

Original Paper

On the Four Eras of the Use of the Ocean by Mankind

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Abstract

This paper takes the relationship between humans and the ocean as the object of analysis, from the perspective of human use of the ocean, four era theories on the relationship between humans and the ocean are proposed, i.e., in the first era, the ocean is a geographic barrier for mankind; in the second era, the ocean is a road for human transportation; in the third era, the ocean is a granary for mankind; in the fourth era, the ocean is a treasure house of mankind's natural resources. Viewing from the last three eras, we can know that the ocean plays an important role in promoting the creation, production, and accumulation of human wealth. This paper argues the four-era theory of the relationship between humans and the ocean, also get the following conclusion: every era has the most significant feature of this era. This most significant feature function is the most important, largest, latest, and trendy contribution of the oceans to humans in this era; the four-era theory of the relationship between humans and the ocean also shows the continuous improvement process of human influence and utilization of the oceans; the continuous improvement of human influence and utilization of the ocean is realized by improvement of science and technology; the ability of humans to influence and utilize the oceans in the second era surpassed the first era is due to advances in shipbuilding technology and navigation technology; humans' ability to influence and utilize the ocean in the third era surpassed the second era due to advances in biotechnology; and the ability of humans to influence and utilize the ocean in the fourth era surpassed the third era due to the advancement and application of all-round science and technology; Historically, once a country has maritime hegemony, this country would become wealthy, powerful, and the leaders of maritime civilization.

Keywords

four eras, marine economy, ocean, mankind

1. Introduction

From the perspective of the development process of human history, the relationship between mankind and the ocean is extremely close. I think from the historical perspective of the ocean's main contribution to mankind, the relationship between mankind and the ocean can be divided into the following key eras: (1) the ocean is a geographic barrier for mankind; (2) the ocean is a road for human transportation; (3) the ocean is a granary for mankind; (4) and the ocean is a treasure house of mankind's natural resources.

Viewing from the last three eras, the main relationship between mankind and the ocean is reflected in economic relations. This means that the ocean plays an important role in promoting the creation, production, and accumulation of human wealth.

The four-era theory of the relationship between humans and the ocean is the argument put forward in this paper. The following part is the argument of this point of view. The review and citation of the literature are interspersed in the process of argument.

2 The Era of Geographical Barriers of the Ocean

In the early stage of the natural use of the ocean by mankind, the primary function of the ocean was a natural safety barrier, secondly, the use of primitive boats to sail inshore, the primitive boats helping humans leave the land, the thirdly, fishing and sun-dried sea salt.

Ocean was a natural safety barrier for human beings. A country or region that has the ocean as a natural barrier, does not mean that it will not be conquered. There is a poem in the classic Chinese book titled the Bible of Poetry, which is translated into English as "Xiangtu is brave and talented, so that overseas people also submit to him" (Note 1). There is a sentence in another Chinese classic book titled Noble Book, which is translated into English as "Walk all over the earth, until the sea" (Note 2). The first poem means that a country or region could be conquered even if this country or region has sea as barrier, the second sentence means that sea is a barrier for human beings.

The Ming Dynasty of China implemented sea ban policy, the purpose of which was to protect oneself via the natural barrier of the sea, because at the end of the Yuan Dynasty and the beginning of the Ming Dynasty of China, the Japanese feudal lords fought against each other, and the feudal lord who failed in the war organized warriors, merchants, and ronin to carry out armed smuggling, looting and harassment in coastal areas of China (Note 3).

At the beginning of the Qing Dynasty, the sea ban was implemented, the purpose of which was to deal with the attack from the sea by Zheng Chenggong, the remnant force of the Ming Dynasty. After Zheng Chenggong was suppressed, the Qing Dynasty lifted the sea ban. After more than 30 years, the policy of fully opening the sea began to shrink due to increasingly serious pirate activities and the potential threats from Western culture, Western civilization, and Western industrial products in East Asian waters (Note 4). The first Opium War in 1840 and the Second Opium War in 1856 completely knocked on China's door, and the sea barrier completely failed.

The United Kingdom is an island country surrounded by the sea, with the North Sea to the east, the Atlantic Ocean to the west and north, and the English Channel to the south, across the sea from France (Qian & Xu, 2017). The ocean provides a natural barrier for Britain. In 55 and 54 BC Julius Caesar invaded Britain twice: The first invasion did not achieve great results. The second invasion consisted of 628 ships, five legions and 2000 cavalry, eventually conquered England (Note 5). The king of England in the Middle Ages did not have to keep a standing army because of the barrier of the sea (Qian & Xu, 2017).

3. The Era of Sea Channel of Trade and Transportation

3.1 Why Do Humans Need Roads

Wikipedia defines transportation as “the movement of humans, animals, and goods from one location to another.” (Note 6)

Abraham Maslow divided the needs of human beings hierarchically into five levels at the beginning of his career and six levels during his later years: (a) physiological, (b) safety, (c) social belonging, (d) esteem, (e) self-actualization, and (f) self-transcendence. (Note 7) Viewing from Maslow’s hierarchy of human needs, we can know that the human needs for transportation are not included in Maslow’s category, as the human needs included in Maslow’s hierarchy of needs belong to category of ends, but the human needs for transportation belong to the category of means (Sun & Philips, 2020), transportation is a means for humans to satisfy their needs, because all of life’s necessities and pleasures that humans need cannot possibly locate within reach of their static bodies. So, if there were not transportation, humans need could not be realized. Roads are infrastructures that match human transportation. Without roads, human transportation behavior cannot be realized.

3.2 The Advantages of Sea Roads

Comparing to rail and land road transportation, sea roads are natural, railroads and land roads require substantial investment in construction waterway, this kind of construction investment can be saved in sea roads. At the meantime, the waterway extends in all directions, is not restricted by roads and tracks, and also transportation by sea roads have stronger cargo capacity, can travel day and night. Before the invention of cars and trains, sea transportation must have been faster than land transportation.

However, if a country wants to fully utilize the advantages of sea routes, it needs to have two capabilities, one is the ability to sea transport, and the other is the ability to protect the safety of maritime transport and the smooth flow of sea routes. The first ability is relative to maritime navigation technique, technology, and knowledge, the courage and passion of the navigator, ship building technology and level, etc. The second ability is relative to the military strength of a country’s navy. Navigation technology mainly includes navigation and positioning of ships, operation and avoidance of ships, types and structures of ships, equipment and accessories of ships, navigation aids and facilities, marine hydrology, geography and meteorology, and port and waterway engineering (Note 8).

Navigation has evolved from skill to science and technology, for example, “Early Pacific Polynesians

used the motion of stars, weather, the position of certain wildlife species, or the size of waves to find the path from one island to another.” (Note 9) The navigation method used by early Pacific Polynesians belongs to skill category. Maritime navigation first using astrolabe occurred during the Middle Ages (Note 10). Due to the development and application of information science, computer technology, electronic technology, communication technology and space satellite technology in navigation, navigation technology has made great progress (Note 11).

Because the control and monopoly of ocean transportation channels can bring huge economic benefits, when countries around the world have huge differences in the two capabilities of maritime transportation, a monopoly pattern on ocean transportation channels has formed.

3.3 The Contribution and Wealth Creation of Greece and Venice, the Early Leaders of Marine Civilization

The geography of ancient Greece included three types of region, i.e., the coast, the lowlands, and the mountains (Note 12), therefore, roads were too expensive, and roads were rarely built, then travel by land in ancient Greece was difficult (Note 13). Due to the rocky and mountainous landscape, ancient Greece had limited food supplies, then the ancient Greeks produced goods to trade for food from other areas around the Mediterranean, it is estimated that ancient Athens imported over three-fourths of its grain at the height of its population (Note 14). Greek coastline provided an abundance of harbors and inlets for shipping, ocean travel and ocean transportation became the most important means of transportation for the ancient Greeks.

Transportation by sea was a great asset to the ancient Greeks, with the help of ocean trade, the ancient Greeks accumulated and created more wealth: “In ancient Greece, nearly 700 small communities were within forty miles of the coast. These communities typically enjoyed more wealth than their inland counterparts.” (Note 15)

With the help of ocean trade, the ancient Greeks created a splendid Greek civilization. “The affinity of the Ancient Greeks to the sea is clearly manifested through their art and mythology. Many sculptures and deities were of or related to the sea, most notably Poseidon, God of the Sea. Greek voyagers would pray to these deities in the hope of receiving guidance and safe passage during their journey.” (Note 16) The republic of Venice existed from 697 AD to 1797 AD. Venice prospered on the salt trade in its early years, and established marine hegemony in subsequent centuries: Venice dominated trade on the Mediterranean Sea, including commerce between Europe and North Africa, as well as Asia, the Venetian navy was used in the Crusades (Note 17). Venice achieved territorial conquests along the Adriatic Sea and became home to an extremely wealthy merchant class, who patronized renowned art and architecture along the city’s lagoons (Note 18). The wealth and prosperity of Venice laid the foundation for Venice to become the center of the Renaissance.

3.4 *The Alternation of Maritime Hegemony*

3.4.1 Portugal's Maritime Supremacy

During the 15th and 16th centuries, Portuguese explorers were at the forefront of overseas exploration, created one of the most powerful empires: they reached India, established multiple trading posts in Asia and Africa, and settled what would become Brazil (Note 19). Major events are as follows (Note 20): (1) King Denis made an agreement with Genoese merchant sailor Manuel Pessanha in 1317, laying the basis for the Portuguese Navy and the establishment of a powerful Genoese merchant community in Portugal. (2) Portuguese occupied Ceuta in 1415 by the aiming to control navigation of the African coast, Young prince Henry the Navigator was there and became aware of profit possibilities in the Saharan trade routes, and invested in sponsoring voyage. (3) Since 1420 Governor of the rich Order of Christ held valuable monopolies on resources in Algarve, invested in sponsoring voyages down the coast of Mauritania, and was granted a royal monopoly of all profits from trading within the areas discovered in 1443. (4) Vasco da Gama commanded a ground-breaking voyage to reach Calicut in western India in 1498, opened up a sea route to Asia, and became the first European to reach India. (5) 1500 Pedro Álvares Cabral made landfall on the Brazilian coast, Brazil becomes the Portuguese colony. (6) In 1511 Albuquerque sailed to Malacca in Malaysia, which became the strategic base for Portuguese trade expansion with China and Southeast Asia. Afterwards the Portuguese Empire expanded into the Persian Gulf, the Portuguese Empire expanded into the Persian Gulf as Portugal, and contested with the Ottoman Empire for control of the spice trade.

3.4.2 Spain's Maritime Supremacy

Portugal monopolized the route from Europe through Africa to Asia, grabbed a lot of wealth, which had caused the jealousy of other countries. But the other countries must find a new route to the East to grab wealth from spice trade, due to the Portugal's monopoly on the old route. Spain had achieved far beyond this goal. Columbus' 1492 America expeditions was sponsored by Catholic Spain monarchs Queen Isabella I and King Ferdinand II (Note 21). The original intention of Columbus's voyage was to discover the place where spices are produced. Columbus did not find spices, but found gold and silver that is more precious than spices, so that Spain could grab a large amount of gold and silver from America. According to estimates, between 1500 and 1650, Spain grabbed 181 tons of gold and 16,000 tons of silver from the New World (Taylor, 2002). If it is converted to current value, if gold value is calculated at the current price of \$1850 per ounce, that much gold would be worth nearly \$10.8 billion dollars, i.e. $1850 * 181 * 1000000 / 31.034768 = 10789511943.508\$$; if silver value is calculated at the current price of \$24 per ounce, then that much silver would be worth nearly \$12.4 billion dollars, i.e., $24 * 16000 * 1000000 / 31.034768 = 12373219,609.6971\$$.

For searching for a westward route to the Maluku Islands, Ferdinand Magellan funded by the Spanish Crown organized the Castilian expedition to the East Indies from 1519 to 1522. Magellan headed south to Patagonia through the Atlantic Ocean, and passed through the Strait of Magellan into Pacific Ocean, at last reached the Spice Islands in 1521, and returned home via the Indian Ocean, finally completed

the first circuit of the globe (Note 21) .Magellan’s voyage around the world brought huge economic benefits to Spain, in the early 16th century, Portugal with a population of less than 2 million dominated the commercial routes of about half the Earth at its heyday, monopolized the western and eastern spice, sugar and slave trade, Spain broke the Portuguese monopoly, and the two countries signed a treaty in 1529, i.e. Treaty of Zaragoza, to jointly monopolize the sea-way spice trade between the East and the West.

3.4.3 The United Provinces’ Maritime Supremacy

The Spanish Armada attacked Britain in the summer of 1588, but was defeated horribly, which led to the end of Spanish hegemony at sea (Note 22), and The United Provinces rose to hegemony in the early seventeenth instead of Spain (Taylor, 1994).

The rampant promiscuity among ideological force resource, military force resource, political force resource, and economic force resource created a very unusual configuration of social forces, which translated into hegemony (Taylor, 1994). The foundation of Dutch maritime hegemony in 17th Century was the excelling of the Dutch shipbuilding industry. By 1600 Dutch shipbuilders dominated the European market, whose success was based on low costs and the technical superiority of ships built by them (Note 23). “Dutch ship design and construction were the envy of seventeenth-century Europe, a target of industrial espionage for the French and a target for violence for the English and a source of capital goods for the Venetians who simply bought Dutch ships outright” (Note 24) (Unger, 2011). The excelling of the shipbuilding industry of the Dutch laid the foundation for the strength of the Dutch shipping industry, which prompted the Netherlands to become the European sea coachman in the 17th Century. Obviously maritime hegemony needs strong military power to escort. Maurice founded a whole new school of military professional practice, and reformed military tactics, his innovations in military field greatly improved the military power of the United Provinces of the Netherlands, which was one of the most powerful in Europe between 1600 and 1648 (Note 25).

The Dutch built up by far the largest merchant fleet in the world. In the North Sea and Baltic there was little risk of piracy and trips shuttled between markets. In dangerous zones (where the risk of piracy or shipwreck was high) they traveled in convoys with a light guard.

3.4.4 The Era of the United Kingdom’s Maritime Supremacy

Britain declared war on the Dutch in December 1780, then the Fourth Anglo-Dutch War broke out. With the end of the war, the world entered the era of British maritime hegemony.

Before 1800, monopoly dominated in the overseas expansion and colonial trade of Europe. “It is inconceivable that any country would have willingly shared access to such fabulous riches as the spices of the Eastern seas or the gold and silver of Mexico and Peru. Following the example of the Iberian kings, every other European monarch refused to permit any other power to trade with his colonies before the end of the eighteenth century.” (Hamilton, 1948, p. 51). The specially designed staple ports, convoyed fleets, prescribed routes, and special privileges “closed most of the colonies to most of the subjects of most of the colonial powers most of the time.” (Hamilton, 1948, p51). After the United

Kingdom got the maritime supremacy, an inclusive and open maritime policy was implemented. The United Kingdom advocated freedom of navigation and free trade policies. For examples, the British Corn Laws, which are laws of anti-free trade, restricted import of food and grain, and was repealed in 1849 (Note 26). It is economic ideas rather than the pressure of interests that were central to repeal the Corn Laws (Irwin, 1989). The Navigation Act long titled An Act for Increase of Shipping, and Encouragement of the Navigation of this Nation was first adopted in 1651 (Note 27), its intent was to intensify the long-standing principle that English vessels should be used by English trade and fisheries. It is obvious that the Navigation Act 1651 was a monopoly law, which was repealed in 1849. To maintain the international trade order is the ultimate goal of the United Kingdom by holding sea power. During the maritime hegemony process “Britain as the hegemon can be seen to have provided a “public good” to the international economy in the form of a liberal ideology” (O’Brien et al., 1992, p. 110). Such a strategic move not only enabled the United Kingdom to obtain huge economic benefits by becoming a “sun never setting empire” with colonies all over the world, but also enabled other countries to obtain large or small economic benefits accordingly. So that the United Kingdom could maintain the longest maritime hegemony in history. 1939 was marked as the year of end of Britain’s cycle of hegemony by Robert Gilpin (Spiezio, 1990).

3.4.5 The USA’s Maritime Supremacy

Because 1939 was marked as the year of end of Britain’s cycle of hegemony, that means the world entered the era of the USA’s maritime supremacy. The United States does not seem to show a diligent pursuit of maritime hegemony. All this is determined by the general trend of historical development, that is, the occurrence of World War I and World War II. The accumulation of US economic, political, military and technological strength paved the way for the smooth succession of hegemony.

The United States’ emphasis on the ocean began with the publication of Mahan’s work titled “The Influence of Sea Power Upon History, 1660-1783” in 1890. Before 1890 the United States had always regarded itself as a Mainland country, whose land was its basic space for survival and development, after 1890 the United States gradually changed from the strategy of valuing land and undervaluing sea to the strategy of valuing land and sea equally. In his book Mahan argued that (Note 28): (1) national greatness was associated with the sea; (2) the importance of strategic locations, such as choke points, canals, and coaling stations, had been emphasized; (3) states should increase production and shipping capacities and acquire overseas possessions; (4) the primary mission of a navy was to secure the command of the sea by destroying or neutralizing the enemy fleet and not by destruction of commerce. Mahan’s sea power theory provided the basis for the strengthening of the U.S. Navy. In the 1890s the U.S. Congress approved building multiple modern steel-hulled armored cruisers and battleships. The number of U.S. Navy ships in 1870 ranked 12th in the world, and rose to 5th around 1900 (Note 29). In 1902 President Theodore Roosevelt said that: “A good Navy is not a provocation to war. It is the surest guaranty of peace.” (Note 30)

The U.S. won two major battles during the 1898 Spanish–American War, which not only verified the

increase in the strength of the U.S. Navy, but also expanded the range of U.S. maritime power. The First World War and the Second World War severely weakened the naval power of Britain and the European powers. In 1939, Britain handed over its maritime hegemony to the United States naturally.

4. The Era of Human Blue Granary

It is said that fishing was an essential source of food in Prehistory, “Homo habilis then Homo erectus were the first fishermen, some 500 000 years ago” (Note 31), and “During Graeco-Roman Antiquity, fishing was the main subject of the Halieutika” (Note 32). Fishery belongs to agriculture in the classification of statistics, so the sea is regarded as the blue granary for humans, but the size of the blue granary depends on the human’s ability to exploit the sea.

In modern history, the Dutch fishing industry was once very strong. The backbone of the Dutch fishing industry was the North Sea herring fishery, “in the 14th and 15th Centuries, herring fisheries in the North Sea, off southern Norway, and in the Baltic Sea became the fountainhead of the enormous wealth of the Hanseatic League of trading cities.” (Note 33) In 1603, 450000 people in Holland were engaged in work related to the thriving herring fishery (Pitcher & Lam, 2015). At that time, the strengths of Dutch fishing industry lie in (Note 34): (1) the catch is large, the size of fishing buses is large. It is estimated that the size of the herring fleet is roughly 500 busses and the catch is about 20000 to 25000 lasts on average each year in the first decades of the seventeenth century; (2) the herring ships could remain at sea longer and increased the range of the herring fishery, because the herring catch can be processed with salt in herring bus at sea.

The data in Table 1 can also support the prosperity of the Dutch fishing industry in the late 16th century and early 17th century.

Table 1. Lasts of Herring Shipped through the Danish Sound in Annual Averages

Time periods	Lasts of herring shipped from the Netherlands through the Danish Sound, 1562-1780
1562-69	2619
1574-79	456
1580-89	852
1590-99	5044
1600-09	8495
1610-19	8658
1620-29	7593
1630-39	7512
1640-49	8089
1650-57	3383

1661-70	2607
1671-80	1954
1681-90	2959
1691-00	1879
1701-10	329
1711-20	1114
1721-30	1748
1731-40	1764
1741-50	585
1751-60	663
1761-70	610
1771-80	1389

Source: W.S. Unger, “De Sonttabellen,” p. 114; “De Sonttabellenvoitooid,” p. 190. Indirectly cited from <https://www.huxiu.com/article/375088.html>

The Dutch fishing industry was very strong in 16-17 Century due to the following reasons:

- (1) Leading Dutch shipbuilding industry in that era. Dutch shipbuilders dominated the European market by 1600, their success was due to low costs and the technical superiority of their product (Unger, 1981). The ship building district of Zaan was the first industrialized area in the world with around 900 industrial windmills at the end of the 17th century. (Note 35)
- (2) Herring bus: a form of factory ship. The herring bus allowed the herring catch to be processed with salt at sea, so that the herring ship could remain at sea longer and increased the range of the herring fishery (Note 36).
- (3) Good regulation. Regulation was designed to maximize rents, this “strategy turned into one which at first limited sales and then returns to the Dutch industry.” (Unger, 1980, p. 253).

Fishing is one way for humans to get food from the ocean, and the other main way is fishing farming. From the middle of the 11th century, the construction of ponds developed, heralding the beginning of fish farming (Note 37). It is obvious that fish farming is later than fishing. This is because fish farming requires humans to have a stronger ability to influence and control waters, and higher level of biotechnology than fishing. The fishing catch is restricted by the renewal of natural wild fishery resources. Excessive fishing will lead to ecological imbalance and affect the sustainable development of the fishing industry. Nevertheless, the aquaculture industry can economically provide humans with high-quality animal protein food, which plays a major role in making up for the lack of marine fishing.

Table 2. World Fisheries and Aquaculture Production, Utilization, Unit: Million Tonnes, Live Weight

	1986-1995	1996-2005	2006-2015	2016	2017	2018
	Average per year	Average per year	Average per year			
Capture:	6.4	8.3	10.6	11.4	11.9	12.0
Inland						
Capture:	80.5	83.0	79.3	78.3	81.2	84.4
Marine						
Total	86.9	91.4	89.8	89.6	93.1	96.4
capture						
Aquaculture:	8.6	19.8	36.8	48.0	49.6	51.3
Inland						
Aquaculture:	6.3	14.4	22.8	28.5	30.0	30.8
Marine						
Total	14.9	34.2	59.7	76.5	79.5	82.1
aquaculture						
Total world	101.8	125.6	149.5	166.1	172.7	178.5
fisheries and						
aquaculture						
Human	71.8	98.5	129.2	148.2	152.9	156.4
consumption						
Non-food	29.9	27.1	20.3	17.9	19.7	22.2
uses						
Population	5.4	6.2	7.0	7.5	7.5	7.6
(billions)						
Per capita	13.4	15.9	18.4	19.9	20.3	20.5
apparent						
consumption						
(kg)						

Source: FAO, The State of World Fisheries and Aquaculture 2020, P. 3.

From the data in Table 2, we can see that the amount of marine capture has basically stabilized at around 80 million tones from 1986 to 2018, the amount of inland capture has basically stabilized at around 10 million tonnes, so that the amount of total marine capture has basically stabilized at around 90 million tones from 1986 to 2018. However, the data in Table 2 also shows that from 1986 to 2018,

the amount of aquaculture increased greatly, the amount of marine aquaculture increased from 6.3 million tonnes to 30.8 million tonnes, the amount of marine aquaculture in 2018 was 4.89 times that of 1986; the amount of inland aquaculture increased from 8.6 million tonnes to 51.3 million tonnes, the amount of inland aquaculture in 2018 was 5.97 times that of 1986. Therefore, the ratio of the amount of total aquaculture to the amount of total capture was 17%, 37%, 66%, 85%, 85%, 85% in 1986-1995, 1996-2005, 2006-2015, 2016, 2017, 2018 respectively. The ratios above show that the contribution of farming and fishing to human food supply is almost evenly divided now, which also shows the huge development potential and space of farming. 2016, 2017, 2018 per capita apparent consumption (kg) of fisheries and aquaculture production reached around 20 kg, which meets about 10% of human food needs, also means that the ocean has indeed become a blue granary for mankind already.

5. The Era of Human Natural Resources Treasure House

In the field of economics, what is generally accepted is the economics definition of Lionel Robbins. “Economics is the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses.” (Robbins, 1935, pp. 15) The means represent resources, the ends represent the human needs or wants. “Economics is entirely neutral between ends; ... in so far as any end is dependent on scarce means,” (Robbins, 1935, pp. 24). “The ends may be noble or they may be base. They may be ‘material’ or ‘immaterial’—if ends can be so described. But if the attainment of one set of ends involves the sacrifice of others, then it has an economic aspect.” (Robbins, 1935, pp. 24-25) Economics definition clearly shows that wants are unlimited, but the resources are limited. As the ocean contains abundant resources: marine resources include marine mineral resources, sea chemical resources, marine biological (aquatic) resources and marine power resources. Marine mineral resources mainly include petroleum, coal, iron, bauxite, manganese, copper, and quartz. Seawater chemical resources mainly include chlorine, sodium, magnesium, sulfur, iodine, uranium, gold, nickel, etc., which are dissolved in seawater. Marine power resources mainly include tidal energy, wave energy, ocean current energy, and seawater temperature difference energy and salt difference energy. But compared with land resources, the development and utilization of marine resources requires humans to have higher capabilities and a higher level of science and technology. In recent decades, the rapid development of science and technology has greatly promoted the use of marine resources by mankind, the ocean has entered the era of being human natural resources treasure house.

China’s acquisition of marine resources is mainly reflected in renewable energy and low-value-added products, of course, China is also striving to pursue the acquisition of high-value-added resources, such as oil and natural gas: (1) 2019 was the best year in history for the global offshore wind industry, because this year the world offshore wind industry added 6.1 GW of new capacity, bringing total global cumulative installations to 29.1 GW. China remains in the number one spot for the second year in a row for new installations, installing a record 2.4 GW (GWEC, 2020); (2) China produced 49.16 million tons of offshore crude oil in 2019, having an increase of 2.3 percent over the 2018; (3) China produced

16200 million cubic meters natural gas, having an increase of 5.4% over 2018. The added value of offshore oil and gas industry was 154100 million yuan in 2019; (4) the added value of sea sand, seabed gold mining was 19400 million yuan in 2019 (China Marine Economic Statistics Bulletin, 2019).

The U.S. Commerce Department's Bureau of Economic Analysis (BEA) has found that the country's marine economy contributed USD 372844 million to the nation's GDP in 2018 (Note 38), that means from 2017 to 2018, the marine economy of the USA grew by 5.8 percent, faster than the 5.4 percent growth of the total U.S. GDP.

Table 3. The USA Ocean Economy Value Added by Industry: Mining Industry Unit: Million Dollars

Sector	2014	2015	2016	2017	2018
Mining: total	66168	40223	33282	37518	41171
Oil and gas extraction	48728	27483	26014	30282	33491
Mining, except oil and gas	780	616	644	859	956
Support activities for mining	16661	12124	6624	6377	6724

Source: Bureau of Economic Analysis. Ocean Economy Prototype Statistics, 2014-2018. <https://www.bea.gov/data/special-topics/ocean-economy>

Viewing the data in the Table 3, we can know that the ratio of the USA's mining industry GDP to the whole nation's GDP is 11.04% (41171/372844) in 2018, the USA's oil and gas extraction industry GDP to the whole nation's GDP is 8.98% (33491/372844) in 2018. The 11.04% and 8.98% ratios are high, that means the United States has obtained a large amount of oil and gas resources from the ocean, as well as a large quantity of other mineral resources, which also means that the world has truly entered the era of treating the ocean as a treasure house of natural resources, and the United States is the leader in this era.

6. Conclusion

From the above analysis, we can see that the use of the ocean by humans clearly shows four eras. Every era has the most significant feature of this era. This most significant feature function is the most important, largest, latest, and trendy contribution of the oceans to humans in this era. For examples, in the first era, the ocean is a geographic barrier for mankind, it means that the geographic barrier function is the greatest contribution of the ocean to mankind in the first era. When mankind uses the ocean as a geographic barrier, it does not exclude mankind from driving boats, fishing, and drying sea salt. However, driving boats, fishing, and drying sea salt are not important features of this era; in the fourth era, the ocean is a treasure house of mankind's natural resources, it means that in the fourth era mankind regards obtaining more important and high-value natural resources from the ocean as an

important economic growth point and engine of technological innovation. In fourth era, ocean is still a road for human transportation and still is a granary for mankind, but ocean as a road for human transportation and as a blue granary for mankind is not main feature of the fourth era of the relationship between man and the ocean.

The four-era theory of the relationship between humans and the ocean also shows the continuous improvement process of human influence and utilization of the oceans. The continuous improvement of human influence and utilization of the ocean is realized by improvement of science and technology. The ability of humans to influence and utilize the oceans in the second era surpassed the first era is due to advances in shipbuilding technology and navigation technology; humans' ability to influence and utilize the ocean in the third era surpassed the second era due to advances in biotechnology; and the ability of humans to influence and utilize the ocean in the fourth era surpassed the third era due to the advancement and application of all-round science and technology.

Historically, once a country has maritime hegemony, this country would become wealthy, powerful, and the leaders of maritime civilization.

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