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20,000 LEAGUES UNDER THE WATER

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*“When one man, for whatever reason,
has the opportunity to lead an extraordinary life,
he has no right to keep it to himself”*
Jacques Cousteau

Annotation. Jules Verne was an author who broke the rules. By the beginning of the 20-th century his tales emerged as mainstays of the screen. Verne’s influence has led to more than three hundred films and television versions of his stories around the globe (and another hundred films have told about his life in documentary form). Hollywood setting the tone and standard in the best known adaptation, the Hollywood treatment on Verne in turn has had global ramification and influence. Nowadays, a film script is created to bring the literary form to the screen, and nothing can replace the mystique of the spirit of the visual sphere, but first of all, cinema! Verne, Nemo and *the Nautilus* have entered the world’s collective memory!

His major works, which were adapted for film many times, remained popular into the 21st century, and the “scientific romance” became a permanent fixture of Western popular entertainment. The writer discovered the poetry of science and scientific creativity for literature, brought to perfection the artistic form of the adventure novel, enriching it with new content and subordinating it to scientific and educational purposes and pedagogical intent.

The author explains, why both French and American consciousness regard Jules Verne as a popular writer of “hard” science fiction. What are the heroes of J. Verne’s novels like? Among the descriptions of the heroes and scientists, we note one: a 40-year-old man, a famous geographer, who has many scientific titles and is a member of many scientific societies, whose full name is Jacques Eliacin François Marie Paganel, who became the prototype of the literary type of the “scientific eccentric.” Thus, it is fair to note that in every Verne novel there is such an image of a scientist - such a popularizer of science, who explains a lot in the course of the novel’s actions, who makes the events in the novel useful and exciting. Quoting Vern’s contemporary scientist Paganel, the author develops a demonstrative idea of the science of the sea and ocean.

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In the second chapter of the trilogy article: "Personalities: Albert 1's contribution to the development of oceanography", the author gives the meaning of the definition of oceanography.

Being in love with the ocean and sea voyages, as in Verne's novels, in keeping of his "everything from the sea" theme, implying that knowledge is mined at the bottom of the ocean, with using deep love of science and technology, with a good dose of their potential for human endeavor in action, we start to get acquaintance with the heritage of Prince Albert I of Monaco.

In general, on the initiative of Prince Albert I ("Scholar Prince" or the "Navigator Prince"), such scientific and humanitarian institutions were created as: the Oceanographic Institute with two branches (Oceanographic Museum in Monaco and the House of Oceans in Paris); International Hydrographic Organization; International Peace Institute; Institute of Human Paleontology in Paris; Museum of Prehistoric Anthropology of Monaco; Science Center of Monaco; Multimedia Library of Monaco; princely foundations dedicated to preserving the oceans and planet for future generations.

Since 1889, one hundred and ten volumes have been published, printed in Monaco. The president summed up his attitude towards the scientific community as follows: "And I represent the Oceanographic Institute, where scientists from all countries can work, investing their efforts. The laboratories with the museum are located in Monaco in a palace worthy of intellectual humanity; the center of dissemination dedicated to this new culture is in Paris in the academic world."

In the third chapter: "From Oceanography to Climate Change in Cli-Fi", the author talks about Jules Verne as the founder of a new genre in literature. Like Jules Verne, Prince Albert 1 has the gift of prediction. The seer, Prince Albert I, predicted some of the troubles facing the ocean today.

Finally, for both the Vernians and the followers of Albert I, it is a particularly fitting tribute to these explorers, who sought to popularize, through fiction and their scientific discoveries, both the wonders and dangers of the modern world, technologies that focus on questions of scientific consensus about the role of human activity in modern climate change that continue to arise in the public sphere both historically and now.

The narrator goes on to analyze novels that share the same idea, such as: Eric Brown's *The Phoenix Guardians*, referring to Kim Stanley Robinson (sometimes called a science fiction genius), his series of three independent books called *Science in the Capital* brings together The problem of environmental disasters and global warming of the planet is also recounted as prominent examples: Janette Winterson, British writer J. G. Ballard, Cormac McCarthy, Ian McEwan, Janette Winterson. The author is interested in a survey of readers of fiction novels about climate change and comes to the conclusion that many people buy books to read because of the pleasure of reading previous novels by a particular writer or because of recommendation for reading.

In our conclusions, she argues, that Zen-like playfulness of reading fictions, prepare us for entering the knowledges like reading poetry helps to enter a state of mindfulness and intentionality, which is so necessary for the exhausting thrilling scientist`s work!

The author of the publication also introduces the reader to the work of the Oceanographic Museum of Monaco both its therapeutic oceanic function and the benefits of the ocean for its visitors, including ocean art-therapy like developing direction of psychotherapy, leading to harmonization of the internal state. The reverence for creative expression and wilderness preservation has led narrator to the art-works of Cody Roberts and Greg Lecoeur. Then the author returns to historical origins and asks the rhetorical question, what if oceanography began with Homer?

The author resumed, that not only the writers and scientists of all of the times were interested of the climate changes but also United Nations. One of the prospects for resolving the issue in the context of climate change was the report, which was adopted in 2016 at the request of governments, observer organizations, including the government of the Principality of Monaco, the Prince Albert II Foundation and their partners and published in Monaco in 2019.

Thus, we can conclude, that ocean pollution is an important, but insufficiently recognized and inadequately controlled component of global pollution. "To make the Ocean known, loved and protected", that is historic mission of the Institut océanographique under the impetus of HSH Prince Albert II of Monaco. "To love the sea! The sea is everything! It covers seven tenths of the globe. His breath is pure and life-giving. In its vast desert, a person does not feel lonely, because around him he feels the beat of life... The sea is eternal movement and love, eternal life, as it was said in "Twenty Thousand Leagues Under the Sea" by J. Verne.

Key words: *scientific romance, science fiction, climate changes, cli-fi, oceanography, Monaco, oceanographic institutions of Monaco, global pollutions in literature, personalities of Prince Albert 1st and the Prince Albert II.*

Formulation of the task. The writer (on the examples of J.Verne works) discovered the poetry of science and scientific creativity for literature, brought to perfection the artistic form of the adventure novel, enriching it with new content and subordinating it to scientific and educational purposes. And our pedagogical and educational goal was to introduce the reader to "scientific novel" and a new fashionable genre about climate change: 'cli-fi' fiction, to make people think about global climate change and its impact on the environment through literature.

The purpose of the article: To describe the remarkable entry of science into literature, which was accomplished thanks to J. Verne and his followers, it is fair to note that in every Verne novel there is such an image of a scientist – such a popularizer of Thus science, who explains a lot in the course of the novel's actions, who makes the events in the novel useful and exciting, and besides, Verne is most successful in these portraits of people of science, thanks to why Jules Verne entered literature with a novel of a new type, making science his muse!

Methods. The methodological foundation of this scientific work consists of a set of research methods and approaches that are present in contemporary literature. Taking into account the object and subject of the research, the stated purpose of the work, and the tasks derived from it, both general scientific and specific methods utilized in literature science (science fiction, cli-fi) and oceanography as the science were employed to fully explore the content of its topic of climate changes.

Structure. The article is structured as a scientific study, divided into 7 chapters, the author's method is used for the first time.

Introduction. From the outset of his career as a novelist in the 1860-s, Jules Verne was an author who broke the rules. He not only defined a new genre, science fiction, but also appealed a wide audience – readers of all ages around the world. At that times, his stories became blockbusters, and they remain staples of the theater. In the United States, these films are of particular importance when considering the phenomenal success of those cinematic adaptations of Verne's works that appeared in America during the mid-20th century and which functioned as the prime popularizers of the *Voyages extraordinaires* (and the myth of "Jules Verne, the Father of Science Fiction"). Thus, both French theatre and early cinema contributed to further enhancing Jules Verne's reputation as a highly successful "popular" author.

Verne's works were astonishing, earning him the recognition he sought as an up-and-coming novelist. George Sand is known to have written a letter to her (and Verne's) publisher P.-J. Hetzel saying: "J'ai beaucoup de tes livres... mais je n'ai pas tous ceux de Jules Verne que j'adore, et je les recevrai avec plaisir pour mes petites et pour moi." He was showered with enthusiastic praise from some well-known authors, prominent scientists, and even a small number of literary critics. For example, his first novel received the following book review in the prestigious *Revue des Deux Mondes* in 1863:

Les grandes découvertes des plus célèbres voyageurs constatées et résumées dans un rapide et charmant volume de science et d'histoire—de l'imagination et de la vérité—voilà ce qui distingue le brillant début de M. Jules Verne. Son livre restera comme le plus curieux et le plus utile des voyages imaginaires, comme une de ces rares oeuvres de l'esprit qui méritent la fortune des Robinson et de Gulliver, et qui ont sur eux l'avantage de ne pas sortir un instant de la réalité et de s'appuyer jusque dans la fantaisie et dans l'invention sur les faits positifs et sur la science irrécusable /the great discoveries of the most famous travelers noted and summarized in a quick and charming volume of science and history—of imagination and truth—that is what distinguishes the brilliant debut of Mr. Jules Verne. His book will remain as the most curious and the most useful of imaginary journeys, as one of those rare works of the spirit which deserves the fortune of Robinsons and Gulliver, and which has over them the advantage of not going out for a moment of reality and to rely even in fantasy and invention on positive facts and on science irrefutable/ (Jules Verne and the French Literary Canon by Arthur B. Evans).

By the beginning of the 20-th century his tales emerged as mainstays of the screen. From trick films to the introduction of special effects, color, widescreen, and in television series and miniseries, Verne has conquered every screen form! Verne's enthusiasm for the idea of his "progress" was tempered from the time of his earliest stories, whether by the insanity of the Arctic explorer in *Journeys and Adventures of Capitan Hatteras* (1866) or by Capitan Nemo's use of the Nautilus as a warship in *Twenty Thousands Leagues under the Seas* (1870) (*Hollywood Presents Jules Verne: The Father of Science Fiction on Screen* (Screen Classics) Hardcover – May 26, 2015 by Brian Taves). Moreover, early enthusiasts saw Verne primarily as a scientific prophet and placed Jules Verne among those writers whose works mark a turn not only in the history of utopian but technologico-adventurous science fiction, for this reason was founded a Jules Verne Society in 1930 (by Marc Angenot, Jules Verne and French literary criticism).

The sincerity of Verne's interest in the United States is demonstrated by the fact that he has already used this country before his books were discovered in America. Verne's influence has led to more than three hundred



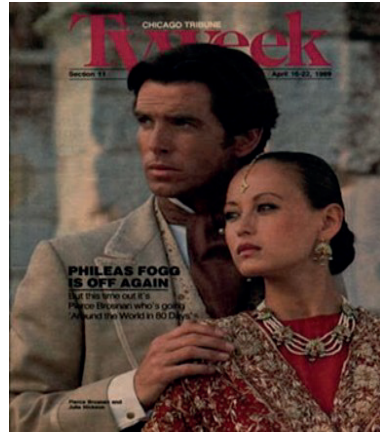
The Indian prince Daaker who becomes Captain Nemo in *Twenty Thousand Leagues under the Sea* (1916).

films and television versions of his stories around the globe (and another hundred films have told about his life in documentary form). No less than William Shakespeare, Edgar Allan Poe, Arthur Conan Doyle, Charles Dickens, or the other canonical authors from Jane Austin to Ernest Hemingway and Edgar Rice Burroughs, Verne was a major box office name, Hollywood setting the tone and standard in the best known adaptation, the Hollywood treatment on Verne in turn has had global ramification and influence,

shaping his reputation and the way he is read. Must be admitted, that the first Hollywood Verne films were not science fiction; they exemplified the genre to which more of his novels belong: adventure, but adventure themes would also influence Verne's science fiction. In 'Hollywood Presents Jules Verne', Brian Taves explores the author's indelible mark on English-language cinema. The process of adaptation of Jules Verne's works in cinema and on television is hardly over after more than a century. Thus, Verne became an author whose reputation was largely shaped by the directors, and the films became an important part of the worldwide Verne phenomenon! (*Hollywood Presents Jules Verne: The Father of Science Fiction on Screen* by Brian Taves).

Around the World in 80 Days is a 1989 three-part television Eastmancolor miniseries originally broadcast on NBC. The production garnered three nominations for Emmy awards that year. The teleplay by John Gay is based on the Jules Verne novel of the same title. As is true of most books-turned-into-

movies, there are quite a few differences between the novel and the film, but it's still an adventure around the world with beautiful landscapes, funny moments, and lots of stars. Starring Pierce Brosnan as Phileas Fogg, Eric Idle as Passepartout, Julia Nickson as Princess Aouda. Victorian aristocrat Phileas Fogg (Pierce Brosnan) bets his entire fortune he can circle the world in record time, in 80 days! The movie follows Jules Verne's adventure of a proper Englishman who on the basis of a wager travels around the world in 80 days. The scenery is outstanding, the places you visit make you wish you lived in the 1800's!



Filmmaking is a whole rich, expansive, expressive infusion of light, which helps to create culture, putting into the text scripts of poetry, literary masterpieces, songs, folk color and mentality, folklore, music and all that poetics, as like I visited the theater earlier. Artistic literature with its cultural codes, the mystique of the word to become an aesthetic function, and the very fact of reading a book, skin lesions, looking at an artistic painting after a novel, gives a small amount of aesthetic strength that forms the top of the hierarchy of people what needs Nowadays, a film script is created to bring the literary form to the screen, and nothing can replace the mystique of the spirit of the visual sphere, but first of all, cinema!

Before starting the narrative of the article, we have to add a few statements about the role of cinematography in the formation of the worldview position of human society from Hollywood celebrities:

➤ *Cinema is a question of what is in the frame and what is outside. Martin Scorsese*

➤ *Photography is the truth. And cinema is the truth 24 frames per second.-Jean-Luc Godard.*

➤ *The film is more like - or should be - like music than fiction. This should be a progression of moods and feelings. The topic behind emotion, meaning, will come later. Stanley Kubrick.*

➤ *For me, movies are an expensive form of therapy. Tim Burton*

➤ *„Never stop. Never stop fighting. Never stop dreaming. And don't be afraid to bare your soul to everyone - in the films you love; the films you want to create; the life you lived and the lives you could portray in film. Tom Hiddleston.*

➤ *I would like to be remembered as a person who did useful things, a kind and loving person. I would like to leave a memory of a person with the right attitude, who did everything possible to help others.*

Grace Kelly, Hollywood film actress.



Actuality is observed in Roland Barthes's quota:

*"Il est bon ton aujourd'hui de contester l'opposition des sciences et des lettres... Mais du point de vue du langage...cette opposition est pertinente; ce qu'elle met en regard n'est d'ailleurs pas forcément le réel et la fantaisie, l'objectivité et la subjectivité, le Vrai et le Beau, mais...des lieux différents de parole... [L'écriture] vise le réel même du langage; elle reconnaît que le langage est un immense halo d'implications, d'effets, de retentissements, de tours, de retours, de redans... L'écriture fait du savoir une fête" / "It is fashionable today to challenge the opposition of science and literature... But from the point of view of language...this opposition is relevant; what it compares is not necessarily reality and fantasy, objectivity and subjectivity, the True and the Beautiful, but... different places of speech... [Writing] aims at real even of language; it recognizes that language is an immense halo of implications, effects, repercussions, turns, returns, steps... Writing makes knowledge a celebration!" (by Roland Barthes, *Leçon* (Paris: Seuil, 1978), in *Jules Verne and the French Literary Canon*).*

Plot of the chapter 1. Jules Verne's Heritage. My high school English teacher always insisted that the first prerequisite of a good essay was a catchy title, and a flatter myself that my choice for this literary excursion is not half bad. If you ask people for the name of the world's most translated writer, the best-seller of all time, the only popular writer to have increased in popularity over more than century, you will get some surprising answers. Verne, Nemo and *the Nautilus* have entered the world's collective memory [34].

But the word "popular" in French literary circles is a two-edged term. It was undoubtedly due to his "popularity" that Verne was systematically shunned by the French *littérateurs*, but lastly, some number of literary critics contemporary to Verne also commended his works. One of the most interesting and detailed is Marius Topin's *Romanciers contemporains* (1876), a 417-page collection of literary discussions about such celebrated authors as Hugo, Balzac, Dumas, Flaubert, and Zola, gives a following reasonable idea of Topin's opinions concerning Verne's oeuvre:

Voici maintenant le roman scientifique...le genre dont M. Jules Verne est l'incontestable inventeur. Assurément bien d'autres avant lui s'étaient efforcés de mêler dans leurs récits, avec une juste mesure, l'utile à l'agréable, et d'être à la fois instructifs par la portée sérieuse de leur oeuvre et piquants par l'invention ingénieuse. Mais nul n'y a réussi comme M. Verne. Toutes les combinaisons...tous les artifices que les romanciers ordinaires imaginent pour nouer et dénouer une situation, M. Verne les a empruntés à la science. Aux merveilles usées de la féerie, il a substitué les merveilles réelles de la nature; aux crimes accumulés du roman d'aventure, il a substitué des procédés dont les notions récentes de la science font les frais...dans ses oeuvres le beau moral resplendisse dans tout son éclat à côté du vrai scientifique / here now is the scientific novel...the genre of which Mr. Jules Verne is the indisputable inventor. Certainly many others before him had strived to mix in their stories, with the right measure, the

*useful and the pleasant, and to be both instructive by the serious scope of their work and spicy by the ingenious invention. But no one has succeeded like Mr. Verne. All the combinations...all the artifices that ordinary novelists imagine to tie and untie a situation, Mr. Verne borrowed from science. For the worn-out wonders of fairyland, he substituted the real wonders of nature; for the accumulated crimes of the adventure novel, he substituted processes for which recent notions of science bear the brunt... in his works the beautiful moral shines in all its brilliance next to the true scientist / (by Roland Barthes, *Leçon* (Paris: Seuil, 1978), in *Jules Verne and the French Literary Canon*).*

Jules Verne's erudition and efficiency were phenomenal. He himself admitted: "I need work. Work is my life function. When I don't work, I don't feel any life in myself! His artistic space is the entire globe with its oceans and continents. Ten of Jules Verne's novels take place in Europe, four in Asia, seven in Africa, three in Australia, nine in America, three in the Arctic and Antarctica. The sea, its surface and depths are the favorite setting of the writer's novels. Readers become witnesses and participants in amazing voyages to the bottom of the World Ocean, to the surface of the sunken Atlantis, an expedition to Antarctica, and the discovery of the South Pole. Through the windows, travelers observe the inhabitants of the deep sea. Some of them have to engage in dangerous fights. And the heroes of some of his works leave the Earth, anticipating the themes of modern science fiction works by a century.

Vernians are the true believers who think Jules Verne's books are scientific manuals rather than fantastic stories. In his novels, *Twenty Thousand Leagues Under the Sea*, *Mysterious Island*, and *Master of the World*, Verne educates the reader on the science. Since the burst of technology in the 1960s, scientists, engineers, and astronauts have found the roots of innovation and inspiration in the novels of Jules Verne. Far more than a science fiction writer Verne is the perfect engineer taking science to its ultimate application. *Paris au XXIème siècle* (*Paris in the Twentieth Century*) – written in 1863 but not published until 1994 – is set in the distant 1960s and contains some of his most accurate prognostications: elevated trains, automobiles, facsimile machines, and computer-like banking machines. He took the infant science of electricity and rudimental principles to foresee the telegraph, telephones, radio, electric vehicles, urban lighting, and storage batteries. Without a firm footing in science, he could not have envisioned these futuristic inventions. Verne's science fiction is not that of H. G. Wells or most writers of today. Verne is a literary engineer and understands that romance is the basis of engineering. Verne's combination of science and romance played a big part in the technological renaissance of the 1950s and '60s. More recently, new translations have added back Verne's science. Writers are again looking at the idea of scientific romance and graphic novels are again awaking the world's youth [50]. Verne's novels achieved remarkable international success, and he became a legend in his own time. His major works, which were adapted for film many times, remained popular into the 21st century, and the "scientific romance" became a permanent fixture of Western popular entertainment.

Although at first glance a seemingly incongruous element in novels geared toward adventure and scientific discovery, *the persistent presence of the library in these texts must first be understood as an emblem of their overall pedagogical intent*. Each such a library serves as a recurring mise-en-abyme reminder of the original social function.

Jules Verne could be a member of geographical, technical, physical, mathematical and many other societies. He loved science and understood it. His works were always based on verified technical calculations. J. Verne often did not leave the library for days on end; he had a huge card index (including over 20 thousand notebooks), the material of which was drawn from books of a wide variety of scientific content. He received a lot of information from his friends, among whom were specialists in various fields of knowledge.

“The sea is eternal movement and love”! It should be noted that the “sea library” of the great novelist consists of unsurpassed creations that were created under the influence of the feelings experienced while traveling under sail. The sailing ship “Saint Michel 2”, and later “Saint Michel 3”, became the “heavenly patron” and “floating office” of the writer. For many years, the writer spent six months a year on a yacht, where he wrote such works as “The Floating City,” “The Land of Furs,” “The Mysterious Island” and, of course, “Twenty Thousand Leagues Under the Sea”.

The expressed goal of the collection, as outlined by Verne’s publisher Pierre-Jules Hetzel, was to: resumer toutes les connaissances geografiques, geologiques, physiques, et astronomiques amasees par la science moderne...’: to be pragmatically educational on the one hand, fictionally entertaining on the other. Or, like Hetzel later goes on to say, “l’instruction que amuse, l’amusement qui instruit!” (the instruction that entertains, the amusement that instructs) (by Arthur B. Evans. *The Extraordinary Libraries of Jules*).



The phenomenon of Jules Verne lies in his powerful influence on the development of world science fiction. He invented a new type of novel – a novel about science and its limitless possibilities and found followers in all countries. The writer discovered the poetry of science and scientific creativity for literature, brought to perfection the artistic form of the adventure novel, enriching it with new content and subordinating it to scientific and educational purposes. But the main secret of his work is his talent as a novelist - a master

of adventure intrigue, who was the first to introduce a new positive hero into literature – a selfless scientist who embodies the traits of a man of the future, ready to accomplish any feat and make any sacrifices in the name of his creative dream! Jules Verne’s faith in human capabilities was limitless: “Everything that a person can imagine, other people can accomplish.”

Verne used his family connections to make an entrance into Paris society. His uncle Francisque de Châteaubourg introduced him into literary salons, and Verne particularly frequented those of Mme de Barrère, a friend of his mother’s. Thanks to his visits to (literature) salons, Verne came into contact in 1849 with Alexandre Dumas through the mutual acquaintance of a celebrated chirologist of the time, the Chevalier d’Arpentigny. Verne became close friends with Dumas’ son, Alexandre Dumas fils, and showed him a manuscript for a stage comedy, *Les Pailles rompues* (The Broken Straws). The two young men revised the play together, and Dumas, through arrangements with his father, had it produced by the Opéra-National at the Théâtre Historique in Paris, opening on 12 June 1850. While continuing his law studies, he fed his passion for the theater, writing numerous plays. Verne later recalled: “I was greatly under the influence of Victor Hugo (sometimes nicknamed the Ocean Man), indeed, very excited by reading and re-reading his works... At that time I could have recited by heart whole pages of *Notre Dame de Paris*, but it was his dramatic work that most influenced me.” In the 2010s, he was the most translated French author in the world. In France, 2005 was declared “Jules Verne Year” on the occasion of the centenary of the memory to the writer» [33]. On his grave there is a monument with a laconic inscription: “To immortality and eternal youth.”

Jules Verne is considered to be an important author in France and most of Europe, where he has had a wide influence on the literary avant-garde and on surrealism. Verne has been the second most-translated author in the world since 1979, ranking below Agatha Christie and above William Shakespeare. He has sometimes been called the “father of science fiction”, a title that has also been given to H. G. Wells and Hugo Gernsback.

Both French and American consciousness regard Jules Verne as a popular writer of “hard” science fiction, being nearly prophetic in his depiction of scientific advancements. However, Verne himself has described this seeming precognition as “pure and simple coincidence” due to his accurate depictions of simple scientific processes. Verne does not depict science as positive or negative, but simply uses science as a hook on which to hang adventure. In the same way that Verne used science as a “hook” to tell stories of adventure, Verne used exploration as the setting to tell stories of humans influencing their environment and rather to show how scientific ideas can grow in complexity and influence society in unpredictable ways [32], but it is precisely this Vernian description that provides the basis for the definition of science fiction. From the Aurora Prize acceptance speech in Calgary (Alberta), let’s quote Alexander von Thorne: “Science fiction (sometimes shortened to SF or sci-fi) is a genre of speculative fiction, which typically deals with imaginative and futuristic concepts such as advanced

science and technology, space exploration, time travel, parallel universes, and extraterrestrial life. It is related to fantasy, horror, and superhero fiction and contains many subgenres. Its exact definition has long been disputed among authors, critics, scholars, and readers. Science fiction, in literature, film, television, and other media, has become popular and influential over much of the world. It has been called the “*literature of ideas*”/ *littérature d'idées*, and has sometimes been described as an exploration of the potential consequences of scientific, social, and technological innovations” and we can add to inspire a “sense of wonder”, that what Verne described himself, speaking about his novels.

Moreover, it is fair to note that in every Verne novel there is such an image of a scientist – such a popularizer of science, who explains a lot in the course of the novel’s actions, who makes the events in the novel useful and exciting, and besides, Verne is most successful in these portraits of people of science, thanks to why Jules Verne entered literature with a novel of a new type, making science his muse! Science, which endowed man with power and helped him penetrate the secrets of nature. The writer found an ideal fusion of science and literature, closely related to knowledge !



What are the heroes of J. Verne’s novels like? This space is inhabited by extraordinary people, among whom are fanatics obsessed with the idea of discovery (Captains Hatteras and Grant, Dr. Samuel Fergusson, the misanthrope Nemo), noble, courageous sailors (fifteen-year-old captains Dick Sand and John Mangle, Pencroft), faithful servants (Conseilles, Nab, Joe), and, of course, eccentric scientists like the geographer Paganel, Professor Aronnax, and the entomologist Benedict.



Among the descriptions of scientists, we note one: a 40-year-old man, a famous geographer, who has many scientific titles and is a member of many scientific societies, whose full name is Jacques Eliacin François Marie Paganel, who became the prototype of the literary type of the “scientific eccentric.” The scientist appeared on board the Duncan under very amusing circumstances, having boarded the

wrong ship, again thanks to his absent-mindedness. But Paganel decided to trust fate and set off with the rest of the Duncan passengers on an exciting, adventurous sea voyage with the following thoughts:

«Oh sea, sea! - repeated Paganel. – What would happen to humanity if the seas did not exist? The ship is a real chariot of civilization! Think, my friends, if the globe were a huge continent, then even in the nineteenth century we would not have known even a thousandth part of it. Take a look at what is happening in the depths of the vast continents. Man barely dares to penetrate the Siberian taiga, the plains of Central Asia, the deserts of Africa, the prairies of America, the vast steppes of Australia, the icy deserts of the poles... The brave retreat, the brave perish. These spaces are impassable and the means of communication are insufficient. The heat, disease, and wildness of the natives create insurmountable obstacles. Twenty miles of desert separate people from each other more than five hundred miles of ocean! People living on opposite coasts consider themselves neighbors, and they are alien to each other if they are separated by some forest... Nowadays, it is easier to cross the sea than any Sahara, and only thanks to the sea, as one American scientist correctly said, between five kinship ties have been established in parts of the world».

Plot of the chapter 2. Personalities: Albert 1's contribution to the development of oceanography.

- Heavy clouds and occasional rain are expected in the Canary Islands. In the northern part of the peninsula, temperatures will drop significantly. While in the southernmost regions they will increase. A strong north wind will blow on the coast of Cantabria and the Canary Islands. The forecast for Sunday indicates that prevailing anticyclonic conditions will continue across the peninsula and Balearic Islands, with showers gradually easing in the Canary Islands, bringing clearer skies (from the weather forecast).

The ocean has always attracted people. The endless expanse of water served as a wide road to unexplored shores, supplied people with fish and seafood, and inspired panic during storms. Already in ancient times, people whose activities were associated with navigation and fishing paid attention to the nature of the ocean and the phenomena occurring in it. Gradually, the foundations of an independent science began to form, the object of study of which was the World Ocean. This science, which was primarily descriptive in nature during its inception, became known as oceanography. **Oceanography** (Greek Ὠκεανός, "Ocean", god of the sea and γράφειν/graphein "record") is a scientific discipline, a part of the Earth sciences, devoted to the study of seas and oceans. Oceanographers study a large number of aspects of oceans and seas, including plate tectonics, basic biogeochemical cycles, ocean currents, marine organisms and ecosystems, and connections between oceans and climate change. Oceanography is holistic in the sense that the ocean influences climate, and that it, in turn, is influenced by terrestrial ecosystems. One of the first books on oceanography was the work of the Italian Luigi Marsiglia, "Physical History of the Sea," published in Amsterdam in 1725. One can assume that the nature of the ocean attracted the discoverers of the era of the Great Geographical Discoveries more than others! (wiki/Océanographie).

As in Verne's novels, in keeping of his "everything from the sea" theme, implying that knowledge is mined at the bottom of the ocean, with using deep love of science and technology, with a good dose of their potential



for human endeavor in action, the Oceanographic Institute was created as a public foundation by Prince Albert I of Monaco in 1906. Part of the Oceanographic Institute, which strives to share its knowledge of the oceans, is the Oceanographic Museum (Musée océanographique), a marine science museum in Monaco-Ville, Monaco. It was opened in 1910. In general, on the initiative of Prince Albert I, such scientific and humanitarian institutions were created as: the Oceanographic Institute with two branches (Oceanographic Museum in Monaco and the House of

Oceans in Paris); International Hydrographic Organization; International Peace Institute; Institute of Human Paleontology in Paris; Museum of Prehistoric Anthropology of Monaco; Science Center of Monaco; Multimedia Library of Monaco; princely foundations dedicated to preserving the oceans and planet for future generations [47].

In his speech about the ocean, Prince Albert I said: «The science of the sea enters this palace, where the architect placed the imprint of his brilliant plans, when I wanted to unite in one illuminates the two guiding forces of civilization: Art and Science. ... Here, gentlemen, you see, the Monegasque land has given rise to a temple proud and inviolable, dedicated to the new divinity which reigns over intelligences. I lent the strength of my brain, my conscience and my sovereignty to the extension of scientific truth, from the only terrain where mature the elements of a stable civilization, guaranteed against the inconstancy of laws humans. Soon the analysis of the facts recognized in the formation and movement of the world showed that the Ocean had played the main role in the chain of causes and effects to which the appearance of life is due. It was then that the study of water fascinated scientists, as also the growing crowd of those who understand the pleasures of knowledge, and who love to fight the fierce army of ignorance!... Gentlemen, I open the Oceanographic Museum of Monaco to bring it to service of scientific truth»[48].

A recognised public interest organisation, the foundation's purpose is to continue the scientific work begun by Prince Albert I. «All of the knowledge which he acquired about the sea enabled him to develop a genuine awareness of the environment, and to recognise the threats facing the ocean». Nicknamed the "Scholar Prince" or the "Navigator Prince", Albert I of Monaco was a rigorous scholar, an advocate for the sciences and an environmental awareness pioneer with a passion for the ocean [2].

Nickname “Prince of the Sea” Prince Albert I received for his incredible passion for exploring the depths of the world’s oceans, as we told before, for numerous expeditions, as well as for his enormous contribution to the development of oceanography. In total, he has 28 expeditions across the Atlantic Ocean and the Mediterranean Sea. His scientific campaigns were dedicated to the discovery of previously unknown currents and depths. The Prince traveled on his four exploration ships – Swallow, Princess Alice, Princess Alice II and Swallow II. The most dangerous journeys of the ruler of Monaco were definitely recognized as 4 polar expeditions (in 1898 and 1899). Albert I dreamed of becoming a conqueror of the Arctic since his childhood, when he enthusiastically read adventure stories and novels, where heroes went to the endless sea and conquered dangerous ice and peaks. And the prince made his dreams come true. He went on expeditions to Spitsbergen to study the local flora and fauna in more detail. In honor of his Arctic travels, the northwestern part of Spitsbergen was also named “Albert I’s Land”. He brought to Monaco from the polar snows memories for the museum, old photographs for a family album, in which the mustachioed Captain Albert I, squinting, looking into the snowy distance, and in his diary entries he notes: “I felt genuine happiness when I saw my through the eyes of the harsh melancholy of Arctic landscapes. In this place, the body and soul are tempered in majestic battle, the mind becomes serene and bright, as in the years of first youth.” Albert I’s heart always remained with the ocean! He sponsors more than 3,500 expeditions and the construction of research ships in Monaco. All these scientific discoveries of his were noticed by the world scientific community, and in 1909 Prince Albert I was elected a member of the British Academy of Sciences, and in 1921 he received an award - an honorary gold medal from the American Geographical Society, where he was called nothing less than “the learned prince.” Prince Albert I was also an ardent representative of peace. The ruler of Monaco in 1903 established the International Institute of Peace in the principality. We can safely say that this institution was a kind of forerunner of the League of Nations that arose later, and subsequently the United Nations. At least the goal of the Institute of Peace is identical to the UN – preserving and maintaining peace, as well as resolving conflict situations on an international scale. Albert I will forever remain in the memory of his descendants as a prince-explorer, prince-scientist, prince-reformer and prince-pacifist [49].



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The Prince’s scientific contributions were particularly decisive in three areas of oceanography: instrumentation, cartography and the dissemination



of knowledge. Results of scientific research carried out on his yacht by Albert I, Sovereign Prince of Monaco. Since 1889, one hundred and ten volumes have been published, printed in Monaco. The dissemination of oceanographic knowledge is the constant concern of the prince. He wanted his work to be known to a wider audience. He does this through publications, participation in numerous exhibitions and presentation of articles in French and foreign academies and scientific societies, at national and international congresses. The prince summed up his desire for the international

scientific community as follows: “And I founded the Oceanographic Institute, where scientists from all countries can work by joining forces. The laboratories with the museum are located in Monaco in a palace worthy of intellectual humanity; the center of dissemination necessary for this new culture is in Paris in the academic world.” A plaque was erected to honor Prince Albert I’s oceanographic work.

Plot of the chapter 3. From oceanography to climate changes in Cli-Fi.

A visionary, Prince Albert I predicted some of the ills affecting the ocean today, such as the overexploitation of resources caused by new technologies, represented at the time by steam trawlers. While controls over the Earth’s climate system have undergone rigorous hypothesis-testing since the 1800s, questions over the scientific consensus of the role of human activities in modern climate change continue to arise in public settings both before and now. Scientists in the 19th century such as Alexander von Humboldt began to foresee the effects of climate change. In the 1820s, Joseph Fourier proposed the greenhouse effect to explain why Earth’s temperature was higher than the sun’s energy alone could explain. Earth’s atmosphere is transparent to sunlight, so sunlight reaches the surface where it is converted to heat. However, the atmosphere is not transparent to heat radiating from the surface, and captures some of that heat, which in turn warms the planet. In 1856 Eunice Newton Foote demonstrated that the warming effect of the sun is greater for air with water vapour than for dry air, and that the effect is even greater with carbon dioxide (CO₂). She concluded that “An atmosphere of that gas would give to our earth a high temperature...” Starting in 1859, John Tyndall established that nitrogen and oxygen—together totaling 99% of dry air—are transparent to radiated heat. However, water vapour and gases such as methane and carbon dioxide absorb radiated heat and re-radiate that heat into the atmosphere. Tyndall proposed that changes in the concentrations of these gases may have caused climatic changes in the past, including ice ages. Svante Arrhenius noted that water vapour in air continuously varied, but the CO₂ concentration in air was influenced by long-term geological processes. Warming from increased CO₂ levels would increase the amount of water vapour, amplifying warming effects [13, 14].

As we have understood when scientific knowledge of the effects of fossil fuel consumption and resulting increase in atmospheric CO₂ concentrations entered the public and political arena as “global warming”, human-caused climate change entered works of fiction. Historically, there have been numerous literary works dealing with climate change in earlier times. Some scholars argue that Verne’s works prophesied climate change, with «The Purchase of the North Pole» (1889) discussing it as a consequence of the tilt of the earth. In his “*Paris in the Twentieth Century*”, written in 1883 and set during the 1960s, the eponymous city experiences a sudden drop in temperature, which lasts for three years. The book presents Paris in August 1960, 97 years in Verne’s future, when society places value only on business and technology. The work paints a grim, dystopian view of a technological civilization. The book’s description of the technology of 1960 is in some ways remarkably close to the actual technology of the 1960s. [8,53]. Also several of British writer J. G. Ballard’s famous dystopian works deal with climate-related disasters: In *The Wind from Nowhere* (1961), civilization is undermined by incessant hurricane winds, and *The Drowned World* (1962) depicts a future of melting ice caps and rising levels of sea caused by solar radiation. [37] In *The Burning World* (1964, later titled *The Drought*) – his climate catastrophe is caused by human activity, the drought due to disruption of the rainfall cycle by industrial pollution [41]. Frank Herbert’s 1965 science fiction novel *Dune*, set on a fictional desert planet, has been proposed as a pioneer of climate fiction for its themes of ecology and environmentalism [20].

Octavia E. Butler’s *Parable of the Sower* (1993) wrote the novel “thinking about the future, thinking about the things that we’re doing now and the kind of future we’re buying for ourselves, if we’re not careful... Right now we’ve got sea level rising, very slowly, but over the past couple of years according to satellite measurements it’s starting to rise faster, increased carbon dioxide over the past century or so, very strange weather—storminess, odd weather—we’ve got a lot of things that we would be expecting if global warming were a fact and not just something still very questionable, but I think it’s going to stay questionable until we can’t ignore or deny it any longer, because nobody really wants to do the kinds of things we would have to do to live with it” [10].

Margaret Atwood explored the subject in her dystopian trilogy *Oryx and Crake* (2003), *The Year of the Flood* (2009) and *MaddAddam* (2013). In *Oryx and Crake*, Atwood presents a world where “social inequality, genetic technology and catastrophic climate change, has finally culminated in some apocalyptic event” [45].

The author shows us the life of the Earth after the death of the ecosystem. The reader finds himself in a devastated world, where it seems that only one person is left alive, struggling to survive. The story Atwood tells is realistic, scary and educational. As the story progresses, the reader may notice details that hint at modern realities – the deteriorating environment, the corruption of politicians, the greed of corporations and the short-sightedness of ordinary people. These are just hints of how human history may end. Lauren Groff and her collection of short stories, *Florida*, are also worthy of



your attention. The book quietly, gradually touches on the topic of ecology, and the idea of the importance of caring for the environment arises only after reading sometimes difficult and disturbing stories. American writer Barbara Kingsolver's novel *Flight Behavior* makes the reader empathize with the story of the impact of global warming on monarch butterflies. Although the book seems to be about the familiar difficulties of life in the family and in everyday life. Paolo Bacigalupi's *The Water Knife* depicts a world in which sudden global climate change has made water a commodity. Water shortages are forcing some politicians to start playing games, dividing spheres of influence. Eric Brown's novel *Guardians of the Phoenix* has a similar idea. Nature has struck back at humanity. There is great dryness on Earth. The few survivors fight for water sources. A small team travels to Africa in hopes of finding such a source. Kim Stanley Robinson is sometimes called a science fiction genius obsessed with climate change. His series of three independent books called "Science in the capital" is united by the problem of environmental disasters and global warming of the planet. The action takes place in the near future, when global warming leads to massive melting of ice and a change in the Gulf Stream, which threatens the onset of a new Ice Age. Among the others prominent examples are Jeanette Winterson, British author J. G. Ballard, Cormac McCarthy, Ian McEwan, Jeanette Winterson [21, 22]. Thus potentially influential novels were those written by established authors whose reputations guaranteed a wide readership. This conclusion was supported by a survey question asking respondents how they came to read the book they selected: for example, twelve of the fourteen readers who chose to answer questions about Barbara Kingsolver's *Flight Behavior* purchased it partially because they had read and presumably enjoyed Kingsolver's previous books. Books of this genre raise the problems of absolute freedom and impunity of man before nature and before himself, and they highlight current environmental problems of our planet, which in the future may cause destructive cataclysms.

Table 1. How respondents came to read the book of climate fiction they selected for survey response

"How did you come to read this book? Please select all that apply."	Percentage of Respondents
"It was recommended to me"	44.1
"I enjoy books like this"	35.4
"I've read other books by this author"	27.3
"I read a positive review"	26.7
"As part of a reading group"	6.2
"It was assigned for a class"	2.5
"Other"	3.1

Despite the sway of literary reputation, table 1 reveals that critical acclaim and positive reader experiences also play an important role in the spread of climate fiction. Of respondents, 44.1 percent read the selected work as a result of a personal recommendation, while 26.7 percent had read a positive review. Only 2.5 percent of respondents read a work of climate fiction because it was assigned for a class [51].

There is going without saying, that science fiction works often include society's response to climate change in a way that no statistical calculations from scientists can work as effectively as a good book! The authors come up with different stories, create amazing worlds, but the key question remains the same: "What awaits us in the future if we do not find the strength to weaken our destructive influence on the planet?" That is why, in recent years, a genre of literature known as Climate Fiction (cli-fi) has become increasingly popular around the world. Climate fiction (sometimes abbreviated as cli-fi) is literature that deals with climate change and global warming [25, 9]. It is a subgenre of science fiction based on theoretically possible or already existing technologies and scientific achievements of mankind. Not necessarily speculative in nature, works may take place in the world as we know it or in the near future. Unlike classic science fiction, the action of books in the cli-fi genre does not take place in space or parallel worlds, but here on Earth. University courses in literature and environmental issues may include fiction about climate change in their curriculum [46]. This body of literature has been discussed in various publications, including *The New York Times*, *The Guardian*, and *Dissent* magazine, among other international media [55.] Climate Fiction is truly interesting and smart literature that helps you develop and look at the world in a new way!

Who reads climate fiction? This is a consequential question. While literary criticism often implies the existence of an average reader who interprets a text or genre in a way that is consistent with the analysis of a professional reader and critic, empirical research shows that readers often experience literature very differently. This experience might be influenced by demographic and socioeconomic factors but it might also be shaped by factors such as familiarity with specific narrative forms, taste, or life experiences that create a strong identification with a focal character or resonance with a major theme. For some works and genres, political beliefs, ecological identities, and strong attitudes about relevant subjects are also salient. To speak with any confidence about how climate fiction is influencing its readers, it is useful to know who they are. For a work of fiction to have influence it needs to reach readers, and thus information about readership is valuable. As a result of the proprietary nature of book sales data, there is little information available about the popularity of different works of environmental literature. Critical assessments of which novels are most "important" or "significant" may not reflect their actual readership. In this case, however, there seems to be a correlation between scholarly attention and general popularity. As climatologist Judith Curry stated in 2013, while "scientists and other people are trying to get their message across about

various aspects of the climate change issue . . . fiction is an untapped way of doing this – a way of smuggling some serious topics into the consciousness of readers”. Academics and critics study the potential impact of fiction on the broader field of climate change communication. A survey of readers found, that readers of climate fiction “are younger, more liberal, and more concerned about climate change than nonreaders”, and that climate fiction “reminds concerned readers of the severity of climate change while impelling them to imagine environmental futures and consider the impact of climate change on human and nonhuman life. However, the actions that resulted from readers’ heightened consciousness reveal that awareness is only as valuable as the cultural messages about possible actions to take that are in circulation. Moreover, the responses of some readers suggest that works of climate fiction might lead some people to associate climate change with intensely negative emotions, which could prove counterproductive to efforts at environmental engagement or persuasion” [51].

The term “cli-fi” is generally credited to freelance news reporter and climate activist Dan Bloom in 2007 or 2008, who wrote “ one very important thing we can do about climate change is to encourage more and more novelists to write cli-fi novels and cli-fi movie scripts... to nurture these authors and... this rising new literary genre [14]. Zen-like playfulness of reading fictions, prepare us for entering the knowledges like reading poetry helps to enter a state of mindfulness and intentionality, which is so necessary for the exhausting thrilling scientist’s work. Fiction is one of the best ways to inspire passion, empathy and action in readers. Our works raise awareness of climate change, and encourage action at the individual, corporate and government levels. “A body of writers working for a common cause cannot fail to influence public opinion.” – Women Writers Suffrage League, 1908.

Climate change is causing a range of increasing impacts on the environment. Deserts are expanding, while heat waves and wildfires are becoming more common. Amplified warming in the Arctic has contributed to melting permafrost, glacial retreat and sea ice loss. Higher temperatures are also causing more intense storms, droughts, and other weather extremes. Rapid environmental change in mountains, coral reefs, and the Arctic is forcing many species to relocate or become extinct. Even if efforts to minimize future warming are successful, some effects will continue for centuries. These include ocean heating, ocean acidification and sea level rise [5].

Ocean acidification, bleaching coral reefs, melting permafrost, melting glaciers, the melting of the Greenland ice sheet, the sixth great mass extinction...the ecological impacts of climate change are everywhere proliferating and worsening. Not just the impacts, but the causes of climate change too are ubiquitous. In the 1980s, the terms global warming and climate change became more common. Though the two terms are sometimes used interchangeably, [52] scientifically, global warming refers only to increased surface warming, while climate change describes the totality of changes to Earth’s climate system [17].

True to its mission, the Oceanographic Institute (Foundation of Albert I) has been providing its audience with reports since 2011 to promote knowledge and ocean protection. According to the materials of the Oceanographic Institute (Monaco), Anny Cazenave (Observatoire Midi-Pyrénées, Toulouse, Membre du Conseil scientifique de l'Institut océanographique, Fondation Albert Ier, Prince de Monaco) in her article "L'océan et le climat" concluded, that ocean currents transport heat from one region to another, and from the surface to the deep ocean at slow speeds, therefore on long time scales in comparison of atmospheric transport. It is for this reason that the ocean plays a major role in thermal regulator of the climate system [40]. Professor Andre Jordan (Genève university) in his publication of the Oceanographic Institute (Monaco) accented why it is necessary to engage in scientific mediation on the oceans and seas in such way: Since its creation in 1906, the Oceanographic Institute, Fondation Albert Ier, Prince of Monaco, gave himself such a mission to introduce as many people as possible to the ocean and oceanographic sciences through museum activities, educational cycles, aquariums, publications, libraries, teachings and conferences for the general public. It is in these terms that Prince Albert Ier of Monaco discusses the reasons which pushed him to found the two establishments "So I wanted to fill a gap, by creating myself and establishing a center in Paris of oceanographic studies closely linked to the Museum's laboratories and collections oceanographic of Monaco, where I have been bringing together the results of my work for twenty years personal and those of the eminent collaborators who came to me from all the countries of Europe". This approach is shared in addition to conferences and various museum activities, through meetings of the partners (Monaco Blue initiative), commitments or through temporary exhibitions on current issues: "The Mediterranean, splendid, alive, fragile". Nothing is lost yet, but much remains to be done! The battle is on now! » [6]. In summary we can remain, that the ocean covers approximately three-quarters of the globe and plays an essential role in sustaining life on the planet Earth. Its waters help regulate the planet's chemistry and climate and are home to more than 2 million of species, many of which have yet to be discovered. On this rich biodiversity rely notably fisheries which feed more than 4 billion people. Currents carry millions of tons of plastics and other debris from the coasts out to sea, where this waste harms marine life and modifies the functioning of ecosystems. The increase in the level of carbon dioxide in the atmosphere has several consequences, notably the rise in temperatures and the increasingly pronounced acidification of the ocean, which further aggravates the stress suffered by marine ecosystems [31,39].

Ecosystems can serve as natural buffers from extreme events such as wildfires, flooding, and drought. Climate change and human modification may restrict ecosystems' ability to temper the impacts of extreme conditions, and thus may increase vulnerability to damage. Examples include reefs and barrier islands that protect coastal ecosystems from storm surges, wetland ecosystems that absorb floodwaters, and cyclical wildfires that clear excess forest debris and reduce the risk of dangerously large fires [27].

Similarly, when coral reefs become stressed from increased ocean temperatures, they expel microorganisms that live within their tissues and are essential to their health. This is known as coral bleaching. As ocean temperatures warm and the acidity of the ocean increases, bleaching and coral die-offs are likely to become more frequent. Chronically stressed coral reefs are less likely to recover [26, 36].



Part 4. What is it ‘Precious corals’?

Various institutions involved in the study and protection of the oceans (Oceanographic Institute, Scientific Center of Monaco /Centre Scientifique de Monaco, Research Monaco and Prince Albert II Foundation,) have joined forces to raise public awareness and act in favor of the survival of coral reefs. Centre Scientifique de Monaco and the Oceanographic Museum decided to create the World Coral Conservatory to preserve the varieties of the many species of corals in aquariums before restoring them in devastated areas. What is it ‘Precious corals’? The answer to this question is given by the director of the Scientific Center of Monaco, professor Denis ALLEMAND, who compares the Mediterranean red coral with “Red Gold” or “Blood of Christ”. The term “precious coral” refers to marine animal organisms. These animals belong to the phylum Cnidaria, which also includes jellyfish, sea anemones, gorgonians, reef-building corals...The most charismatic: Mediterranean red coral is used since prehistoric times,



red coral has continued to be the subject of significant trade, even like the currency exchange with northern amber [4]. What is the role of corals? Coral reefs play an important ecological role. Often in waters not rich in phytoplankton, the source of the marine food chain, they offer real oases of life in the middle of the oceanic desert. In addition, they also provide an ideal natural barrier against cyclones, storms and erosion as they absorb the force of the waves.

For fish and other marine animals, corals are a true refuge from predators, as well as a breeding ground and nursery for many species. These are the basics of marine life in the tropics [18]. Coral reefs provide direct livelihoods for 500 million people worldwide through fishing, and reefs protect coastlines more effectively than any human structure against waves and tsunamis.

Recently, Environmental Economy expert Dr. Nathalie Hilmi (responsible for Environmental Economy at the Monaco Scientific Centre), was invited to an Organisation for Economic Cooperation and Development (OECD) meeting, who participated in a meeting of the Fisheries Committee of the OECD. This organization had scheduled a workshop on climate change issues for fishing sector management from November 20 to 23, 2023 in Paris. The idea was to discuss what climate change means in terms of public policies, both to adapt to it and to help the sector reduce emissions. Dr Hilmi has been invited by the OECD to chair a workshop on issues at the intersection of fisheries policy making and climate change. The first part of the workshop focused on the adaptation of fisheries to climate change and the second part on mitigating the impact of fisheries on climate change. Nathalie Hilmi also presented the state of Mediterranean fisheries, the impact of climate change and other stress factors and pointed out gaps in knowledge on the subject and data that is still missing. She discussed with representatives of the 40 delegations to understand their specific problems for inclusion in future researches [19].

In the Centre Scientifique de Monaco (Department of Marine Biology) not only carry out basic marine biology research, for example on the biomineralisation of tropical corals, but also study highly topical environmental problems such as ocean acidification or the chemical pollution of coral reefs. They are planning experiments on how to illuminate demanding coral species with JBL LED lamps, which do not work with extremely high Kelvin values, but simulate the natural sunlight above the reef top at shallow depths very well. And that's where about 98 % of all corals for aquaristics come from! Since its foundation, the CSM has developed activities in marine biology and supported the action of governmental and international organizations in charge of protecting and preserving marine life.

“The coral ecosystem could be the first to disappear, from the face of the Earth, because of humans,” says professor Denis Allemand in his interview, “so it was important to us to study the capacity of coral reefs to adapt. We were able to identify some elements of adaptation amongst these organisms thanks to the breadth of the samples and data collected. There are those who have suffered from the phenomenon of rising temperatures, but have changed part of their microbiome and have been able to adapt, some more easily than others, which we must take as a positive. This adaptation could prevent the total destruction of coral reefs in the future.” Many fish, as well as higher predators, focus on seamounts, but intensive exploitation of fish, shells and corals has caused overexploitation and destruction of certain stocks, and the destruction or reduction of wildlife. A temperature rise of 1 °C in just a few weeks can cause coral bleaching, while a change in pH can severely limit coral

growth and affect the ability of animals living in and around them to grow their skeletons and ultimately survive. Corals across the Pacific are already struggling with climate change. The biggest threats facing them today are rising temperatures and ocean acidification, along with pollution, overfishing, coastal development and subsequent sedimentation. “To enlarge the human perspective, to build on knowledge for future generations, to identify dangers, and to chart the course to a better world: If these are the goals of the explorer, then everyone – voyager, scientist and citizen, parent and child – is engaged in humanity’s momentous expedition.” – Jacques-Yves Cousteau.

CSM’S Denis Allemand speaks on ambitious project to study coral reefs and the impact of climate change: «Thanks to the ambitious TARA Pacific Expedition (began in 2016), co-led by the Centre Scientifique de Monaco’s professor Denis Allemand, 70 scientists from eight countries and representing 23 institutions and research laboratories spent time onboard! “This was a highly ambitious project,” says professor Allemand. “Two and a half years of sailing that crossed the Pacific Ocean, 58,000 samples taken... Almost the whole Centre Scientifique de Monaco team was involved... A brand new technique had to be developed to achieve the project.” Figures already released by the project show that 20% of reefs have been destroyed and show no signs of possible reconstruction, 15% of reefs will be in great danger in the next 10 to 20 years, and a further 20% of reefs will be threatened in the next 20 to 40 years. Just 25% of those observed appear to be in good health» [11].

The Scientific Centre of Monaco (CSM) is a Monegasque public establishment founded by Prince Rainier III en 1960 to provide the Principality of Monaco with the means to conduct scientific research. The missions of the CSM are:

- The development of knowledge in all areas of Science, particularly those that are in accordance with the scientific traditions set up by the Princes of Monaco.
- Dissemination of information and scientific and technical knowledge.
- Scientific training and research management.
- Scientific expertise

Since 2009, the CSM is also developing biomedical research activities which are:

- Encouraging the Principality’s medical community to develop Clinical Research Activities through CMS funding of a call for tender involving all Principality healthcare establishments.
- The creation of an INSERM & CNRS labeled transnational research laboratory in partnership with the University of Nice Sophia Antipolis themed on “Cancer and aging” [29].

To better understand the world’s ocean experts, the scientists from the Oceanographic Institute provide schematic representations of ocean protection classifications with corresponding subtopics:

1. “Man and the Ocean” includes:
 - Marine resources
 - Environmental risk

- Ocean Pollution
 - Law of the sea, maritime law, maritime conventions and international organizations
 - Collaborative science, mediation
 - Scientific innovation and new technologies
 - Art and Science
2. Functioning of the ocean:
- Geosciences
 - Chemistry of sea water
 - Biogeochemistry
 - Climate, ocean-atmosphere interactions, ocean dynamics
3. Marine biodiversity:
- Biodiversity Study
 - Biological diversity, the emergence of Life
 - Current threats to marine biodiversity
 - Protecting Biodiversity [28].

Part 5. Discover the richness of life on the Great Barrier Reef with the Oceanographic Museum of Monaco!



The Oceanographic Museum of Monaco offers a virtual and interactive dive on the Great Barrier Reef, an introduction to the symbolic species that inhabit it and the megafauna. The incredible biodiversity unfolds before your eyes, nestled in the heart of one of the 7 natural wonders of the world, the Great Barrier Reef, the largest coral ecosystem on the planet. Discover the richness of life on the Great Barrier Reef! A monumental jewel designed by a visionary Prince, the Museum offers a variety of spaces with an incomparable visiting experience: with an aquarium renowned throughout the world with more than 6,000 residents from the marine world, from the Mediterranean to the tropics, and spaces combining exploration tools and natural history specimens, antique objects and event exhibitions, the Museum invites you to travel and discover. This visit is now completed by a brand new tour, the Sea Turtle Odyssey, partly in the open air, as well as a room dedicated to the Principality's major orientations on the ocean:

Monaco and the Ocean, a state-of-the-art digital and interactive space [28]. In addition, it is necessary to say, that complete sensory immersion of the ocean evokes calm and present state of mind. It fosters a mind-body connection that reduces stress and helps you relax. The ocean is intrinsic to our well being and all life on Earth (Cody Roberts, art photographer and videographer, Maui).

The idea of being immersed in nature to improve health and wellbeing is not a new one. The sea has long enchanted human kind – perhaps through its unexplored mystery, awesome power and continual ability to provide useful resources. To spent silently ‘reconnecting with the ocean’, highlighte the enormous healing powers of the sea, that is what recommended by journalist Naomi Tolley (magazine «Positive news»). «The ocean can not only heal cuts with salt, but it has the ability to induce a psychological state of calm and contentment. It can literally wash away the pain», she added. In 1901, naturalist John Muir wrote how: “Thousands of tired, nerve-shaken, over-civilised people are beginning to find that going to the mountains is going home; the wildness is a necessity; that mountain parks and reservations are useful not only as fountains of timber and irrigating rivers, but as fountains of life.” Even before then, the Greeks had evolved a healing therapy called the ‘water cure’. This was made up of a number of therapies, including hydrotherapy. “The basic premise of ocean therapy is nature immersion therapy but there is a lot of depth to the research conducted on humans’ internal desire to move towards water, which appears to be much more than merely being in nature”. “Ocean Therapy is a combination of programmes that are all ocean-centric and chosen to create balance through fostering the mind-body connection,” explains author. And listening and feeling the ocean’s energy, forming a connection with the sea through the power of visualisation through beach meditation and yoga forms is another part of the ocean therapy programme. And it seems to be the perfect way to relax the mind and reduce the stress! With regards to working with individuals with mental health issues or physical disabilities, what is most important is that the ocean is a great leveller, because for all of us we are at the mercy of the ocean, none of us can control it. The ocean provides perspective in a way that nothing else in nature therapy can. It is constantly changing and shifting right before your eyes, which is engaging from both a physical and psychological perspective. It forces us to learn to quickly adapt and take in new information as the environment changes before us [43].

Nowadays, the benefits of the Ocean and other scenes of nature are becoming clearer. We are beginning to realise that not only does the Ocean provide food, a home and inspiration; it also provides us with improved wellbeing, too. Research conducted at the centre of Ocean excellence, the National Marine Aquarium in Plymouth, over the past decade by Dr Deborah Cracknell showed that watching an aquarium exhibit calms you down as well as significantly reducing your heart rate. The restorative effect of nature can even be felt by looking at photos or having class of ocean art-therapy with

natural views out of windows; studies show that patients recover faster and better if they have a view of trees outside their windows.

Currently, art therapy is seen as a very plastic, constantly developing direction of psychotherapy. The main goal of art therapy is defined as the harmonization of the client's internal state, that is, the restoration of the person's ability to find the optimal equilibrium state conducive to active continuation of life. Art-therapy in the literal sense of the term means treatment through the visual arts. Art-therapeutic work in most cases evokes positive emotions in people, helps to overcome apathy and lack of initiative, and form a more active life position. The Ocean and our relationship to it has featured in artwork since 12,000 BCE. The Ancient Egyptians were also heavily inspired by the Ocean; depictions of people hunting birds from boats can be found in decorations within Egyptian tombs. The Ancient Greeks were equally enthralled by it, and painted ships and mythical creatures on vases to tell stories as early as the 1st century BCE. This restorative effect of the Ocean goes hand in hand with the benefits of art and creativity. In 2017, a report called "Creative Health: The Arts for Health and Wellbeing" detailed the health benefits of engaging in the arts, whether it be drama, painting, music or a mixture of everything. The key messages of the report are:

- The arts can keep us well, aid recovery and support longer lives better lived.
- The arts can help meet major challenges facing health and social care.
- The arts can save money in health services and social care [16].

Feeling overwhelmed with life? Explore the world of the best adult colouring books to soothe your mind with the mental health benefits of art therapy. Are coloring books good for mental health? Despite the fact that coloring and art therapy aren't quite the same thing, coloring does offer a slew of mental benefits. "Coloring definitely has therapeutic potential to reduce anxiety, create focus or bring more mindfulness". Art therapy is more than just a pastime. It is actually a powerful tool for improving mental health. Engaging in art activities such as colouring, can reduce stress, anxiety, and even symptoms of depression. It can provide a sense of accomplishment, boosts self-esteem, and promotes mindfulness by helping you focus on the present moment. It's time to embark on your artistic journey to calmness and creativity. Let the colours flow, and the stress melt away, one stroke at a time.

In recent years, the trend of 'Adult colouring books' has developed and our understanding of the benefits of colouring as adults has improved. There's growing evidence that replacing looking at electronics with colouring can help adults get a better night sleep, as well as helping them to concentrate their minds as much as meditation. Colouring is also considered to be a great way for adults to relax and reduce levels of stress, providing escapism from our busy lives. There are practical applications for colouring too: colouring has been used to ease people living with post-traumatic stress disorder onto more challenging art therapy. The low cost of materials also

makes colouring a very accessible form of relaxation that can be enjoyed by all who partake, it is generally considered to be more effective to colour in a pre-drawn picture than drawing alone. All in all, using the Ocean to get creative is the perfect combination. Whether it's taking photos of fish in an aquarium, painting Ocean landscapes, colouring in art books or just capturing a moment of peace looking out of your window, the Ocean can provide many benefits to all [16].

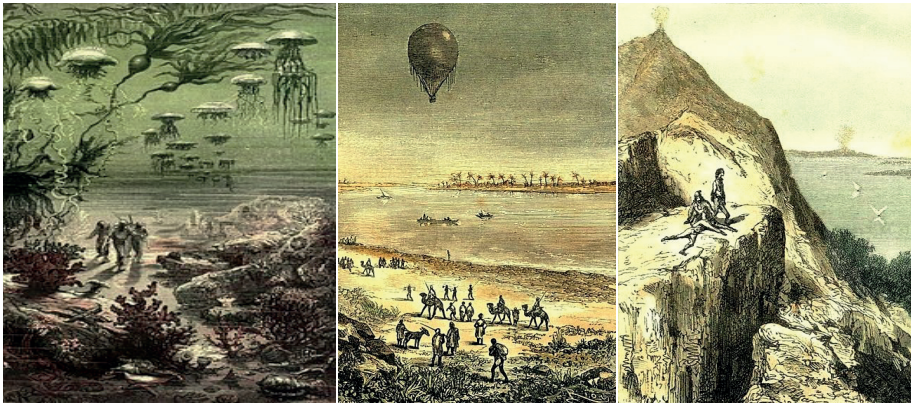


Vernian criticism has virtually ignored the crucial role played by the illustrations, evoking that sense of faraway exoticism and futuristic awe which the original readers once experienced in Verne's oeuvre, but not we are. Consider the following amazing statistic: there were over four thousand illustrations in Jules Verne's *Voyages Extraordinaires* – an average of 60+ illustrations per novel, one for every 6-8 pages of text. The places visited by the protagonists and are normally more panoramic and postcard-like – e.g., the many exotic locales, unusual sights, and flora and fauna which the heroes encounter during their journey, like the one from *Vingt mille lieues sous les mers* [20,000 Leagues Under the Sea] depicting divers walking on the ocean floor. As Georges Borgeaud has described it: "It is not the text which defines the illustration, but the illustration which defines the text and which transports the reader beyond...it is a catalyst to dream." Each illustration not only condenses and concretizes into one image many separate segments of the text (presented linearly), but it also adds another layer of rich meaning to them, deepening the narrative's associative and intertextual effect on the reader. In his study of Verne's illustrations, for example, Daniel Compère has observed: This commentary via illustration establishes a dialectic between the real and the imagined. The illustrations strengthen the verisimilitude of the Vernian text and their realism acts as a kind of guarantor of veracity. But they also add a dimension...of illusion [7].

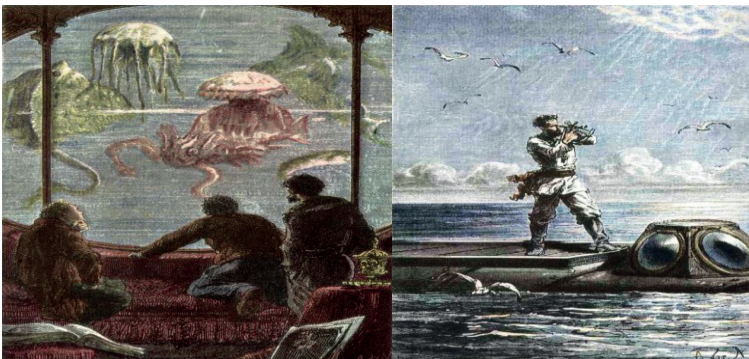
Jules Verne's interest in science and the themes he touches on in his stories, which are decades ahead of his time – journeys to the underwater depths, the natural environment – make him the author of "premonitions". Illustrators who collaborated with his stories – Alphonse de Neuville, Édouard Riou (it also must be mentioned illustrated by him the novels by A. Dumas "The Count of Monte Cristo", W. Scott "Ivanhoe", V. Hugo "Notre Dame Cathedral"), Leon Bennett (illustrated most of J. Verne's novels), Alexandre-

Georges Roux (22 illustrated Jules Verne's books), Jules Ferat, who created to him reputation of the romanist of the "premonitions".

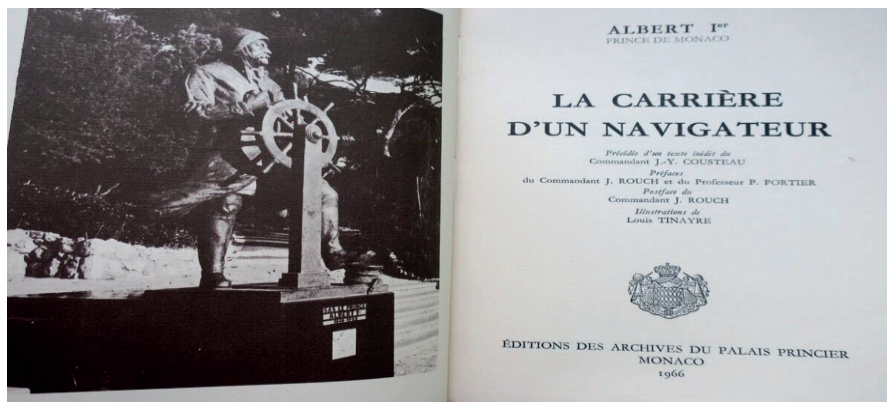
Here we offer you illustrations of the following extraordinary journeys: Twenty Thousand Leagues Under the Water, Five Weeks in a Balloon, Around the World in Eighty Days, Mysterious Island, Journey to the Center of the Earth.



One of the best works of the talented French writer Jules Verne can rightly be called the book "20 thousand leagues under the water", which is also probably the most famous novel in the science fiction genre. Exciting trips to the most unusual places, like on our planet: sea depths, the bowels of the earth. The book "20,000 leagues under water" first saw the light in 1870, and the accuracy with which Jules Verne described his inventions would be envied by more than one scientist. Not everyone knows, that a nautical mile is equal to 5555 meters. New messages from the French frigate "Normandy" and a detailed report of a mostly scientific nature quite surprised the imagination of every thoughtful reader. Jules Verne convincingly relies on serious scientific articles of the journals of the Geographical Institute, on scientific notes of solid French and foreign newspapers, on the Royal Academy of Sciences. Fantasy, full of adventure and danger, excites as always, tying thoughts to the sea and the seabed. Twenty thousand leagues under the sea is like plunging into the enchanting and dangerous world of the ocean depths, history through the eyes of a navigator...



“I write these first lines while crossing the waters of Spain where my naval career began... But the Ocean, similar to the hearts of men, closes the folds under other palpitations of its surface. I write while the undulating sheet reflects the columns of Hercules among the sails gathered from all corners of the world on a current tinged with azure; and Gibraltar appears, in the freshness of the morning, like a gateway to Europe which opens to the radiance of the rising sun. Thus hope sometimes awaits men at the bend of a road, to announce to them happy days... Here I expose the emotions of a navigator matured in the culture of truth; the fruit of impassive resolutions: a work advised by the scientific and upright spirit which brings people together in the legitimate conquest of well-being and morality... ”, where written in major work of Albert I of Monaco «The Career of a Navigator», whose first edition dates back to 1902. It traces the prince’s first campaigns, between 1885 and 1898, in the Azores and Madeira, as well as the first of four campaigns off the coast of Norway, in Spitsbergen, in 1898. Initially published in serial form in magazines, the chapters, under the encouragement from the prince’s entourage, who recognized his literary qualities, were brought together in a single book in 1902. The prince, more accustomed to scientific publications, revealed a real pen in it. The work will go through numerous reissues, notably that of 1913-1914, illustrated by Louis Tinayre, that of 1966 by Editions des Archives du Palais in 2022, by the Oceanographic Institute [3]. Albert I Navigator.



Part 6. «Mathurin Méheut, marine biodiversity artist and others». The maritime imagination captured not only writers, scientists, but also many others artists. Inspired by the reality of the marine world and its biodiversity, Mathurin Méheut was able to combine scientific truth with an aesthetic form of harmony. Mathurin Méheut was born in 1882 in Lamballe (Côtes-d’Armor). At the age of 20 he entered the School of Decorative Arts in Paris and at the Pedagogical School of Drawing, where Eugene Grasset became his teacher. This last one presented it to the magazine “Art and Decoration”. Grasse – cantor France and Emile Levy, director of the magazine, asked him to work on the marine environment. Méheut together with Pillard-Verneuil

for the texts, creates a real encyclopedia of the marine world inhabiting the coast of Northern Brittany. Numerous colored plates illustrate extravagance biodiversity of the pools still in the water at low tide, the ledges are richly populated by the archipelago the reefs of the Gulf of Morlaix, the vibrant life in the seaweed thickets that were so developed at that time... Artist however, is still frustrated by the inability to penetrate the kelp forest, lacking a diving suit, he will talk to Jules Richard, an ally of Prince Albert I of Monaco. Argues Michel GLÉMAREC, Professeur honoraire d'océanographie biologique à l'université de Bretagne occidentale Expert et consultant en écologie marine in his article « Mathurin Méheut, marine biodiversity artist ». In 1914 Mehe received a grant from the Albert Kahn Foundation to travel around the world with the title scientific columnist. Roscoff director Yves Delage recommended him to the prince Albert Ier, who was part of the scholarship award jury. This trip was interrupted in August 1914 declaration of war, Meche returns with a gouache made at the Honolulu Aquarium. Thus Mehe points out that in the region of tropical biodiversity is also abundant. The following pictures are of tropical fauna found in Hawaii. We invite you to explore the works of one of the most popular Breton artists, Mathurin Mechet (1882-1958) to trace the life and journey of an artist who needs to be rediscovered again and again! [42].

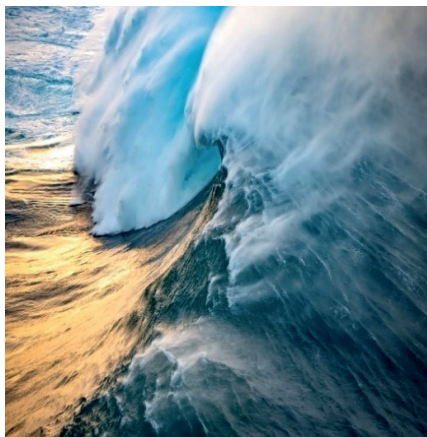
The following figures deal with the tropical fauna encountered in Hawaii.



In Hawai'i, there are hundreds of meaningful words and phrases that are deeply rooted in the ancient culture and shared wisdom of the native people. It's very admirable how sincerely they practice their traditions. A well



known phrase that defines how many Hawaiians look at life, is "Ua Mau ke Ea o ka 'Āina i ka Pono" – "The life and sovereignty of the land is perpetuated in righteousness. Here in the islands, if a person is living pono, it means that they have cultivated the right poise in their relationships with the land, other people, and things in their lives. It means that they are living with a continuous conscious decision to do right by themselves, by others, and by the world in general. I've developed a great reverence for their ways of life and feel



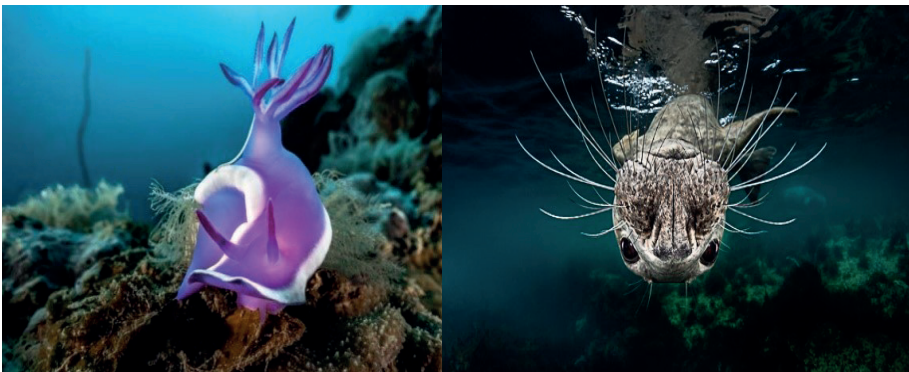
a sense of kuleana or “responsibility” to honor, respect, and help take care of these places I’m privileged to create art with. My photographic art stems from a passion for discovering the majestic wilds and wondrous elements of our planet. The more striking a natural phenomenon or setting appears to me, the more I feel called to capture and share the story of its significance. My reverence for creative expression and wilderness preservation has led me to spectacular locations across Hawai’i through continued work and support

with numerous environmental organizations. I believe nature is intrinsic to our well-being. I want my artwork to transport you to these wild places, and inspire a deeper connection to the magnificent lands that sustain our life on Earth. My vision is simple – to create art that is visually therapeutic and enliven humans to care more about the Earth. Nature soothes the mind, restores balance, and even heals us - Nature is intrinsic to our well-being. My goal is to bring these stress relieving environments as museum quality photographic artworks into homes, offices, and businesses for people to enjoy a lifetime of inspirational peace and wonder ,” – said Cody Roberts. From mountain tops to oceans, Cody’s fine art photography is known to convey the power and wonderment of wild landscapes. Through aerial, adventure, and outdoor images, his work has been awarded, published, exhibited, and collected as museum quality wall art worldwide. For over a decade Cody has traversed and explored the islands of Hawai’i, documenting the majestic wilds of the most isolated archipelago on Earth [15].



Each form has its own role in maintaining the Universe and its inhabitants. Impressive are Greg Lecoœur’s works, photographer of the wildlife and naturalist who has dedicated to the preservation of the environment and biodiversity for the savity in collaboration with the Oceanographic Institute, bears witness to the state of the polar regions in the face of climate change, and aims to raise awareness so that everyone becomes an ambassador for the Ocean.

Greg Lecoeur grew up on the French Riviera, between Mercantour National Park and the Mediterranean Sea. He spent his childhood exploring marine and mountain environments, fueling his interest in animal observation and biological discovery. The purpose of photographic art by Greg Lecoeur that is to highlight the beauty of our planet, to raise awareness among the general public about the importance of its preservation. As a photojournalist and artist, Lecoeur is deeply committed to preserving marine ecosystems, using images to highlight the planet's natural heritage. Greg Lecoeur is one of the world's greatest photographers of underwater wildlife, capturing unexpected scenes to raise awareness of the fragility of our ecosystems and the preservation of biodiversity. His portfolio has been awarded numerous times (Golden Diver at the Marseille Underwater Images Festival in 2015, Ocean Arts in 2020, etc.). Greg Lecoeur in 2023 together with the association We are Méditerranée starts popularize and preserve the Mediterranean Sea through a combination of scientific research and an artistic approach. Oceanographic Museum of Monaco and Gares & Connexions join forces to better "Make the ocean known, loved and protected" due to the exhibition "Pôles, des mondes fragiles" / "Poles, fragile worlds" / 2023 [24].



Part 7. What if oceanography began with Homer? This rhetorical question interested researcher Jacqueline Goy, Scientific attaché of the Oceanographic Institute of the Albert I, Prince of Monaco Foundation. When Prince Albert I of Monaco declared at a conference at the Sorbonne on January 14, 1904, that "oceanography is the most attractive of sciences", he might have added the oldest, since the first navigation story is the famous journey of Ulysses across the Mediterranean Sea, a journey so wonderful Homer said. Recognized as the first literary masterpiece, the *Odyssey* introduces a hero a mythical struggle against the vicissitudes of a sea voyage, which, adding an epic touch, first of all, they represent an unusual description of the sea, a kind of draft treatise oceanography. If "the Shaker of the seas", Poseidon – the Neptune of the Romans – is the absolute master and manages "the great abyss of the seas, its terrors and its dangers", his interventions remain astonishingly realistic. Without doubt because Homer was inspired by intrepid navigators, in particular the Phoenicians, "these old sea travelers who know how to tell stories so well", this is what makes his

speech so lively to evoke a sea that moves, the author continuing. Homer wisely matches the wave category to each type of wind. In ancient Greek mythology the personification of the winds, the children of Astraeus and Eos: Boreas, Noth and Zephyr, where Boreas – northern stormy wind, Noth– southern hot wind and Zephyr – the softest of the winds, the messenger of spring. Hesiod mentions three winds; Homer adds Heb. The jokes of the god Eol are formidable, Eol, who encloses the winds in a strong shell, from which he releases “sweet Zephyr” at his whims for the return of Ulysses to his native island, that even “the wind gusty” cause a storm. Their “whistling gusts” form a “thundering surf” on the rocks. Indeed, there is a relationship between the strength of the wind and its effect on both the surface of the water and the surface of the water on a rocky shore. And of course, sailboats can leave the port thanks to a fair wind, which pushes them out to sea [30].

In Greek mythology the personification of the stormy northern wind is Boreas. Mentioned in Theogony, Iliad and Odyssey. He lived in cold Thrace, but flew on his wide wings all over the world and was the most powerful and indomitable of all the winds. Boreas wooed Orithia, the daughter of the Athenian king Erechtheus, despite all his requests and promises, was refused and then kidnapped her. From Orithia, Boreas had two sons, Kalaid and Zet, both of them winged - they became famous during the Argonauts' campaign in Colchis. In addition to them, Boreas had a daughter, Cleopatra, whom he married to the Thracian king Phineas. Among the works of modern times, we mention the sculptural groups “Boreas abducts Orithia” by Marcy (1714–1716) and Boisot (1786). It is worth mentioning the painting by Rubens Boreas abducts Orithia (1620), Vienna, Academy of Arts Gallery. The name “Boreas” still lives on in the name of a gusty cold wind (in its Italian form, “Bora”) and in many other languages, such as: Borris (Irish: An Bhuiríos, formerly Buirgheas Ó nDróna) is a village on the River Barrow, in County Carlow, Ireland; Bor (Old Scanian Borr, Burr) is one of the Aesirs in Germano-Scandinavian mythology, the son of the first man Buri and the father of Odin, Vili and Ve; all Nostratic (lat.noster-our) languages belong to the superfamily of the highest level (the so-called Borean languages, Borean (also Boreal or Boralean) is a hypothetical linguistic macrofamily that encompasses almost all language families); Boris, Borys or Barys, what can be used as a short form of the name Borislav, derived from the Slavic elements bori “battle, fight” and slava “glory”. As for example, the ancient Greek name of the Dnieper River is Borysthene (Βορυσθένης). Herodotus, an ancient Greek scholar, called this river Borysthene, which in Greek translation means “river from the north.” As Ancient Rome complains, the Dnieper was called Danapris. The word Dnieper is of Celtic origin, from the common root don (“water”), don-ieper, which means, respectively, “upper river”. The first mentions of the existence of this river are in documents of the 5th century BC and the population that lived here was called Borysphenites [22,23].

To the Romans “Boreas” was known as Aquilon – Ancient Roman name for the northeast, sometimes north wind, that corresponded to the ancient Greek Boreas. In ancient Greek mythology, the habitat of the Hyperborean people is located beyond Boreas, in the legendary northern country.

It's nice to live in Hyperborea,
Where was Apollo born
There are walking the fairies,
Blowing Northern Aquilon!

Results. As we can see, not only scientists of all times have dealt with the functioning of the ocean, marine biodiversity and the relationship between man and the ocean, as well as the dissemination of knowledge about ocean protection.

Not only the writers and scientists of all of the times were interested of the climate changes but also United Nations were troubled by the effects of it. Fossil fuels – coal, oil and gas – are by far the largest contributor to global climate change, accounting for over 75 per cent of global greenhouse gas emissions and nearly 90 per cent of all carbon dioxide emissions. As greenhouse gas emissions blanket the Earth, they trap the sun's heat. This leads to global warming and climate change. The world is now warming faster than at any point in recorded history. Warmer temperatures over time are changing weather patterns and disrupting the usual balance of nature. This poses many risks to human beings and all other forms of life on Earth [56].

Declines in the duration and extent of sea ice in the Arctic leads to declines in the abundance of ice algae, which thrive in nutrient-rich pockets in the ice. These algae are eaten by zooplankton, which are in turn eaten by Arctic cod, an important food source for many marine mammals, including seals. Seals are eaten by polar bears. Hence, declines in ice algae can contribute to declines in polar bear populations [1, 12, 54].

The marine biologists I spoke to as part of my research are actually bitter about this fact.

The Roman emperor Marcus Aurelius wrote in the treatise "Alone with Himself" that everyone is worth as much as the goal to which a person strives is worth. The bigger the goal, the bigger the person. So, the meaning of life is to have the greatest possible goal, to make this goal your own, to make

yourself! Let this goal, like an ocean, awaken oceanic forces in you and not so that you become great, but so that you become an ocean!



Perspectives. In the context of climate change, the report which details the situation in the polar regions was decided in 2016 at the request of governments, observer organizations including the Princely Government of Monaco, the Prince Albert II Foundation and their partners. Made public in Monaco in 2019, it explains in particular the impact of global warming on polar ice. It highlights the consequences on the biodiversity of these regions and recalls the disastrous

repercussions that changes at the poles will have on the rest of the planet. Support for research plays an important role, the only way to develop action. "It seems essential to me to bring these regions back into the spotlight. The polar regions are not just a land of adventure, the domain of scientists or a new tourist destination. They are the laboratory of the future of our planet," the Prince Albert II explained. In order to better understand these processes then little-known and preserved environments, Prince Albert I, a visionary explorer, paved the way at the end of the 19th century by organizing several expeditions to the Arctic and Spitsbergen. After discovering the North Pole in the footsteps of his great-grandfather and completing the journey by going to the South Pole, HSH Prince Albert II commits himself, convinced that only international cooperation can save the poles. In the context of climate change, this report which details the situation in the polar regions was decided in 2016 at the request of governments, observer organizations including the Princely Government of Monaco, the Prince Albert II Foundation and their partners. Made public in Monaco in 2019, it explains in particular the impact of global warming on polar ice. It highlights the consequences on the biodiversity of these regions and recalls the disastrous repercussions that changes at the poles will have on the rest of the planet. "It seems essential to me to shine a light on these regions. The polar regions are not just an adventure playground, the domain of scientists or a new tourist destination. They are the laboratory for the future of our planet." – HSH Prince Albert II of Monaco. Nourished by the stories of His great-grandfather, HSH Prince Albert II traveled for the first time to the Far North with His parents and His sisters. A journey that He Himself describes as initiatory. He was then 24 years old. From then on, interest in these extreme territories no longer fades. Following in the footsteps of Prince Albert I, he traveled the Svalbard archipelago in 2005. In 2006, he set foot on the North Pole after four days of walking and, three years later, he made a 17-day journey, visiting several scientific bases of Antarctica. He becomes the first head of state to have joined the two poles. But it is with the photos of His great-grandfather in hand that HSH the Sovereign Prince truly becomes aware of the drama unfolding in the Arctic. "I was amazed to measure the retreat of several kilometers of the Lilliehöök glacier, one of the largest in Spitsbergen, even though it is at almost 80° N," he says. Scientists' analyzes of ice cores showing the impact of increasing CO₂ in the atmosphere only reinforce his decision to act. In 2006, he created his eponymous foundation with three priorities: the management of water resources, the fight against climate change and the protection of biodiversity, particularly at the poles. Support for research plays an important role, the only way to develop action [38].

Conclusions. Thus, we can conclude, that ocean pollution is an important, but insufficiently recognized and inadequately controlled component of global pollution. It poses serious threats to human health and well-being of our planet. Oceans account for 70 percent of the surface of planet Earth and play a pivotal role in the health of our ecosystem — including land-dwelling animals like ourselves. According to the National Oceanic and Atmospheric Administration, U.S. Department of Commerce (NOAA), billions of pounds of trash and other pollutants enter our oceans every year. Marine debris is a persistent pollution problem that reaches throughout the entire ocean and Great Lakes. Ocean pollution — also called marine pollution — is a mixture of both chemical contamination and trash. The act of ocean pollution occurs when chemicals

and trash are either washed, blown or intentionally dumped into the ocean. The consequences of ocean pollution are far-reaching; ocean pollution is now tied to negative health outcomes in human health and marine ecosystems. The nature and magnitude of these impacts are only beginning to be understood [44].

Ocean pollution has multiple negative impacts on marine ecosystems, and these impacts are exacerbated by global climate change. Industrial discharges, pharmaceutical wastes, pesticides, and sewage contribute to global declines in fish stocks. Ocean pollution is a global problem. It arises from multiple sources and crosses national boundaries. It is the consequence of reckless, shortsighted, and unsustainable exploitation of the earth's resources. It endangers marine ecosystems. It impedes the production of atmospheric oxygen. Its threats to human health are great and growing. Local, national, and international efforts are needed to address this environmental problem. A healthy ocean starts with us! Whether humans live near the coasts or far inland, they are a part of the problem – and the solution—to ocean pollution!

“To make the Ocean known, loved and protected”, that is historic mission of the Institut océanographique under the impetus of HSH Prince Albert II of Monaco.

– *Do you love the sea, captain?*

– *Yes, I love the sea! The sea is everything! It covers seven tenths of the globe. His breath is pure and life-giving. In its vast desert, a person does not feel lonely, because around him he feels the beat of life. Unseen, outlandish creatures live in the bosom of the seas. The sea is eternal movement and love, eternal life, as one of your poets said. And in fact, Mr. Professor, the aquatic environment offers exceptional advantages for the development of life. All three kingdoms of nature are represented here: minerals, plants, animals. The animal kingdom is widely represented by four groups of zoophytes, three classes of arthropods, five classes of mollusks, three classes of vertebrates, mammals, reptiles and countless legions of fish, orders of animals, which number over thirteen thousand species, of which only one tenth lives in fresh waters. The sea is nature's vast reservoir. If I may say so, the life of the globe began with the sea, and it will end with the sea! There is supreme peace here! The sea is not subject to despots. On the surface of the seas they can still commit lawlessness, wage wars, and kill their own kind. But at a depth of thirty feet under water they are powerless, here their power ends! Ah, sir, stay here, live in the bosom of the seas! Here, only here, is real independence! ..Here I am free! (35).*

“Twenty Thousand Leagues Under the Sea” by J. Verne.

The article was written on the base of the Biblioteque Princes Caroline (Monaco).

For more information:

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