intensive exploitation of the pearl reserves. Economists have coined the phrase the “tragedy of the commons” to describe situations of over-exploitation and eventual depletion (to the detriment of sustainability) of natural resources, especially in cases where these resources are not privately

4. Zhou *et al.*, 2017, p. 286; Turner, 2022, p. 270.

5. Saunders, 1999, p. 248.

6. Perri, 2009, p. 134.

7. Warsh, 2018, p. 52-53.

8. Romero, Chilbert, Eisenhart, 1999, p. 67; Warsh, 2018, p. 58.



Fig. 2. – The Venezuelan Pearl Coast and the islands of Coche, Cubagua and Margarita

owned but are shared.⁹ Pearl fisheries were in no sense a “common” but the crown monopoly was given to individual entrepreneurs without sufficient insurances as to the sustainability of the system. In the case of the Pearl Coast, the lack of regulation produced the earliest example of ecological disaster and depletion of a natural resource in colonial America. This was the result of an imbalance between global demand for luxury products such as pearls and nature’s capacity to produce and regenerate such a resource.¹⁰

Estimates on the quantities of pearls extracted from the Venezuelan Pearl Coast provide a measure of the environmental impact of Spanish pearl fishing. It is said that a boat with six divers could harvest as many as 35,000 oysters in the course of two or three weeks. From this figure, historians have estimated that between 1515 and 1542, at least 11,5 tons of pearls arrived in Spain from the Americas. In the first five years alone, at least 200 kilos of beautiful *magaritas* (round, uniform and white) pearls, but also *asientos* (flat on one side), *berruecos* (irregular), and *aljófara* (small and irregular) pearls were extracted off the coasts of Venezuela.¹¹ In less than thirty years from the beginning of the sixteenth century, at least 120 million pearls were sent

9. Hardin, 1968. The term “tragedy of the commons” has raised a great deal of debate. For a critique, see Frischmann, Marciano, Ramello, 2019.

10. Perri, 2009, p. 130.

11. Orche, 2009, p. 20.

to Europe from the Americas.¹² These are probably conservative estimates as pearl smuggling was rife: it is estimated that more than half of the pearls caught were not declared in order to avoid paying the quinto.¹³

Only twenty years after the start of intensive exploitation, the first signs of a depletion of pearl resources were evident. Some “conservation” measures were put in place: in 1533, in order to allow oysters to regenerate, a fishing rotation was established between the three main islands: four months in Cubagua, followed by three months in Coche, and two months in Margarita. It followed the assessment of a newly-arrived resident judge Francisco de Prado, who concluded that the local señores “to get a frame of pearls, they destroy and spoil more than twenty.”¹⁴ Two years later, as oysters could only be found at greater depths, pearl traders and their slaves moved to the newly discovered pearl beds on the Colombian coast, where they could fish at shallower waters. The decline of the Venezuelan Pearl Coast was as rapid as its rise: in 1537, only one swimmer per boat was allowed and yet the Council of Nueva Cádiz had to report to the emperor that “no pearls have been extracted for more than year and a half.”¹⁵ Two years later, in 1539 when the Spanish Crown prohibited the use of pearling dredges, there were no more than fifty people left on the island.¹⁶ Despite attempts to revive pearl fishing, a tsunami in 1541 and the subsequent fire by French pirates two years later, which destroyed Nueva Cádiz, led to the depopulation of the island. As early as the 1540s, the Milanese merchant and adventurer Girolamo Benzoni (c. 1519-after 1572) commented on the Pearl Coast: “Today, all the land in the Gulf of Paria & other places are inhabited by Spaniards, because there are no more pearls, no more gold & the fishing of it has come to an end.”¹⁷ Attempts to regulate and preserve them came too little and too late. To this date, the Island of Margarita remains uninhabited.¹⁸

12. Rodríguez Velásquez, 2022, p. 2; Warsh, 2010, p. 346.

13. Unlike gold or silver, pearls could not be marked or easily identified. To preserve their quality, it was also forbidden to pierce them in the Americas as only Spanish jewellers had this privilege. Perri, 2009, p. 136.

14. “*Para sacar un marco de perlas, destruyen y echan a perder más de veyntes*” (Otte, 1977, p. 35).

15. “*Ha más de un año y medio que no se sacan perlas*” (*ibid.*).

16. Perri, 2009, p. 142.

17. Benzoni, 1572, p. 9.

18. On the archaeology of Nueva Cádiz, see: Antczak *et al.*, 2019; Domínguez Torres, 2015, p. 15-39.

Double common: the exploitation of pearls divers

This story of intense exploitation and equally intense decline of the American pearl banks is part of what the American historian Molly Walsh has called “political ecology”: the relationship between political power and the exploitation of natural resources.¹⁹ For the Spanish empire pearls became both a metaphor for the expansion of Christendom, an expression of wealth, and an example of how Europeans could exploit the abundant natural resources of the Americas, something that they believed, local populations had been unable to do. In fact, the exploitation of natural resources went hand in hand with the abuse of the indigenous labour force as divers. Michael Perri calls this a “double common” in which the exploitation of labour supports the depletion of natural resources.²⁰

The coastal populations provided not just labour but also knowledge and skills. They had knowledge of the environmental conditions and techniques of pearl fishing: it was said, for example, that indigenous fishermen were able to identify the areas where oyster beds were located by carefully listening to the noise that oysters made underwater, a sound that the Spaniards said was similar to that of pigs looking for acorns.²¹ They were also able to swim in deep waters for long periods, an activity that no European would be able to or would accept to do. Local populations were soon subjugated by the Spaniards and forced to work as oarsmen and divers, and enslaved to search for pearls on the seabed of the Atlantic coast. Initially, this was the fate of the Guayquerí people of the Pearl Coast. However, violence and epidemics decimated the local population, making it necessary for the Spaniards to find labour further afield. As early as 1508, Indigenous people from the Lucayan archipelago of the Bahamas were forcibly transported by the Spanish to be employed in the pearl fishery at Cubagua.²² Ten years later, the population of the Bahamas, originally numbering 60,000, was almost reduced to zero.²³

19. Warsh, 2018, p. 31-77; 2014.

20. Perri, 2009, p. 130.

21. Warsh, 2014, p. 518.

22. Saunders, 1999, p. 250.

23. Romero *et al.*, 1999, p. 57-58.

After the annihilation of the local and Bahamian population, in 1527 the Spanish resorted to enslaved people from Africa, who were considered more expensive, although excellent swimmers.²⁴

Contemporary sources tell us of the mistreatment, abuse and terrible conditions in which the natives and enslaved employed in the pearl fisheries found themselves. They were first branded with a letter “C” on their foreheads and arms (perhaps the C stood for Cubagua) and forced in groups of six per boat to dive for the catch. In the case of the pearls of Margarita Island, they were usually found at a depth of up to eighty feet (25 metres). We owe to Carmelite Father Antonio Vázquez de Espinosa (1570-1630) a description of the canoes that headed for the pearl fishing grounds in the morning. In his *Compendio y Descripción de las Indias Occidentales*, published only in the twentieth century, he provides a precise account of the fishing: lowering themselves with the use of stones “when they dive under water, they carry a little fastened by a rope to the canoe” (Fig. 3).²⁵ While gathering pearl oysters, they deposit them in nets “and with great speed and skill they come the surface.”²⁶

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Antonio Vázquez de Espinosa and other contemporary observers focused on the job of divers, though others were more overtly critical. The Dominican Bartolomé de las Casas (1484-1566) wrote his *Brevísima relación de la destrucción de las Indias* after his visit to the Americas in 1542-1545 as a report for Emperor Charles V.²⁷ In it, Las Casas says that:

“ The tyranny exercised by the Spaniards against the Indians in the pearl fishing business is one of the cruellest imaginable. There is no life so hellish and desperate in this century that can be compared to it, although gold mining is a dangerous and burdensome way of life. The pearl fishermen dive into the sea five fathoms deep and do so from dawn to dusk and remain for many minutes without breathing, plucking oysters from their rocky beds where the pearls lie. They return to the surface with a net bag containing these oysters, where a Spanish tormentor waits for them

24. Warsh, 2018, p. 46.

25. *The Drake Manuscript*, fol. 56v-57r: <https://www.themorgan.org/collection/Histoire-Naturelle-des-Indes/57>.

26. Vázquez de Espinosa, 1942, p. 51-52 (cit. in Dawson, 2006, p. 1348).

27. Las Casas, 1987.

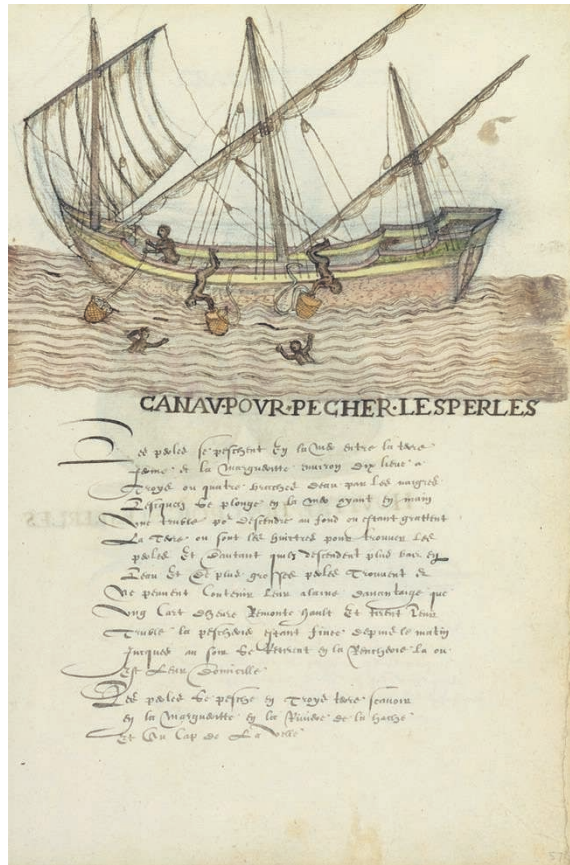


Fig. 3. – “Canav pour pecher les perles” (canoe for pearl-fishing)
The Drake Manuscript, c. 1586, illustrated manuscript, f. 57, 29.3 x 19.7 cm.
The Morgan Library & Museum.

in a canoe or boat and if the swimmer shows any sign of wanting to rest, he is showered with blows, his hair is pulled and he is thrown back into the water, forced to continue the hard work of tearing the oysters and bringing them back to the surface.²⁸

28. See: http://www-personal.umich.edu/~twod/latam-s2010/read/las_casasb2032120321-8.pdf. See also Otte, 1977, p. 25-26. On the representations and descriptions of labour, see Domínguez Torres, 2005, p. 72-83.

The life of pearl divers was indeed hellish: exposed for long periods to water temperatures of 15-20 degrees, they often suffered from hypothermia. As they reached deeper and deeper waters, the divers' eardrums ruptured, causing them to bleed from their ears, but also from their mouths and noses once they rose to the surface. They would drown or bleed to death often only after a few months or weeks of fishing. If they survived the many physical pressures and mistreatments, they would also have had to contend with sharks and manta rays as the famous Drake manuscript shows us, which comments: "This fish is very large and no less ferocious. When the blacks dive into the sea for pearls, he jumps on them to drown them and then eats them" (Fig. 4²⁹). Those who survived were promised a small share of the pearl harvest, which they were often forced to sell to the señores de canoa at a price far below their value. Vázquez de Espinosa provides further insights when he explains that enslaved divers lived in a non-monetised economy in which "on certain holidays they [*the señores*] lay on a table or elsewhere excellent suits of clothes or other valuables articles of clothing, and the Negroes come out with the clothes, and their masters with riches."³⁰ Divers resisted exploitation by shortening the times of their dives. They also created a parallel, extra-legal market for the pearls they absconded during their dives. This was the social organisation of the so-called "rancherías," the base of operations for pearl fishing composed of skippers, divers and the entrepreneurs. During the fishing season, hundreds of such rancherías sprung up in the Venezuelan islands.³¹

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Technologies and the deeper sea

We must not project the myth of the "noble savage" with an ecological soul onto the populations of the pearling coasts of the Americas. If there is any harmony with nature, it is a balancing act between exploitation and the profitability of future pearl harvests. However, it is correct that Cubagua and Margarita are the first case of a natural resource being depleted by the Europeans in the Americas, long before the intensive exploitation of silver mines or the depletion of the lands cultivated with sugar or cotton.

29. *The Drake Manuscript*, fol. 46v-47r: <https://www.themorgan.org/collection/Histoire-Naturelle-des-Indes/47>.

30. Vázquez de Espinosa, 1942, p. 51-52 (cit. in Dawson, 2006, p. 1349).

31. Otte, 1977, p. 35.

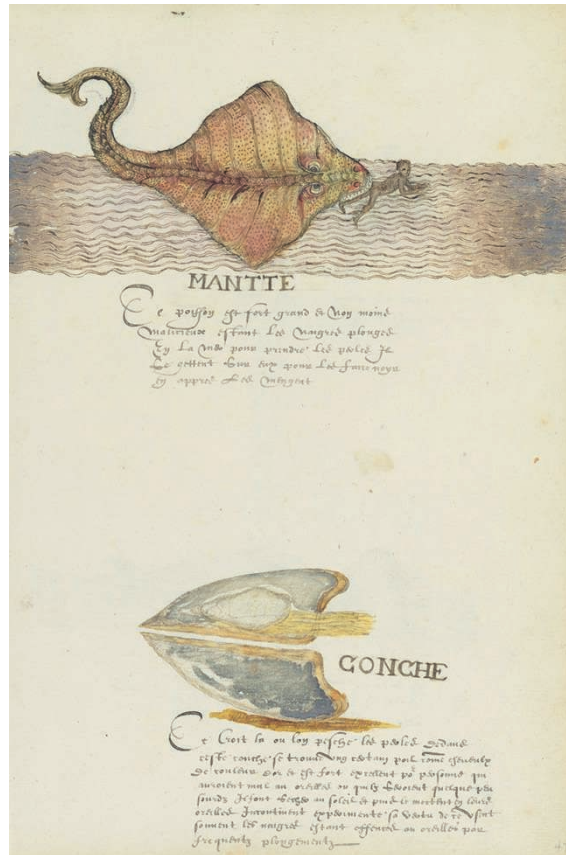


Fig. 4. – “Mantte” (manta ray)

The Drake Manuscript, c. 1586, illustrated manuscript, f. 47, 29.3 x 19.7 cm.
The Morgan Library & Museum.

Yet the exploitation of pearl banks differs from the damage created by slash and burn and intensive agriculture. Historians have long addressed the problem of ecologic imperialism and have recently discussed the importance of frontiers in the shaping of modern capitalism.³² In the case of pearls, one might think instead of a “vertical frontier” in which the exploitation of the natural resource is directly correlated to the ability to access it at increasing depths. Unlike modern mining, oil drilling or fracking, the

32. On ecologic imperialism, see Crosby’s classic formulation: Crosby, 1986. On frontier economies, see Beckert *et al.*, 2021.

extractive potential for pearls was directly correlated to the human ability to reach deeper banks. In the Venezuelan islands, the average pearl bed was at 13 metres in of depth and could reach as deep as 25 metres.³³

Spanish archives contain a number of important documents that testify to the constant search for technological solutions to allow deeper pearl fishing. We know of several attempts to patent these devices, such as the licence granted in 1520 to a certain Juan de Cárdenas, a sea pilot from Seville, for fishing with mechanical aids.³⁴ In 1528, a concession was granted to the Milanese nobleman Luigi Lampignano (Luis de Lampiñán in the Spanish documents) for the construction of “a machine or device with which entrepreneurs can fish for pearls [...] without having to send Indians, slaves or anyone else to the bottom of the sea to extract them.”³⁵ It was a kind of bar called “rastros” that literally pulled oysters out of the seabed more efficiently and deeper than divers could.³⁶ Lampiñán in the end was forced to abandon the project because of the many protests from local entrepreneurs whose incomes were being jeopardised.³⁷

Other proposals followed and other devices were suggested. They can be divided into two types: the first was an open glass diving bell with a visor underneath, into which the swimmer put his head; the second was a leather bell with weights containing air, which the swimmer could use when there was a lack of oxygen. Among these types are probably those proposed by Blasco de Garay in 1543, Pedro de Herrera in 1556 and the most famously by Antonio Luis de Cabrera, Antonio de Lima and Diego de Lira, who founded a company in 1568 for pearl fishing and the recovery of gold and silver from the wrecks of sunken ships.³⁸ Among the many inventors – and swindlers – was an Italian, the Florentine Giuseppe Bono, who in 1585 obtained a patent from the Consejo de Indias for his bell, which allowed swimmers to fish while remaining in the water. Tests were carried out in the ports of Seville and Lisbon, but they failed to reveal that the swimmer could not stay inside a bell for long without fresh air.³⁹ The search for bells

33. Romero *et al.*, 1999, p. 62.

34. Warsh, 2014, p. 528; 2018, p. 64.

35. Cit. in Perri, 2009, p. 137. See also Warsh, 2018, p. 64-68; Otte, 1977, p. 43-44.

36. Herrera García, 2021.

37. Warsh, 2018, p. 69. See also Otte, 1964.

38. Warsh, 2018, p. 86.

39. Orche, 2009, p. 29-30.

made of different materials continued to fascinate scientists and politicians in the following centuries with the idea of extracting and recovering the riches of the seabed, most especially those of sunk galleons.

So far, I have highlighted the importance of violence, imperial institutions and the adoption of new technologies to pearl fishing in the Americas. In the long run, the exploitation of the pearl banks caused unprecedented environmental disaster, which in many cases foreshadowed similar phenomena of environmental impoverishment in the twentieth century. As the French philosopher Michel de Montaigne (1533-1592) put it at the end of the sixteenth century, when he reminded his contemporaries that “so many cities razed, so many nations exterminated, so many millions of people put to the sword, and the richest and most beautiful part of the world turned upside down, for the traffic in pearls and pepper!”⁴⁰ Montaigne was thinking not only of the Americas but also of Asia.

The Asian pearls of the Gulf of Mannar

A long tradition in Mannar

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Before the arrival of large quantities of pearls from the Americas at the beginning of the sixteenth century, most pearls used in Europe came from Asia, most especially the Persian Gulf and the Gulf of Mannar, located between India and Sri Lanka (Fig. 5). Mannar pearls were already known and appreciated in ancient Rome: the first-century *Periplus* reports that they were fished by prisoners of the king of the Pandya dynasty of southern India and that the pearls were sold to Roman merchants at the market of Nencynda, in the Kerala region of South India.⁴¹ Pearl fishing in the strait that separates Sri Lanka and India prospered also in the centuries before the arrival of the Portuguese in the early sixteenth century and the Dutch a century later. Giordano Catalani of Séverac, the first Bishop of India, says in his *Mirabilia Descripta* of 1329 that 8,000 boats were engaged in pearl fishing for three months of the year under the authority of the King of Kandy.⁴²

40. Montaigne, 1959, p. 164 (cit. in Priyadarshini, 2023, p. 372).

41. McLaughlin, 2014, p. 176.

42. Ravichandran, 2012, p. 318; Cariño, Monteforte, 2005, p. 49.

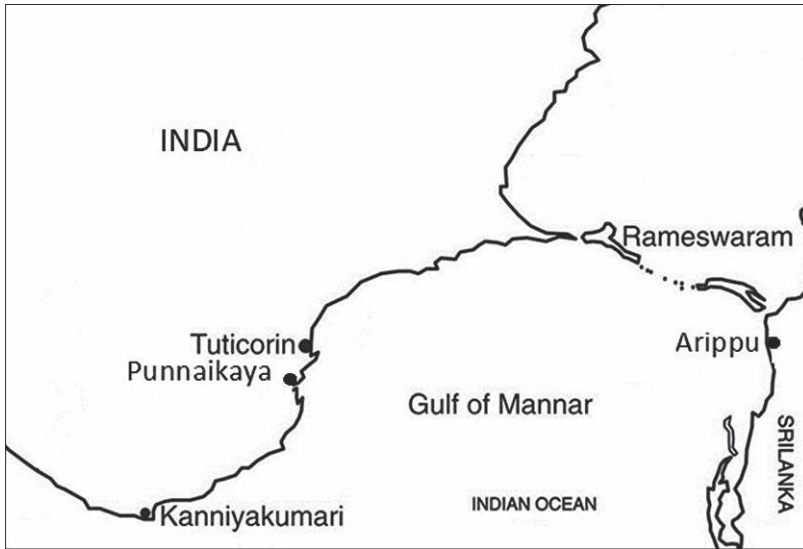


Fig. 5. – The Gulf of Mannar

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Three centuries later, the Florentine Francesco Carletti (1573/4-1636), the first European merchant to travel around the world between 1594 and 1602, tells of the pearls fished in the Gulf of Mannar “and from there up to the said Comorino along the entire coast, which can be a space of approximately fifty miles, from the sea pearls are fished which come out of oysters in the months of March and April. These pearls are taken by those who go under water fifteen and twenty marine fathoms, men of the country accustomed to this labour and not without some help from great enchanters to defend themselves from sharks, which do not touch them, which do not harm these pearl fishermen.”⁴³ Carletti gives us a view of the social organisation of labour not unlike that of the rancherías in the Americas, although he also notes that it was local labour – rather than imported slave labour that characterised pearl fishing in the Americas. A few years after Carletti, in 1608, Pedro Teixeira reported

43. “E da quella insino al detto Comorino per tutta quella costa, che può essere lo spatio di cinquanta miglia in circa, si pescono, le perle nel mare, le quali vi vengono precisamente nel mese di marzo, et d’aprile nelle ostriche, che sono presi da quelli che vanno sott’acqua in quindici et in 20 braccia marine-resche huomini del paese avezzi a questo e non senza qualche sospetto di grandi incantatori per difendersi da pesci cani, che non li toccano, i quali non fanno a questi pescatori di perle alcun male” (Brega, forthcoming, 2025, fol. 154r and 154v).



Fig. 6. – Idealized portrait of the Mughal empress Nur Jahan (1577-1645), Jahangir's twentieth wife

Opaque watercolor and gold on paper, Rajasthan, Kishangarh, c. 1725-1750, 29.52 x 21.59 cm. LACMA, gift of Diandra and Michael Douglas. M.81.271.7.

that 400 to 500 boats and a total of 50-60,000 people were employed in pearl fishing.⁴⁴ However, these sources are silent on the complex political situation, the conflicts (often armed) and the power struggles that access to this “marine capital” entailed.

The pearls of Mannar, like those of the Persian Gulf, were coveted by many rulers of Indian kingdoms. In the kingdom of Vijayanagar in southern India, jewellery was part of the aesthetic culture of the elite and the court, as commented on by many Europeans who were amazed at the abundance

44. Teixeira, 1902, p. 177-179.

of precious stones, gold, diamonds and pearls. The king of Vijayanagar controlled the extraction of the famous diamonds from the Deccan and Kanara mines, which were assembled by master goldsmiths and stonecutters with amethysts and sapphires found in the high riverbeds. Pearls from the Gulf and Mannar, as well as coral and gold, were imported in abundance to decorate jewellery, but also clothes and parasols, which, once opened, revealed astonishing vaults of jewels.⁴⁵ Seventeenth- and eighteenth-century miniatures of the Mughal emperors and their wives show them bedecked with pearls (Fig. 6).

Unlike the Venezuelan coast, Asian pearl fishing and trade was part of a highly commercialised system before the arrival of the Europeans. At the beginning of the sixteenth century, the Portuguese Duarte Barbosa (c. 1480-1521) noted that the trade in Mannar pearls was coordinated by Chetty merchants, who were particularly active between the Subcontinent and Malacca.⁴⁶ The port of Cambay in Gujarat was one of the most important markets for the trade of pearls from the Persian Gulf.⁴⁷ The city of Surat, also in Gujarat, was equally important for the pearl trade. The French traveller Jean de Thévenot (1633-1667) tells us that when Shivaji, lord of the Marathas, sacked Surat in January 1664, the booty taken in five days of violence and plunder was estimated at 30 million French francs and consisted of jewels, gold, silver and pearls. Up to ten kilos of strung pearls “and a large quantity of others not yet pierced” were looted from the house of a single local merchant (banyan).⁴⁸

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Portuguese and Dutch control

The abundance of pearls in Asian markets and court ceremonies was much commented upon by the Europeans who visited Asia during the sixteenth and seventeenth centuries. The circumnavigation of the Cape of Good Hope by the Portuguese with Vasco da Gama in 1497 and their arrival in the city of Calicut in India initiated direct trade between Europe and the Indian Ocean. Among the goods the Portuguese were interested in trading with the Indies – bypassing the Ottoman Empire – were pearls.

45. Lach, 1965, vol. 1, p. 374, p. 402.

46. Barbosa, 1918, vol. II, p. 172-173.

47. Pires, 1944, p. 20, p. 43-44, p. 86.

48. Sen, 1949, p. 25, p. 41.

The Portuguese fished for pearls on the coasts of the Bazuruto Islands in the Mozambique Channel, 200 km from Sofala, in the Red Sea (where oysters produced better mother-of-pearl than pearls), in the Persian Gulf and in the Gulf of Mannar.⁴⁹

The pearl banks of Mannar had long been a productive and much contested area of South Asia. The pearl reserves were disputed by the kings of Kotte (Colombo) and of Jaffna in Sri Lanka, and by the Muslim leaders of the Indian cities of Palaykayal and Kilakkarai, local vassals of the emperor of Vijayanagara. The pearl banks were productive as, according to Barbosa, in the early sixteenth century the local lords and kings claimed the pearls from at least one day of fishing for each season. Barbosa also tells us that it was at this time that the struggle for control of the pearls of Mannar reached a turning point when the troops of Palaykayal were attacked by those of Kotte: as a result, the lord of Palaykayal was killed and 89 of his men taken prisoner by the king of Kotte.⁵⁰

When the Portuguese came to control the Gulf of Mannar and its pearl reserves, they initially considered managing the fisheries themselves. This was around the same years that the Spanish were undertaking a similar project in the Americas. However, like the Spanish, the Portuguese in Asia soon realised that this would have been beyond their organisational capacity. In the 1520s they settled instead for indirect management: the fishermen of Palaykayal and Kilakkarai would do the fishing, and the Portuguese would receive a fixed sum in return. It was an unstable balance: the local fishermen soon allied themselves with the lord of Calicut against the Portuguese. Retaliation was immediate and devastating, with the Portuguese fleet attacking and destroying the port of Palayakayal.

The story of how the Portuguese forcibly became the new masters of the pearl banks of the Gulf of Mannar explains not only the arrival of unprecedented quantities of pearls in Europe, but also the mechanisms of European domination over the populations of Asia. In addition to force, the Portuguese also used faith: in what they called the "Costa da Pescaria," the Portuguese carried out a strong campaign of conversion to Catholicism among the local populations engaged in pearl

49. Kunz, Stevenson, 1908, p. 153; Cariño, Monteforte, 2005, p. 65.

50. Da Silva, 1978.

fishing (the Paravas community), creating new alliances but also subordination.⁵¹ In the 1540s, the Portuguese also established a new pearling centre at Punnaikayal, about ten kilometres south of Palaykayal. They used violence and coercion to tax the fishermen, pocketing some of their pearls and burdening them with high food and material costs. As in the Americas, Mannar's important pearl resources were subject to intense exploitation. By the end of the sixteenth century, the yield was diminishing and between 1604 and 1634, fishing was suspended, partly because of the lack of oysters, but also because the local fishermen, overburdened by the Portuguese, found little profit in the fishing that had characterised their communities for centuries.⁵²

The Dutch regulation of the pearl reserves

238 The Mannar pearl fisheries share several elements with the Venezuelan fisheries. Intense ecological and labour exploitation led to resource and human exhaustion. However, the arrival of the Dutch in the first half of the seventeenth century came to change this trajectory. Founded in 1602, the Dutch East India Company (VOC) had become interested in the idea of accessing the Asian pearl fisheries directly, rather than simply trading pearls from local merchants. Their first area of direct operation was the Persian Gulf where in 1643 the VOC sent two employees of the company who spoke Arabic and Persian to Kong (Iran) and Bahrain “to discover precisely once and for all the mystery of the trade pearls.”⁵³ With the decline of Portuguese rule on the Sri Lankan coast in the mid-seventeenth century, the Dutch played a central role in pearl fishing in the Gulf of Mannar.⁵⁴ In 1645 they established a factory at Kayalpatnam just a few kilometres south of Punnaikaya where the Portuguese had been based and over the following decade expelled the Portuguese from Sri Lanka and the Fishery coast.⁵⁵ The Dutch imposed a system not dissimilar to that of the Portuguese, especially through the control of the Paravas community (which in the previous century had converted to Catholicism and was now subservient to a Protestant nation).

51. Ravichandran, 2012, p. 318.

52. Da Silva, 1978, p. 19-21, p. 24.

53. Floor, 1982, p. 210.

54. Subrahmanyam, 1996.

55. Da Silva, 1978, p. 21; Subrahmanyam, 1996, p. 145.

By the 1660s the VOC had total control over vast pearl reserves: a 1682 survey listed 31 pearl banks on the Indian side of the Coast and nine years later, in 1691, another report distinguished no less than 47 pearl banks.⁵⁶ The Company had the task of preventing illegal fishing. This was the case for instance in 1694 when militia standing in Arippu on the coast of Sri Lanka, and formed by a hundred Dutchmen, a hundred Lacukkāriṅ (Sri Lankan) and another hundred native soldiers, patrolled the newly discovered pearl fishing banks.⁵⁷ We should be clear about the kind of coordination and control the Dutch imposed. The Company relied on revenue from the taxation of diving stones (in Dutch, *steengelden*), pear-shaped stones weighing about 11 pounds that were necessary for divers to reach the bottom of the sea quickly (Fig. 7).⁵⁸ This was a technology in use in other parts of Asia as well as in the Americas as contemporary written and visual sources show. In line with the conversion campaign started by the Portuguese, the Dutch imposed differential rates according to religion: Christians paid 7 pardaus or rixdollars per stone, while Hindus paid 9 ½, and Muslims as much as 12 pardaus. In effect, divers were recruited from among the poor, lower-class Christian Paravas and Muslim Labbais, while the boat owners were from both elite Christian and Muslim communities. During the fishing season, the boat owners (*campannottis*) gave work to up to 50,000 people employed as divers and assistants who formed a large migrant population in temporary fishing camps at Tuticorin (Thoothukudi) and Arippu (Fig. 8).⁵⁹

While local boat owners acted as entrepreneurs, they could only start a fishing season if the VOC agreed on it. The Portuguese had traditionally held two fishing seasons in November (the so-called “little fishery” – *pescaria pequena*), and a second one in April-May (the “great fishery” – *pescaria grande*). By the time the Dutch took over in the seventeenth century only one fishery between mid-March and mid-May was held.⁶⁰ It is unknown whether the experience of the exhaustion of pearl banks in the Americas by the Spanish informed the choices made by the Portuguese

56. Vink, 2015, p. 231.

57. Nationaal Archief, The Hague, VOC 1570, “Report of a pearl fishery at Mannar and Arippu,” c. 1695: https://www.nationaalarchief.nl/onderzoeken/archief/1.04.02/invnr/1570/file/NL-HaNA_1.04.02_1570_1143?eadID=1.04.02&unitID=1570&query=1570.

58. Subrahmanyam, 1996, p. 147-148.

59. Vink, 2015, p. 234-236.

60. *Ibid.*, V231; Subrahmanyam, 1996, p. 140.

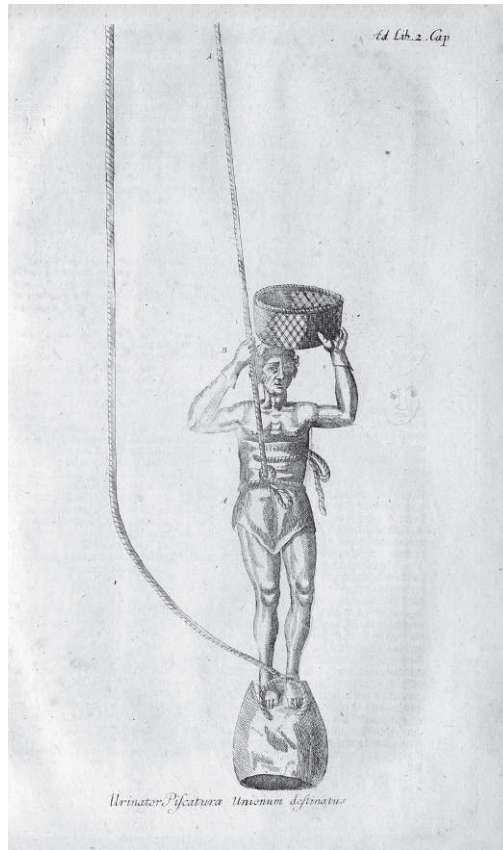


Fig. 7. – Page from the *Museum museorum, oder Vollständige schäu bühne aller materialien und specereyen* D. Michael Bernhard Valentini (1714)

first and later on the Dutch to regulate and limit fishing. Every year, in October, the VOC appointed an official who carried out an inspection of the coast together with representatives of the merchants to evaluate the potential of pearl fishing. If the value of 1,000 sample oysters exceeded 5 *fanams*, the fishery was publicly announced by the beating of a drum at Tuticorin and other ports under the company control.⁶¹ In the period between 1658 and 1690, out of a total of 33 years only 10 pearl fisheries were organised and most of them were held in the 1660s.⁶²

61. Vink, 2015, p. 237.

62. *Ibid.*, p. 231. For detailed descriptions of the fisheries, see Da Silva, 1978.

over with a large number of vessels and could have formed a number of 600 to 700, which would have been so beneficial to the VOC.”⁶³

In 1690, caution – or perhaps collusion – prevailed and reduced the company’s profit. But the report also tells of the ways in which the VOC sought to maximise its revenues. This was not so much a matter of “conserving” natural resources – after all, the American Pearl Coasts had been exhausted within a few years but of insuring the possibility of making good profits from it over time.⁶⁴ As a Dutch source reports: “[the divers] see that as a result of the passing of time (Lankheit van tijden) the “sea crops” are not plentiful and close, but instead spread out [in time].”⁶⁵ This system of assessing the potential of a particular fishing area and its monetary value for the season continued into the next century, when the English succeeded the Dutch in controlling the Sri Lankan coast.

Conclusion: repository or devastation?

The Pearl Coast of Venezuela in the Americas and the Gulf of Mannar in Asia are two of the most important natural pearl reserves in history. Yet their stories have only been considered separately. As Alison Frank Johnson has noted, they can be seen as “spaces defined by a kind of ecological logic” in the same way that a forest or a mining area might be. As such, “they evoke comparisons with distant places and connections made by people and goods in motion.”⁶⁶ This article has taken pearls as the unifying feature of two similar, yet profoundly different, histories of natural resources and technologies.

In the great age of pearls, these two areas of pearl fishing shared similar forms of intensive exploitation of nature. In the sixteenth and seventeenth centuries, European demand for pearls boomed, and yet this precious and unique natural object could only be sourced outside Europe, as only a

63. Dam, 1927-1954, p. 416.

64. Ravichandran, 2012, p. 319.

65. “*Dewelke ziende dat die zegewassen door Lankbeijt van tijden, nu niet zoo veel en digt bij den anderen, maar in tegendeel wat wijt en zijt leggen*” (Nationaal Archief, The Hague, VOC 1616, “Documents concerning a pearl fishery at Kondaichi, 1699,” f. 740: https://www.nationaalarchief.nl/onderzoeken/archief/1.04.02/invnr/1616/file/NL-HaNA_1.04.02_1616_0011?eadID=1.04.02&unitID=1616&query=1616).

66. Frank Johnson, 2022, p. 137.

handful of low-quality river pearls were fished in European rivers and lakes. In the eyes of the Europeans, the pearling banks of the Americas and Asia were among the areas of the world that they believed to be replete “with such abundant resources that the scarcities Europeans faced at home no longer counted.”⁶⁷ Pearl reserves were therefore part of a “myth of tropical exuberance” that Europeans thought characterised the Americas as well as tropical Asia. The imperial expansion of Spain and Portugal in the sixteenth century and the creation of chartered companies such as the VOC, the English and other European East India companies in the following centuries, found a *raison d'être* in the extraction, exploitation and commodification of the natural resources offered by the world beyond Europe.

Yet the stories of the Pearl Islands and Mannar are also profoundly different. The meteoric trajectory of the American fishery differs from the longer yields of the Asian pearl reserves. Historians have used the concepts of the “curse of the commons” to explain how finite resources are threatened when access to their exploitation is not controlled. Although access to the American pearl fisheries was by no means free, the Spanish imperial authorities did not exercise sufficient control. In Asia, by contrast, the Portuguese and especially the Dutch established a system of resource management, not so much to prevent overexploitation as to ensure continued profit from the pearling coasts.

Economic historians would attribute these different outcomes to the different institutional structures put in place by Europeans in the Americas and Asia. But the institutional differences are small: the Spanish Crown could only apply an indirect system of organisation and control, granting licences and taking a percentage of the yields. There was therefore an incentive for both the entrepreneurs and the Crown to maximise returns for each fishing. In Asia, the VOC – and the Portuguese before them – seemed to have more direct control (political, but also religious and social) over the local fishermen, although they too renounced direct exploitation of the fisheries in favour of a return proportional to the amount of tax levied on the divers' stones. There is, however, a subtle but important difference between the two revenue systems: in the Americas the percentage “tax” was applied to the resource itself (twenty percent of the pearls fished), whereas in Asia it was applied to the technology (the stone) as a tool for a

67. Curtin, 1990, p. 131.

potential catch. In the Americas it encouraged maximisation of resource extraction (as well as embezzlement), whereas in Asia it encouraged maximisation of efficiency in the extraction process.

There is a second set of factors that distinguish our two cases: in the Americas, Spanish entrepreneurs used local knowledge but had to create a new organisational structure and a new system of labour exploitation that relied on enslavement. In Asia, on the other hand, where enslavement and indentured labour were by no means absent, the organisation of the pearl fishery was based on existing structures and practices. The high demand for pearls in Asia may have put pressure on local resources as Europeans became additional customers. However, the existing structures and practices most likely provided a self-regulating mechanism.

In this article I borrow from game theory the concepts of “simultaneous” and “sequential” games. While I do not use the terms in their original sense, they are useful to highlight another difference between pearl fishing in the Americas and in Asia. On the coast of Venezuela, Spanish entrepreneurs competed among themselves in a simultaneous game. Their extraction capacity was proportional to their ability to employ enough divers and to provide the technology (diving, but also dredging) needed for pearl fishing. Each two- or three-week period of pearl fishing was treated as a “one-off” event, without considering the long-term consequences of overfishing or the fact that the destruction caused by invasive practices would hamper future production. In contrast, in the Gulf of Mannar, pearl fishing was seen as a “sequential” game. Entrepreneurs competed to secure the best oysters and pearls, but the VOC ensured through regulation that no fishing took place in years when oyster productivity (measured as the number of pearls per 100 oysters) was deemed insufficient. This was in line with the logic of a “repeated game” where it is understood that current resource decisions will have long-term consequences. The case of pearl fishing shows how similar technologies – understood not only as technical solutions but also as socio-economic and labour organisation – can be both a repository of processes and a tool for the depletion of natural resources.

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