

Cosmic Stones

A Space Art Project by Arthur Woods

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Abstract

Will humanity's future be a "Space Age" or a "Stone Age"? The human species has reached a pivotal point in its evolutionary history and it appears that the moment has arrived for it to make a critical choice about its future on Earth and, consequently, about its future in the cosmos. This decision could be called the "Cosmic Choice" which conceivably is a choice that all potential spacefaring civilizations must confront at the appropriate moment in their particular history.

The *Cosmic Stones* space art project embodies this decision in a physical and conceptual art work that literally and artistically combines the microcosmos with the macrocosmos, one that utilizes the terrestrial and extra-terrestrial forces of nature in its both concept and realization and one that connects our species' history on Earth with its future destiny in space.

The project – to send *Cosmic Stones* into space - is designed to proceed in various stages of development including realizations in micro-gravity environments, on space habitats and, ultimately, on the surfaces of other celestial bodies or in the expanse of interplanetary space. This paper details the background and inspiration of the project as well as its development and implementation approach.

1.0 What are Cosmic Stones?

Definition:

cos-mic

Pronunciation: 'kăz-mik

Variant(s): *also* **cos-mi-cal**

Function: *adjective*

Etymology: Greek *kosmikos*, from *kosmos* order, universe

1. : of or relating to the cosmos, the extraterrestrial vastness, or the universe in contrast to the earth alone
2. : characterized by greatness especially in extent, intensity, or comprehensiveness

stone

Pronunciation: 'stOn

Function: *noun*

Etymology: Middle English, from Old English *stAn*; akin to Old High German *stein* stone, Old Church Slavonic *stena* wall, and perhaps to Sanskrit *styAyate* it hardens

1.
 - a. Concreted earthy or mineral matter; rock.
 - b. Such concreted matter of a particular type. Often used in combination: sandstone; soapstone.
2. A small piece of rock.

3. Rock or a piece of rock shaped or finished for a particular purpose, especially:
 - a. A piece of rock that is used in construction: a coping stone; a paving stone.
 - b. A gravestone or tombstone.
 - c. A grindstone, millstone, or whetstone.
 - d. A milestone or boundary.
4. A gem or precious stone.
5. A *Cosmic Stone* - a stone from the Earth sent into the cosmos

2.0 Origins of the *Cosmic Stones* in my Art

The *Cosmic Stones* are common, naturally formed stones that have been found and collected in the area where I live in Switzerland. They are painted in my particular artistic technique and are prepared for spaceflight into the cosmos.

Painting Inspired by the Microcosmos

The job of artists and scientists is to interpret and describe reality. Scientists look at the material world and create explanations for the form and function of everything we experience. Similarly, when painting an image of an object or a scene, the artist is trying to convey the essence and "being" of the object or experience. Early in my art career, I turned to science for a contemporary description of reality and eventually became inspired by particle physics.

What I discovered in my exploration of particle physics and what has influenced my art ever since, was a description of the universe at the microcosmic level consisting of sub-atomic particles in an inseparable network of interactions. These interactions involve a ceaseless flow of energy which gives rise to the stable structures of the material world which is the macrocosmos. The structures that make up our perception of physical reality do not remain static but are constantly transient and oscillate in rhythmic movements. Thus, the entire universe is engaged in endless motion and activity: in a continual cosmic dance of energy.

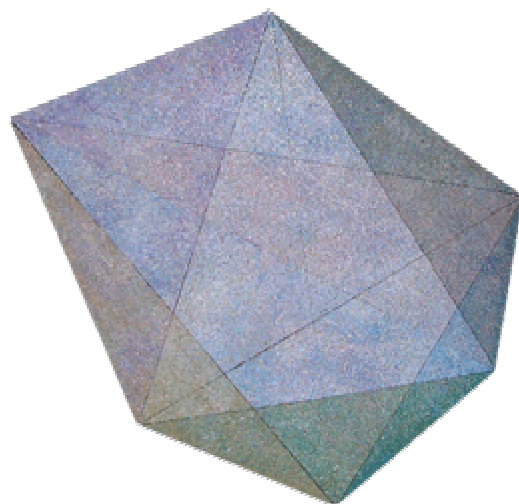


Fig. 1. *Voyager Series*, 1995
Acrylic on Canvas , 120 x 150 cm

Both the aesthetic aspects of this description as well as the environmental implications of an interdependent and interconnected universe stimulated me deeply.

Based on the description of the microcosmos found in particle physics, I developed a painting style and "pointillistic" painting technique that uses points and dabs of color as a visual metaphor for the sub-atomic universe which is the foundation for the material world that we inhabit. To this I added calligraphic lines to signify energy and motion and "signs and symbols" indicating our reliance on various languages to explain our observations and understandings. Over the years I developed various combinations of these painterly attributes and applied them to a variety of artistic expressions that have included abstract as well as hyper-realistic painting and three-dimensional sculptural artworks and objects. Through the act of painting on physical objects I try to communicate the essence of the inner reality of all material in the perceivable universe. This can be described as looking at a form from the inside out.

The three-dimensional works included geometrically shaped and painted sculptures such as the *Cosmic Dancer* sculpture which was sent to the Mir space station in 1993, common objects such as paint brushes and furniture, and a series of naturally formed, painted stones called *Philosopher's Stones* which I commenced in the mid 1990's. As the *Philosopher's Stones* are a precursor to the *Cosmic Stones* project some further explanation is needed.

The Philosopher's Stones

Legend has it that an imaginary substance exists which was sought by alchemists in the belief that it would magically turn ordinary metals into gold or silver which would lead to tremendous wealth. Today, science and technology have become this imaginary substance and their "magic" has created tremendous wealth and opportunity for our species. As we transverse the new millennium, our understanding about how to use this magic will determine the ultimate destiny and fate of our species. It has been said that humanity sometimes has a knack for *creating the right technologies for the wrong reasons*. As the *Philosopher's Stones* were inspired by science, I believe them to be symbolic of our interdependent relationship and to the magic of science and technology and of our responsibility to how we use that magic.

My intent to send such painted stones into space adds a new dimension to these works and they now become *Cosmic Stones* by applying the "magic" of space technology.



Fig. 2. *Philosopher's Stone*, 1994
Acrylic on Stone ca. 8 x 20 x 6 cm

Local and Personal Connections

The idea of making *Cosmic Stones* is also directly related to my recent move to the historic Swiss town of “Stein am Rhein” translated into English as: “Stone on the Rhine”. The local people refer to the village simply as “Stein”. The local inhabitants are called “*Steiners*”. Stein am Rhein is located at the beginning of the Rhine river as it flows from the Lake of Constance (Bodensee) on its way to the North Sea.



Fig. 3. Stein am Rhein
Where the Lake of Constance (Bodensee) becomes the Rhine River

The stones I am using in the *Cosmic Stones* project obtained their final form through their journey from the Swiss mountains to the banks of the Rhine river next to where I live. They arrive serendipitously in “Stein am Rhein” where they I find them and prepare them for their ultimate journey into the cosmos.



Fig. 4. Stones found by my home in Stein am Rhein



Fig. 5. Stone spiral with two *Cosmic Stones*, 2006
Stein am Rhein

Recently it was pointed out to me that a source of my name “Arthur” comes from the Irish Gaelic word meaning "stone" [1].

Space Art – Art for the Cosmos

My fascination and involvement with space activities goes back to my youth and to where I lived from 1959 – 1970 which was in the vicinity of the Cape Canaveral and the Kennedy Space Center. There I personally witnessed the beginnings of the U.S. space program. In the summers of 1967 and 1968, I worked at the space center during the Apollo program.

Eventually space themes entered my artistic work and, beginning in the mid-1980's, I initiated and developed a number of art-in-space projects. The first of these was called "***O.U.R.S - the Orbiting Unification Ring Satellite***" which was designed to put "a circle in the sky" in the year 2000 symbolizing peace, hope and unity as a way to celebrate the new millennium. This technology behind this project utilized an exotic inflatable material that would become rigid when exposed to sunlight once it is deployed in orbit. At an orbital altitude of approximately 400 kilometers, with a diameter of 1 kilometer and a ring thickness of 30 meters, the O.U.R.S. sculpture would have appeared to observers on Earth to be one-quarter the size of the moon. [2]

In 1988, I introduced the "***OUR-Space Peace Sculpture***" which was conceived as a technical prototype of the O.U.R.S. This project was developed extensively which resulted in agreements signed with the former Soviet Union and the construction of full size model of an inflatable space sculpture by NPO Energia in 1990 in Russia. The project was designed to promote and celebrate international cooperation and the peaceful use of outer space. After significant development, the project was unfortunately postponed and eventually canceled after the dissolution of the Soviet Union which resulted in the loss of sponsor support. [3]

However, the Russian space organizations were still eager to have such projects realized with their facilities and on May 22, 1993, my ***Cosmic Dancer*** sculpture was

the first of my artworks to be launched into outer space. Sent to the Mir space station with the purposes to investigate the properties of sculpture in weightlessness and to assess the process and value of adding art to crewed habitats in orbit, the *Cosmic Dancer* sculpture was the first three-dimensional artwork purposely designed for and officially integrated into a human habitat beyond Earth. The artwork was never returned and may have been aboard Mir when it re-entered Earth's atmosphere in 2001. [4]

With the goal to help open the space frontier to other artists, I initiated and managed another art-in-space project called ***Ars Ad Astra -the 1st Art Exhibition in Earth Orbit***. In a cooperation between the OURS Foundation and the European Space Agency (ESA), a collection of original artworks from 20 international artists expressing the theme "Space & Humanity" was flown to the Mir space station as a part of ESA's EUROMIR'95 mission. [5]

In 1995, I initiated the "***SEEDS – Synergizing Earth's Evolutionary Development Spacewards***" project. The purpose of this project was to promote the survival of terrestrial life in the cosmos by sending "seeds" or *SEED* artworks into space. The first instances of this work were designed to be of a symbolic and communicative nature leading to artistic realizations that could become repositories of our natural heritage in "seed banks" placed in orbit or on the Moon. Later, with sufficient enthusiasm and cooperation, "seed payloads consisting of genetically optimized materials" would possibly be integrated into interstellar space craft and the potential seeding of birthing star systems could be attempted. Due to the controversial and technical challenges involved, this project is on hold until the conditions for spreading life beyond Earth have improved. [6]

The *Cosmic Stones* project is a further development of both my three-dimensional painting and my art-in-space activities. The *Cosmic Stones* can be considered as "cosmic" artworks due to the fact that they are designed to be sent into outer space. As they are also directly related to my current home and surroundings they have a local and personal dimension.

3.0 The *Cosmic Stones* as Art Objects

Basically stated the *Cosmic Stones* are painted stones. By painting them in my pointillistic technique described above, I attempt to visually portray the inner dimension of the stones which, in a symbolic manner, represents the atomic composition of all matter in the Universe. Everything, at least everything we know to be physical reality, is made up of minute particles of matter spinning and shooting around in energetic ways. The geomorphic forms that the stones have taken define their momentary and transitory reality as a physical object.

Like all material forms in the Universe, the *Cosmic Stones* are transitory. Some forms are more transitory than others. A raindrop has a very limited lifetime before it loses its form and becomes absorbed in the fundament of the environment. People, too, don't last very long on the cosmic scale of time. Organic forms are especially transitory through the constant inter-exchange of matter with the environment. Although the *Cosmic Stones* are very solid and durable objects of concentrated matter, eventually they will - at some point in time - become dust. All of my art concerns this cosmic and transient quality of nature.

One obvious characteristic of the *Cosmic Stone* is that stones are dense and heavy. This density of mass subjected to the pull of gravity which determines an object's

weight – *the gravitational constant*. The weight is an indication of the energy that is embodied in a particular stone.

As such, the *Cosmic Stones* exist as art objects that combine qualities of painting with the aspects of form. While the *Cosmic Stones* are physical, three-dimensional objects they cannot be classified as sculptures as they are not man-made. Their forms have been determined by the effects of erosion encountered on their long journey as rocks separated from the mountains of their origin, subsequently having been passed down the mountain streams to the Rhine river where they were deposited on banks of the river before being collected, painted by me and transformed into *Cosmic Stones*.

Archetypal Consciousness of Form

I believe the process of natural formation endows the *Cosmic Stones* with a particular spiritual quality that relates to an archetypal consciousness of form. Natural forms contain a sublime sense of *numinosity* - the mystical and spiritual power of the elemental forces of nature that are embodied in an object.

The art historian Herbert Read [7] has written about this numinous quality of such forms in his book *Modern Sculpture* (1964) when he discusses the work of the sculptor Henry Moore, "The mystical and spiritual – *mana*- is a quality of animistic vitality that informs all natural forms, not only of organic beings, but all inorganic things in so far as a structure has been given to these by growth (e.g. crystals) or by natural forces (e.g. the erosion of rocks by wind or waves). The artist is someone who is often acutely aware of what Baudelaire called '*correspondences*' - that is to say, real but irrational associations between disparate objects. To the poet these correspondences may be of color, sound or rhythm, but to the sculptor they are always of *shape* .

Read supplies this quote from the sculptor Henry Moore:

"There are universal shapes to which everyone is sub-consciously conditioned and to which they can respond *if their conscious control does not shut them off*. I have always paid great attention to natural forms, such as bones, shells, and pebbles, etc. Sometimes for several years running I have been to the same part of the sea-shore - but each year a new shape of pebble has caught my eye, which the year before, though it was there in hundreds, I never saw. Out of the millions of pebbles passed in walking along the shore, I choose out to see with excitement only those which fit in with *my existing for-interest* at the time. A different thing happens if I sit down and examine a handful one by one. I may then extend *my form-experience* more, by giving my mind *time to become conditioned to a new shape?*" [8]

James Lovelock has pointed out in his book *The Ages of Gaia – A Biography of Our Living Earth* – that Life is an intricate, interconnected and self-regulating planetary system consisting of our atmosphere, the organisms, the oceans and the Earth's crust including its 'stones'. Together these make up the phenomena of "Life" – a super organism he refers to as Gaia. Lovelock states: "*.. the growth of an organism affects its physical and chemical environment; the evolution of the species and the evolution of the rocks, therefore, are tightly coupled as a single, indivisible process.*" [9] Seen in this context, the *Cosmic Stones* also become messengers of Life on Earth.

The Transformation of Form through Painting and Process

By isolating the stones from their natural environment and selecting them to become artworks, as an artist I have effectively, although momentarily, altered their destiny as normal terrestrial stones. Through the application of my microcosmically inspired painting technique I have attempted to expose the inner, numinous aspects of these found and naturally formed objects. By pointing them into the direction of the cosmos by identifying and accessing launch possibilities that will take the stones into micro-gravity environments and beyond, I have added another cosmic dimension that makes them *Cosmic Stones*.

4.0 The Suitability of the *Cosmic Stones* in the Space Environment

Material Aspects

Other than the obvious weight and logistical characteristics of the *Cosmic Stones* selected for spaceflight, there appears to be no technical obstacles to their eventual manifestations on spacecraft, space habitats or placement on the surfaces of other planetary bodies.



Fig. 6. This picture of asteroid 951 Gaspra was obtained by the Galileo spacecraft during its approach to the asteroid on 29 October, 1991. Photo: ESA

Indeed, the geomorphic shapes of the *Cosmic Stones* – formed by the terrestrial natural forces on planet Earth share a interesting “Correspondence” with other celestial entities. They exhibit a striking similarity to asteroids which have been eroded, not by water and wind, but by numerous impacts from other asteroidal materials. Likewise a liquid substance such as water in weightlessness forms itself into a rounded bio-morphical form due to the attractive force of surface tension of the water molecules.



Fig. 7. A globule of water next to the *Cosmic Dancer* sculpture on the Mir space station. 1993

Concerning their suitability for integration in crewed environments such as space stations and future interplanetary spacecraft, the material of the *Cosmic Stones* is non-flammable and durable. The edges of stones are blunt and rounded.

The acrylic paints which will be used are Lascaux Artists Paints which have been tested by the Russian space agency for their approved use in the closed environment of a crewed space habitat (Mir space station). These paints exhibited no toxic out gassing or other issues. Lascaux paints were used for the *Cosmic Dancer* sculpture [10] flown to the Mir in 1993 and on the twenty artworks selected for the Ars Ad Astra project sent to Mir as a part of the ESA Euromir95 mission.



Fig. 8. Preparation of the *Cosmic Dancer* sculpture at Kayser-Threde GmbH, Munich, Germany

The *Cosmic Stones* selected for spaceflight to a crewed habitat will receive a final varnish consisting of a two-component epoxy coating which will enable the *Cosmic Stones* to be sterilized with alcohol in order to prevent the introduction of bacteria and fungi into the space habitat – a process that was employed by the German Aerospace Company Kayser-Threde GmbH in the preparation of the *Cosmic Dancer* sculpture for transport to the Mir space station in 1993.

Psychological Aspects

It has been shown and reported that astronauts and cosmonauts on long duration mission in Earth orbit specifically appreciate the presence of objects that bear a strong relationship to the home planet. The color, form and the tactile qualities of art objects sharing the somewhat cramped living quarters of the crews are also very important characteristics.

Cosmonaut Alexander Polischuk speaking about the qualities of the *Cosmic Dancer* sculpture on the Mir space station in 1993:

“When the Progress arrived and we unwrapped the sculpture we were very pleased as it was like we saw an old acquaintance. But we were quite surprised as the color of the sculpture was different than the training model - it was green! But it was maybe even better so. The combination of the light green and yellow color has a more calming effect and this is very important for us in stress situations.”

“One can see in this figure any being one wants. Therefore it is interesting to enjoy looking at it and to hold it in ones hands. When holding it in ones hands, one caresses it and feels a cozy feeling, as if one would hold a living being. We think that such art works are not only important to the artists who send them into space but also for us cosmonauts who simply feel the presence of a little artwork as comfortable.” [11]



Fig. 9. Cosmonaut Alexander Polischuk and the *Cosmic Dancer* on the Mir space station, 1993

ESA astronaut Thomas Reiter speaking about *Ars Ad Astra: The 1st Art Exhibition in Earth Orbit*.- Mir Space Station/Transinne, Belgium link-up, November 30, 1995

“.....and let me tell you that there are many things here on board which keep us alive, of course technical systems which produce oxygen to breathe, water to drink which clean the air from carbon dioxide, food and all these things which help to keep us alive, life support systems. But I can tell you that this kind of thing (he holds up a painting) are a part of what is necessary to keep us alive, to keep the memory to the Earth, to our families, to our friends, to the nature.” [12]

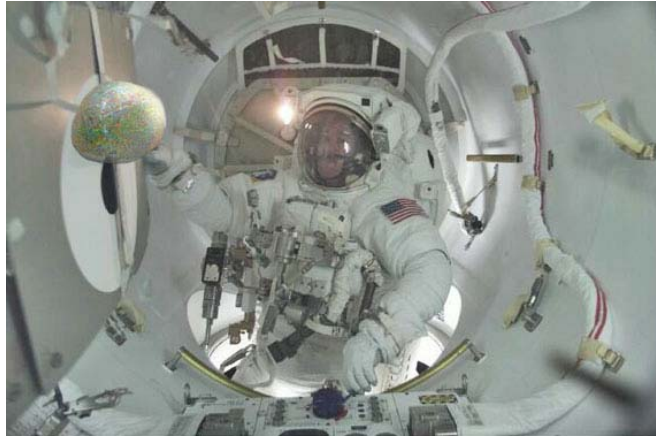


Fig. 10. Artist's Conception of a *Cosmic Stone* on the ISS

The *Cosmic Stones* are artworks that seem especially suited for integration in crewed environments in space as they:

1. are art objects that are in the midst of their own particular journey which began hundreds if not thousands of years before in the fundament of the home planet where they were given their present shape by the natural forces of Earth;
2. have been endowed with numinous qualities inspired by insights into the nature of the universe derived from our explorations into the microcosmos,
3. are composed of a benign and non-flammable material,
4. their shapes are blunt and rounded,
5. utilized art materials that can be considered as "space qualified" by their use on previous space missions involving crewed environments,
6. can be easily sterilized to prevent bacterial or fungal infections,
7. are finished in an artistic manner that combines aspects of color, form and tactility that would appear to be psychologically beneficial to human crews on missions in Earth orbit and beyond.



Fig. 11. Artist's Conception of a *Cosmic Stone* placed on Mars

The *Cosmic Stones* also appear to be suitable artifacts to take to and leave as human markers on other celestial bodies in the Solar System such as the Moon or Mars. Their inert composition endow the *Cosmic Stones* with qualities of durability and ease of handling. Likewise, with proper preparation and sterilization procedures any biological contamination risk to extra-terrestrial environments can be minimized. Special UV resistant varnishes will be used to reduce or hinder the effects of UV radiation that will impose a deteriorating effect on the acrylic paints in the long term. Personal experience with outdoor sculptures painted in this manner has shown an acceptable terrestrial life-span of plus twenty years. The effect of extreme temperature fluctuations on the painted surface needs to be examined in more detail and such an investigation would be integrated into any feasibility study once a launch opportunity to another celestial body becomes defined.

5.0 Our Future: Will it be a “Space Age” or a “Stone Age”?

"We face a choice of the type of future that we leave to posterity: a stone age or a space age. If it is to be a space age there is a need to act now with much greater vigor that is currently being shown."

Mark Hempsell, 1989 [13]

Not only today, but throughout millennia humanity has wondered about its relation to the cosmos and about its ultimate purpose. Based on existing knowledge, myths, religions, and other models of thought were created to try to satisfy its ignorance of the answers to these fundamental questions of existence. As knowledge increased, all these models of thought were modified or replaced by newer ones in order to have a more precise and believable explanation of where we came from, who we are and what our purpose is.

Of all the life forms sharing our home planet, the human species appears unique in that it alone can contemplate its existence, examine its past and look ahead to its future. Our species has also developed the means to look beyond Earth into the universe and has yet to find any hard evidence of Life, as we know it.

The overwhelming success of our species poses a great threat to the rest of Life sharing this planet. There is no need to list the many problems facing humanity in the 21st century. Be they environmental, ecological, political, economic or social, the problems are obvious, immediate and threatening. Most of these problems can be linked to the ever-expanding activities of the human species that has resulted in it occupying every available niche and exploiting every available earthly resource for living, working and maintaining society. Thus, humanity today is at a crossroad. Its future well-being, the sustainability of modern civilization and indeed its very survival as a species is at stake.

Just 10,000 years ago there were only about 5 million people on the planet living, at that time, mostly in caves. For these people planet Earth was surely the entire cosmos. 8,000 years later, there were 130 million people around when Christianity was born. By 1650 the human population grew to about 500 million. 200 years later, at the beginning of the industrial age, it doubled to 1 billion. Our planet still seemed large enough and resilient enough to support any human purpose. 100 years later, the number of humans increased to 2.5 billion. At this time, a new development appeared - all of humanity as well as all of Earth's inhabitants began living with the threat of nuclear destruction hanging over their future.

And now, there are approximately 6.5 billion busy humans living, working and playing on a very crowded and ecologically endangered planet. The mothers of the next 2 billion people have already been born and, barring a major catastrophe, by the year 2020 there will be at least 8 billion people sharing the planet with the rest of Life that hasn't yet been pushed to extinction by human expansion.

With the human population presently growing at a rate of almost 100 million human beings per year and as more and more species are becoming extinct at an alarming rate, is it not too soon to ask a fundamental question:

"Has humanity - and indeed, all terrestrial life - outgrown its home planet Earth?"

"Stone Age"

A "No" answer to this question implies that our species will either somehow find a combination of *terrestrial* solutions to comfortably accommodate 8-10 billion people in the coming decades; or *nature* (including human nature) will drastically reduce the human population to more sustainable levels. It has been estimated that the carrying capacity of the planet's ecology can comfortably sustain a human population of just 1.5 billion people at the living standards of Western society.

With the impact of 200 hundred years of industrialization based on a fossil fuel economy which many scientists believe is upsetting the climate balance in unpredictable and unmanageable ways and the fact that wars have already begun over vital resources, the likelihood of a mass reduction of the human population appears to be a definite possibility. Without any alternative to modern society in place, once our fossil fuel economy collapses in the midst of climatic upheaval, one could imagine that our civilization would quickly slide into a post-industrial "Stone Age".

"Space Age"

A "Yes" answer implies that our species recognizes this fact and tries to understand why it has reached this point in its own evolution in the context of the evolution of life on Earth.

A cosmological explanation is that Mother Earth has come of age and it is now time for it to sow its seeds throughout the cosmos in the hope that one or more of them will catch, begin to grow and flourish as Life has on Earth.

Seen in this context, it has taken planet Earth 4.5 billion years of time to reach this opportune moment. Humanity has undergone over 2 million years of evolution capped by the last 200 years of accelerated technological development and some 40 years of spaceflight experience. The development of spaceflight – the ability to visit other planets - is perhaps, the most significant development, not only in the history of our species, since the appearance of life itself on our planet.

The result of this unprecedented industrial, technological and scientific development that has led to our current predicament has also provided the means for our species to perpetuate our present civilization and indeed to promote the survival of humanity. To do so it will need to harness the infinite resources beyond the atmosphere of our planet to 1. meet the needs of human society on Earth while 2. creating an infrastructure in space for further human expansion in the cosmos. This scenario for humanity is called the "Space Option".

The Space Option

Space visionaries and pioneers long ago recognized this eventuality and they and their followers have quietly and consequently developed both the scientific rationale and the technological concepts to open the space frontier.

Upon these works is the development of a concept called *The Space Option* [14,15,16] and, because this option offers humanity the most "optimistic" pathway to sustainability, it is a choice humanity will most likely make in order to maintain its well-being and its ultimate survival.

The Space Option concept is an evolutionary plan to meet the basic and anticipated needs of humanity through the utilization of near Earth resources - especially that of energy from space. The wide-scale and successful implementation of the Space Option could substantially contribute to the restoration of the global environment by its reliance on unlimited, clean space solar energy to replace humanity's dependence on fossil fuels which are finite or nuclear fuels which have negative environmental and political aspects.

Such a new energy source would not only maintain and stimulate the global economy, the eventual exploitation of other extraterrestrial resources would guarantee future generations a sufficient supply of material resources. Thus, the Space Option provides hope for the less fortunate societies on our planet to aspire to reaching a living standard substantially beyond their present situation while the present advanced societies can maintain their standard of living and continue their development - an approach to the future that differs greatly from many of the current scenarios for "sustainable development" that are under discussion.

As such, the Space Option could and should become the primary motivation for continued space exploration and development - perhaps even becoming a more powerful driver for space activities than national prestige, security and scientific exploration have been. Indeed the Space Option should be a catalyst for the opening of a "New Space Frontier" attracting the energies and capital of a new generation of explorers and entrepreneurs.

If implemented in time and with sufficient commitment, the ultimate reward will be a prosperous and dynamic planetary civilization living in a healthy environment and the creation of an infrastructure in space upon which the expansion of the human species throughout the solar system and beyond could be realistically anticipated. Instead of finding ourselves forced to live in the misery of a post-industrial "Stone Age" our species will find its destiny in the "Space Age".

6.0 The Cosmic Stones as an Artistic Catalyst of the Space Age

In addition to language or speech, art has been a fundamental way of communicating humankind's understanding of the universe. In the book *The Meaning of Art*, British art historian Herbert Read discusses the evolution of our understanding and appreciation of art. "Art," Read says, "is the expression of any ideal that the artist can realize in plastic form" [17]. And while the "expressive" aspects of art are subjective and temporal, aesthetic values vary from person to person, culture to culture and among different periods of civilization. Form, though intuitive in origin, is more universal and can be analyzed in intellectual terms, such as measure, balance, rhythm and harmony. In a good work of art, all of its elements are interrelated for a coherent unity - content and form fused into its overall message or meaning. Such

images, exploiting the expressive qualities of form, go beyond mere representation of fact and can communicate a wide range of subtle and powerful feelings.

The *Cosmic Stones* function in this art context in a number of ways. In the space environment a “stone” is for all practical purposes basically useless. On the one hand, the cosmos is already full of rocks and on the other, in our high-tech perceptions of space exploration sending an obviously non-technically inspired object such as a “stone” would be considered by most to be a absurd thing to do. This is especially so due to the fact that the high cost of space development is directly proportional to the cost of lifting mass from Earth into orbit. Thus, the idea of sending objects that may appear to be both useless and heavy could be considered by some to be a “*reducto ad absurdum*” type of art or space activity.

However, this is exactly where art intervenes into humanity’s extraterrestrial imperative. Simply stated, if *Cosmic Stones* are sent into space it will be made possible by those who do not want to see a new Stone Age on Earth. Thus the *Cosmic Stones* become symbolic vehicles of meaning that embody the future of our species and the choices it will make about its future.

The question whether our future will be a “Space Age” or a “Stone Age” is perhaps the most important question ever faced by our species until now. The answer to this question could be called the “Cosmic Choice” which conceivably is a choice that all potential spacefaring civilizations throughout the universe must confront at the appropriate moment in their particular history. Much has been researched and written about the probable fate of our species and the potential positive impact that space activities will have on society. The *Cosmic Stones* art project is a way to transcend language and speech about this important issue by broadening the discussion on an aesthetic, symbolic and emotional level.

7.0 Project Development and Implementation

The *Cosmic Stones* project will be developed along the lines of a typical experiment designed for the space environment. Ground base testing, configuration and documentation will be utilized as preparation for eventual implementations in outer space. Under consideration are the use of the ESA Drop Towers located at ESTEC in the Netherlands and in Bremen, Germany. At the ESTEC tower a *Cosmic Stone* can be subjected and filmed in 1.5 seconds of micro-gravity. Similarly 9.5 seconds can be achieved at the ZARM Drop Tower in Bremen.

One of the first instances of the project which is already under development will take place on a parabolic flight in 2006. The purposes of this exercise in weightlessness are to:

1. obtain video footage of the *Cosmic Stones* subjected to the unique characteristics of weightlessness,
2. explore the interaction between a person or persons and the *Cosmic Stones* in this situation,
3. to physically involve the artist in the perception and experience of weightlessness and the sensation of directly experiencing the *Cosmic Stones* in this situation,
4. to provide the artist with a first-hand zero-g experience.

These preliminary sub-orbital activities will endow a sense of inevitability to the future developments of the project by the realization and completion of “first steps” toward the cosmos which be a reference for all future developments.

Furthermore, in response to a “Request for Proposals for scientific experiments, applied experiments, educational experiments and / or cultural experiments” the *Cosmic Stones* concept was submitted to Dice-K Enomoto who is slated to become the first private astronaut from Japan. [18]

A Commercial Approach

As I believe the commercial development of the space frontier by private enterprise is a major factor in enabling the Space Age, the *Cosmic Stones* project is being developed in a commercial manner. All activities, including testing, marketing, as well as any eventual parabolic flights or launches into space, will be financed through the sale of the *Cosmic Stones*. The sale of *Cosmic Stones* will take place in exhibitions and on the Internet. Of course, any contributions, opportunities and donations of support, be they financial or technical, are also welcome.

I have opened a permanent art gallery in Stein am Rhein, Switzerland where the *Cosmic Stones* will be on permanent display “www.arthurwoods.ch” and the *Cosmic Stones* can be purchased on its website located at “www.cosmicstones.org”.

The Price of Spaceflight

A major feasibility factor of any space project is the launch cost. The launch cost factor is often expressed as a cost ratio of “mass to orbit”. The cost of the spaceflight of the *Cosmic Dancer* sculpture was negotiated on the basis of 1 kilogram at a price of 100,000 Swiss francs. It is estimated that a *Cosmic Stones* installation on the ISS similar to the *Cosmic Dancer* Mir event – e.g. 1 kilogram launch , 30 minute video, return of video - that would be realized through the ESA commercial department would cost in the neighborhood of €100,000. Obviously *Cosmic Stones* included in payloads destined for the Moon or Mars would be more expensive and would represent another set of circumstances.

The Price of the Cosmic Stones

It is my hope that when the Space Age eventually unfolds, the “mass to orbit” cost will be in the range of 100 Euros per kilogram. Thus, the purchase price of a *Cosmic Stone* will be directly based on its weight with the initial price being 100 Euros per kilogram. Each *Cosmic Stone* will be signed and dated by me. As some *Cosmic Stones* are quite small, they are affordable to anyone. The price of the *Cosmic Stones* may increase when a major project milestone has been achieved, such as parabolic flights, a launch into orbit, etc.

Additional Cosmic Stone Products

In addition to *Cosmic Stones*, photomontages - in the initial phases - and later photographs of the *Cosmic Stones* in a space environment will be offered for sale. DVD video productions may offered at a later date.

The Cosmic Stones Network

The *Cosmic Stones* Website will maintain a weblog, regularly publish project news and related topics, a newsletter and a private discussion forum for all project supporters will be available.

8.0 Conclusion

The human species has indeed reached a pivotal point in its evolutionary history and it appears that the moment has arrived for it to make a critical “Cosmic Choice” about its future on Earth and, consequently, about its future in the cosmos. The *Cosmic Stones* space art project embodies this decision in a physical and conceptual art work that literally and artistically combines the microcosmos with the macrocosmos, one that utilizes the terrestrial and extra-terrestrial forces of nature in its both concept and realization and one that connects our species’ history on Earth with its future destiny in space. As art objects the *Cosmic Stones* obtain their “cosmic” attributes by the application of a painting technique that makes visual the “microcosmic” nature of their underlying material and, in a “macrocosmic” dimension, by my intention to send them into the cosmos. Previous experience has shown me that the *Cosmic Stones* would be materially and psychologically suitable for space environments and would pose no environmental or technological problems. As such, the *Cosmic Stones* space art project may help our species to avoid a return to a “Stone Age” and instead help to catalyze a new “Space Age”.

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