THE ECONOMIC AND ENVIRONMENTAL IMPACT OF LARGE SHIPS ON THE TERRITORY, ON THE COAST AND ON THE SEA: THE MSC CRUISES CASE STUDY[1]

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Abstract – Cruise tourism is expanding almost everywhere, despite the pandemic generated by COVID-19 in this sector as well. According to estimates and reported by the CLIA (2021), between mid-March and September 2020, the economic damage was around 77 billion dollars, with a loss of jobs that exceed 500 000. The CLIA itself, however, records a significant increase in travelers who aspire to join a cruise, even among those who have never been there. Cruise ships and their economic impact have been the subject of research for many years and the data, which can also be obtained from various agencies and shipping companies, denote the importance of this particular sector, in the more general context of tourism. It is therefore increasingly appropriate to direct research towards an interdisciplinary and multidisciplinary analysis that considers the concept of environmental impact (now in many cases somewhat emptied of its deep meaning and become a sort of opportunistic slogan), so as to consider, in addition to the economic aspects, also the anthropogeographic ones (both negative and positive). In fact, the opportunity to enrich the technical and organizational changes required by the pandemic with second thoughts that also have a cultural impact, in addition to the usual environmental impact, is a delightful opportunity. Through the MSC case study, this contribution aims to partecipate in the reflection on the theme of sustainability, which is also abused lexically, to look at the possibility of directing cruise tourism towards a new way of introducing Man into the landscape.

Introduction - Man, Nature and the ship: “paleo-cruises” and “neo-travels”

We understand the importance of the topic, from the term “cruise” and the french derivative term *croiser* (to cross), with the meaning of patrolling a stretch of sea (to distinguish from the architectural significance[2]).

[1] The work is the result of the collaboration between the authors; however, it is possible to attribute paragraph n. 1 to Anna Rosa Candura; n. 2 to Emanuele Poli; n. 3 to Luca Fois.

[2] The etymology proposed on the site *sardegna-traghetti.info/crociera/* is interesting; however, we do not find homogeneity in the encyclopedic entries; by way of example, we recall, Treccani: «In aeronautical terminology, phase of the flight of an aircraft in which the speed and altitude are regulated so as to cover a given distance in the most economical way possible both in terms of costs consumption both in relation to the duration of the aircraft and the propulsion system.[..] Contract concluded for a c. tourist, that is, for a pleasure trip, mainly by sea and usually with a return to the starting point. It is a

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The first cruise in a contemporary sense (a sea voyage for tourism) dates back to 1833. In 1831 the Francesco I ship entered service which covered the Palermo, Civitavecchia, Livorno, Genoa, Marseille lines. The same ship made the first tourist cruise in the world, in 1833, more than 50 years ahead of those that followed: it lasted three months with departure from Naples, arrival in Constantinople (where it aroused the admiration of the sultan) and return with several intermediate stopovers[3]. However, it was the "Albert Ballin"[4] ship that set up the real cruise business from 1928; the first ship that exceeded 100 000 tons was built again in Italy, by Fincantieri.

Figure 1 – The ship Francesco I.

After recognizing this forgotten primacy in Italy, it cannot be argued that a precise historical moment should be established for the birth of an activity of which we can find much more than an ancient trace. Think, for example, of Luciano di Samosata who describes the arrival of the ship Isis, well analyzed by Tomassi. The arrival of the Isis in Piraeus attracts an extraordinary mass of onlookers, so much so that Adimanto gets lost in the crowd, without his friends noticing. In the 2nd century A.D., Piraeus was excluded from the great navigation routes and was animated mainly by tourists, intellectuals, and students, attracted by the monuments and by the renowned Athenian philosophical schools. Consequently, the arrival of a ship of impressive proportions could not fail to arouse the curiosity of the locals, accustomed to seeing boats of much more modest tonnage. However, the landing of a ship in the ration fleet (*flotta annonaria*) had to represent an extraordinary event even, in the busiest ports (more or less equivalent to the docking, at some docks, of modern cruise ships), as evidenced by the testimony of Seneca, according to which the arrival of grain ships from Alexandria in Pozzuoli was an event that attracted all the inhabitants of the place to the port,

typical membership contract stipulated between a travel agency, which provides for the organization, and individuals.» (treccani.it/enciclopedia/crociera/).

[3] Maresca, 2012, p. 129 (freely translated from the Italian text).

[4] The ship was built by the Blohm & Voss company of Hamburg.

as if it were a party[5]. In ancient times boats used exclusively for human transport did not exist and for this function they generally made up for merchant ships, on which travelers were offered a place to sleep and water to drink, while, for food or other types of drinks, they had to think themselves. As a result, merchant ships were often crowded with passengers who, in some cases, had to stay tight during the crossing, due to excessive crowding. For those who were leaving Italy for the Near East, or had to follow the opposite route, large ships such as the Isis were the fastest and safest means of transport. Unfortunately, we do not have any explicit information on how people got on board, since the first evidence relating to the space the passenger could have, the amount of free baggage, the rules relating to food and drink will only be available in the Middle Ages; for the ancient era, we find only hints, scattered in various kinds of texts, which in any case make it clear that only those who could afford it could obtain a more or less comfortable accommodation, otherwise people made do as they could, traveling in conditions often uncomfortable or even inhumane[6]. While it is not possible to establish a date of birth for the cruise, it is possible to identify reflections and data relating to the environmental impact that navigation produced in various areas. With regard to a reflection on the relationship with the landscape that can connect Man to the Planet (in a form that, today, we call "sustainable"), we can go back so far as to make the choice of possible citations difficult. In order to recall both Italian and Anglo-Saxon scientific thought, we therefore choose (for pure lexical opportunity) to recall two eminent scholars.

For Italy, we mention Sestini (1947), since he taught us to consider the locution "anthropogeographic landscape" almost equivalent to "sustainable landscape", thus demonstrating how Italian Geography has contributed to forging that planetary sensitivity which is so much in vogue today[7]. For the Anglo-Saxon context, increasingly, the best analysis (on the question of the changes that our Species has always made to the Earth) was offered to us by Marsh[8], in the preface to his famous work *Man and Nature; or, Physical Geography as Modified by Human Action* (1864). Here the naturalist reminds us that the purpose of the copious volume (560 pages) is to indicate the character and the extent of the changes produced by human action in the physical conditions of the globe and to illustrate the condition of Man who, both in the Species and in the degree, is a Power of a higher order than any other form of animated life[9]. The superior order to which Marsh refers is not,

[5] *Subito nobis hodie Alexandrinae naves apparuerunt, quae praemitti solent et nuntiare secuturae classis adventum: tabellarias vocant. Gratus illarum Campaniae aspectus est; omnis in pilis Puteolorum turba consistit et ex ipso genere velorum Alexandrinas quamvis in magna turba navium intellegit.* (Seneca, Epist. 9, 77,1).

[6] Tomassi, 2019, p. 108-110, *passim* (freely translated from the Italian text).

[7] Generally, in Italian scientific thought, naturalists emphasize the position of Man who has become: «the main modifying agent of the earth's crust» (Candura 1964, p. 3).

[8] He is considered the first American ecologist (Lowenthal, 2000); it would be better to define him a naturalist, in order to avoid confusing "ecology" with "ecologism", a word with a political meaning.

[9] «The object of the present volume is: to indicate the character and, approximately, the extent of the changes produced by human action in the physical conditions of the globe we inhabit; to point out the dangers of imprudence and the necessity of caution in all operations which, on a large scale, interfere with the spontaneous arrangements of the organic or the inorganic world; to suggest the possibility and the importance of the restoration of disturbed harmonies and the material improvement of waste and exhausted regions; and, incidentally, to illustrate the doctrine, that man is, in both kind and degree, a power of a higher order than any of the other forms of animated life, which, like him, are nourished at the table of bounteous nature.» (Marsh, 1864, p. III).

however, intended as moral superiority (as can be seen from reading his work); the naturalist refers to a potential superiority which makes especially necessary to develop that sense of responsibility to which Geography always refers. It is not the optimistic vision of Tertulliano who, in the second century, observed the domination of Man over Nature; Marsh manifests a cautious pessimism, accompanied by data and observations, from which we draw an in-depth study suitable for the theme of navigation. In Chapter III (*The woods*), where he extensively dedicates himself to the modifications made by Man to the forests, he inserts an interesting digression, recalling how, since the Middle Ages, the great naval navies of Venice and Genoa have caused an immense consumption of *limber*[10]; marine construction of that period employed far more lumber than modern naval architecture of most trading countries; the ancient techniques of building ships, of the Mediterranean area, have been handed down for a long time. Marsh also cites the geologist Karl Hummel (1855), for his observations around the Carso landscape, where the bare rock is swept by the Bora; the fury of this wind was once held back by fir trees, the trees that the Republic of Venice cut down in large numbers to build its fleets[11]. Since the nineteenth century, therefore, the environmental impact of navigation was very clear, even with regard to the procurement of building materials; we are not, therefore, narrating anything new or surprising, but we can certainly note the secular disinterest (or at least the superficiality) for the warnings of the "nature specialists" of various orders, degrees and eras.

The case of MSC Cruises

The significant case of MSC cruises bodes well, in the context of the containment of environmental damage. The shipping company MSC Cruises periodically publishes a sustainability program, in which the environmental and social policies promoted are defined, illustrating the objectives achieved and those on the agenda schedule (MSC, 2019). In the 2019 program report, (the year during which the company was not yet harmed by the pandemic) many issues are addressed (Trovato, 2021). With regard to gaseous emissions, MSC has invested five billion euros to power three future ships with liquefied natural gas (LNG), a fuel that reduces emissions of sulphur and nitrogen oxides by 99 % and 85 % respectively. MSC is committed to modernizing the rest of the fleet, installing advanced technologies that can significantly reduce SO_X and NO_X emissions. LNG will also make it possible to reduce CO_2 emissions by up to 20 %. The problem related to the use of this fuel

[10] «Limber is a sixteenth-century word used in the dialectical sense to refer to a cart shaft, alluding to its to and fro motion.» (dictionary.cambridge.org/dictionary/english/limber).

[11]«The great naval and commercial marines of Venice and Genoa must have occasioned and immense consumption of limber in the Middle Ages, and the centuries immediately succeeding those- commonly embraced in that designation. The marine construction of that period employed larger timbers than the modern naval architecture of most commercial countries, but apparently without a proportional increase of strength. The old modes of ship building have been, to a considerable extent, handed down to the present day in the Mediterranean, and an American or an English-man looks with astonishment at the huge beams and thick planks so often employed in the construction of very small vessels navigating that sea. According to Hummel. The desolation of the Karst, the high plateau lying north of Trieste, now one of the most parched and barren districts in Europe, is owing to the felling of its woods to build the navies of Venice. "Where the miserable peasant of the Karst now sees nothing but bare rock swept and scoured by the raging Bora, the fury of this wind was once subdued by mighty firs, which Venice recklessly cut down to build her fleets" – *Physiche Geographie*, p. 32.» (Marsh, 1864, pp. 218-19, nota †).

is the so-called methane slip, the escape of unburned methane through the engine, which MSC thinks it can reduce by updating its engines and technologies. MSC is investing in an innovative project in collaboration with Entrepose Group, the Chantiers de l'Atlantique shipyard and the French Commission for Alternative Energy and Atomic Energy to develop a power system that uses LNG batteries. The batteries would be recharged ashore at each shipyard, reducing CO_2 emissions by over 325 000 tons (MSC, 2019)[12]. For the sector of environmental innovations, various interventions are announced on the components of existing ships and the design of future ones: the exhaust gas cleaning system reduces the sulfur oxides produced by the exhaust itself by 98 %; the hull and propellers are designed and improved to minimize radiated underwater noise, which disturbs aquatic mammals; wastewater is treated through an advanced system that returns it to the sea practically drinkable; waste is pressed, sorted or incinerated, while residual waste is delivered to ports and properly disposed of; the hulls are covered with low environmental impact anti-vegetative paints; the total illumination of the ship is guaranteed by energy-saving LEDs and fluorescent bulbs. 63 % of wastewater is affected by advanced treatment and, as stated by the Vice President of Environmental and Compliance Operations, MSC's policy requires bilge and oil water to be landed and purified. In accordance with the International Convention for the Control and Management of Ballast Water and Ship Sediments, MSC is committed to eliminating any threats related to the transport of species through ballast water, to preserve ecosystems (MSC, 2019). MSC Cruises is therefore sensitive to the main sustainability objectives promoted, coordinating technological innovation, passenger well-being and scientific research. The results achieved are still insufficient, and not all shipping companies promote the same initiatives or respect environmental protocols (Carić, 2010 a).

Results

The case of MSC represents an example of sustainable planning, in the context of cruise tourism. The issue of the impact of cruise tourism is, in fact, complicated and embraces different and distant themes and disciplines. It is important to reconstruct a general picture of the effects that large ships have on the environment, considering the economic impact in light of the costs required to manage the impact of this important activity on the seas and oceans. The complexity of the topic is difficult to describe, but this should not discourage the attempt to analyze the different fronts.[13] What emerges, especially from the MSC sustainability program, is the importance that scientific research and technological innovation assume in inspiring the choices of governments and navigation bodies. The growing presence of multidisciplinary studies on the issue gives hope that, in the future, the definition of "impact" will be continuously updated and will be able to provide the scientific community with an increasingly detailed picture of that cultural, social, economic, environmental, and engineering phenomenon that is cruise tourism.

[12] See: Ytreberg, Eriksson, Maljutenko, Jalkanen, Johansson, Hassellöv, Granhag, (2020), p. 1.
[13] See, for example: Carić, (2010 b); Dosi, Musu, Rizzi, Zanette (2013); Milazzo, Badalamenti, Ceccherelli, Chemello, (2004); Nabi, McLaughlin, Hao, Wang, Zeng, Khan, Wang, (2018); Raudsepp, Maljutenko, Kõuts, Granhag, Wilewska-Bien, Hassellöv, Eriksson, Johansson, Jalkanen, Karl, Matthias, Moldanova, (2019).

Discussion - Man and the sea: for a sustainable economic recovery, between past and future

There are countless examples of the fundamental role that the sea has always played in the life of our Species, to describe the link between the sea and History. The great French historian Ferdinand Braudel wrote about the Mediterranean Sea: «The sea. We must try to imagine it, to see it with the eyes of a man of the past: like a limit, a barrier that extends to the horizon, like an obsessive, omnipresent, enigmatic immensity»[14]. Precisely the eyes of a man of the past - Lamberto di Saint-Omer - see him surround, dividing and characterizing an idealized Europe, a fraction of an ecumene reduced to the schematic O-T representation, typical of the medieval world.[15] Lamberto's image is accompanied by lists of geographic objects and peoples, so that the space - even the one drawn - is always covered by writing: everything in its place, every people in its land[16]. Real distances are canceled out by the ideal representation; the observer can gaze at the entire continent and its inhabitants, each with its diversity, just imagined.

Figure 2 – 1120 Cartographic representation of Europe from *Liber Floridus* by Lamberto di St.-Omer.

The respectful tack, the slow time of the crossing, are now drastically reduced by the speed of the machines and that ideal map has suddenly become real, however losing the

[14] Braudel (1998), p.19 (freely translated from the Italian edition).
[15] See: Harvey (1987); Woodward (1987).
[16] See: von den Brinken (1972).

sense of human and geographical differences. The thin and insurmountable limit of the sea is plowed by ever larger ships carrying travelers-tourists to the "discovery" of an exotic now only stereotyped and artificial, standardized by commercial needs. Thus the ship is no longer the heroic tool with which the Renaissance man imposes his thirst for knowledge on Nature. The oversized object-ship, full of historical significance, which appears in the historiated papers of the early modern age, such as the famous one by Sebastian Munster (1550), is totally canceled from a perspective aimed only within ships that are increasingly large and complex, but totally deprived of their symbolic strength, reduced to the mainland, to anonymous corridors of shopping centers, all identical, all falsely reassuring. The time of the journey is occupied by something else, the goal is just another activity among the many proposals, without interruption, without perception of the different.

Figure 3 – Sebastian Münster, 1550.

The need to reconstruct the right proportions between man and the sea, symbolized by the Münster map (1550), connects us well to contemporary cruise navigation; born as a pure economic activity, but containing suggestions and structures capable of contributing to the achievement of that goal (anthropogeographic balance) which, currently, is the absolute protagonist of the 17 objectives of the 2023 Agenda[17]. The tourist/traveler - often coming from far away and completely decontextualized - is transported from one place to another, without being able to realize precisely how he arrived, with the urgency to absorb as much information as possible, to see as many buildings, places, works as someone suggests to him to be important and unmissable. Other impacts concern the places and territories touched. The cultural offer, driven by profit, conforms to demand, diluting the peculiarities, depending on the short time of visits and the impossibility of further study. The economic opportunity causes societies and customs to change, somehow impoverishing all the actors involved. The

[17] This objective, however, requires a joint effort to bring down disciplinary barriers, facilitating connections and collaborations between researchers.

'environmental' impact of cruise tourism should therefore also take into account time and space as identifying elements of the places, not only the technical aspects of protection, recovering them, with the mediation of History and Geography in order to bring the journey back to its original dimension, less bulimic and more "human"[18].

Conclusion

In order to clarify the condition of cruise navigation in 2020, Kelly Craighead[19] says that: «For the cruise community, there is no denying that 2020 was not the year we anticipated. Still, the industry wasted no time adjusting course to address the challenges before us. With the year drawing to a close, we are pleased to share CLIA's 2021 report that highlights the extraordinary steps that cruise community took to develop and implement enhanced public health protocols to keep putting people first, while continuing to focus on innovation and responsible tourism practices that make cruising the best way to experience the world.» (cruiselifestyle.co.uk/2020/12/28/state-of-the-cruise-industry-2021/). The desire to put people first, turning towards responsible tourism, has led us to believe that the MSC case study, summarized in paragraph 2, denotes an approach to "sustainability"[20], compatible with the desirable expansion of the cultural horizons of this specific tourist activity. However, this is a land, albeit fertile, on which the seeds of interdisciplinary collaboration are still to be planted. Even for human works related to cruise navigation (as for any other activity), the proposals for the future must be based on the foundations of experience, therefore of History. Citing once again a classic of scientific thought, Marsh (1864), we resume some of his observations, fundamental around the importance of a careful study of the consequences of Man's actions on the Planet. The naturalist, cited in paragraph I, reminds us: «But it is certain that man has done much to mould the form of the earth's surface, though we cannot always distinguish between the results of his action and the effects of purely geological causes; that the destruction of the forests, the drainage of lakes and marshes, and the operations of rural husbandry and industrial art have tended to produce great changes in the hygrometric, thermometric, electric, and chemical condition of the atmosphere, though we are not yet able to measure the force of the different elements of disturbance, or to say how far they have

[18] «The management of natural and human resources settled in the various territories has become increasingly important as an instrument of economic development, especially in the tourism sector.» (Rizzo, Rizzo, 2022, p.1).

[19] CLIA President and CEO: «[...]the world's largest cruise industry trade organization» (cruiselifestyle.co.uk/2020/12/28/state-of-the-cruise-industry-2021/).

[20] We refer, in particular, to the 2030 Agenda: «The 2030 Agenda for Sustainable Development is an action program for people, the planet and prosperity signed in September 2015 by the governments of the 193 UN member countries. It incorporates 17 Sustainable Development Goals - SDGs - into a large action program for a total of 169 'targets' or goals. The official launch of the Sustainable Development Goals coincided with the beginning of 2016, guiding the world on the way to go over the next 15 years: the countries, in fact, are committed to achieving them by 2030. The Goals for Development follow up on the results of the Millennium Development Goals that preceded them, and represent common goals on a set of important development issues: the fight against poverty, the elimination of hunger and the fight against to climate change, to name but a few. 'Common goals' means that they concern all countries and all individuals: no one is excluded, nor should they be left behind on the path necessary to lead the world on the path of sustainability.» (unric.org/it/agenda-2030/).

been compensated by each other, or by still obscurer influences; and, finally, that the myriad forms of animal and vegetables life, which covered the earth when man first entered upon the theatre of a nature whose harmonies he was destinated to derange, have been, through his action, greatly changed in numerical proportion, sometimes much modified in form and product, and sometimes entirely extirpated.» (Marsh, 1864, pp.13-14).

What Marsh observed in the mid-nineteenth century is, to a large extent, still applicable to contemporary human activities and serves as a warning to us not to overlook the fundamental role of History and Geography as "ethical supervisors".

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