

Plan and Prospect of Maintenance of Life by Science and Technology

— Creation of Eternal Life Spreaded to Unlimited Universe —

科学技術で命を守る—悠久無限の宇宙に広がる永遠の生命の創造—腹案と見通し

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We all know that we will die inevitably. Multicellular lives, thus, leave space and resources for descendants. We thank to our ancestors beginning from the birth of life 2.8 billion years ago. We will return your favor to our descendants.

All lives on earth, however, will be exterminated in future including human kind. If so, what will be the meaning of our life now? I am not scaring you in order to spread a fake religion. Off course, even if extermination happens, the later the better.

Number one possibility will be the nuclear war and following nuclear winter that wipe out human being. But human being will not be so fool to cause self extinction, if human being can survive eternally as insisted in this work. Another possibilities are collision of large meteorites and intensification of eruption. These problems will be discussed later.

And final decisive one will be the change of sun to red giant.

Every living thing utilizes energy of nuclear fusion in the sun to live.

The aspect of the fusion will change by the course of time and solar light is gradually increased (Fig.1).

And lives on the ground will perish within hundred million to one billion years as sun increases its luminosity. A method

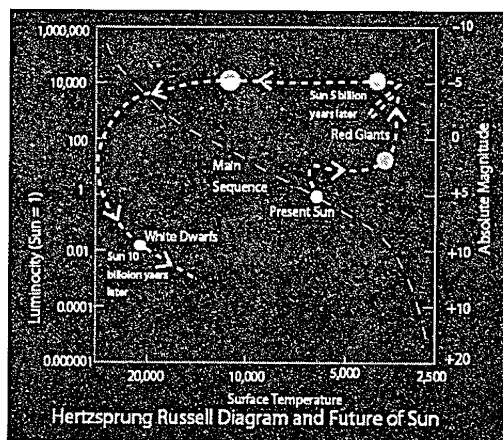


Figure 1 Future of sun. (Figure changed from that of Newton, pp.47 No.12, 2005)

is already proposed to prolong life. That is to launch mirrors as satellites for reflecting part of solar light. However, several billion years later, the sun will become a red giant and the earth will be swallowed (Fig.1). The sun will keep to be red giant approximately one billion years, and later will contract and become the white dwarf star, stops nuclear fusion and is aloud to cool down slowly after several ten billion years until it ceases to emit light. So we have to escape solar system and transfer to other star. One schedule is to stay in solar system in space colonies keeping appropriate distance from the sun while the sun is red giant and then escape solar system. Another schedule is to escape after sun became white dwarf star. The change of sun from red giant to white dwarf star should be elucidated sufficiently, as the change may yield destructive amount of radiation to space colonies.

Approximately several billion years from now, the Small Magellanic Cloud, the Large Magellanic Cloud and Andromeda nebula will collide with our galaxy, Milky Way. Large disturbance will happen to our galaxy, although stars will rarely collide with each other as they are not densely situated. We have to spread to many stars. If life is spread to more stars, the higher is the chance to survive. Basic questions is to transfer to other star in living state or in preserved genes. By general theory of relativity, a space ship travels through Milky Way during person's life time, if it travels nearly in light velocity. The necessary energy required is nearly infinite and space ship will be destroyed by the collision with small object. The nearest star to sun is 4.4 light years apart. We assume 1/10,000 light velocity for space ship, resulting 44,000 years for travel. Before launching heavy space

ship with genes that require thick shielding and large spaces for life, light weighted inquiry rockets with higher velocity should be sent. It should find out whether the target star has sufficient magnetic field to shield Galaxy cosmic rays, and whether it has small celestial bodies like asteroids that can be used as resources.

It seems to be impossible to supply sufficient energy and materials for people living in space ship for such long time, as the outer space is dark. So it seems rational to carry genes by computer controlled space ship. The space ship should be protected against Galaxy cosmic rays of high energy protons or ions of heavier elements by shielding materials. Strong magnetic field seems not to be sufficient against Galaxy cosmic rays. The materials consists of asteroids or small celestial bodies in Kuiper belt or Oort's cloud to save fuels for rocket. They serve as future resources as well. After reaching the targeted star, genes are recreated to life. Josephson computer seems to be suitable to control the space ship in open space as it can be operated at very low temperature, and the average space temperature is minus 269 degree in centigrade. Radioisotope batteries should be applied as energy source.

We have to developed computers and soft wares functioning 44,000 years without serious error. Much more advance of sciences and technologies are required. In order to develop sciences and technologies, improvement of education efficiency is required. The reason is to develop new science and/or technology, scientist should be sufficiently educated. The required knowledge to develop newest science is increased by the course of time. Efficiency of basic education, reading,

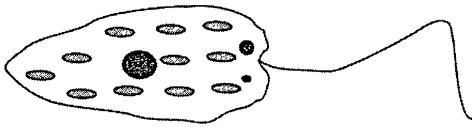


Figure 2 Euglena (Changed from the figure at <http://www.euglena.jp/>)

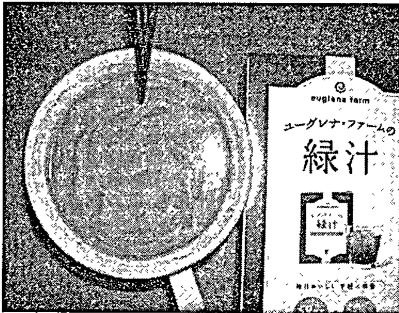


Fig.3 Green drink including euglena (<http://www.euglena-farm.jp>)

writing, calculating, and understanding international language, should be increased as far as possible. Universal Literacy Alphabet, Computer Numerals, New Abacus Numerals, International Numeration System, and Esperanto seem to play important roles. Automatic revival of genes to life also seems to be a big challenge. For mammalian, artificial uterus should be developed together with developing robots for substituting mother. Artificial uterus is under development to overcome the ethical problem of surrogacy. Automatic teaching machine should also be developed. Plants should also be transferred, as animals cannot live without plants. We should have to know the set of genes of species transferred with human genes. They should make closed set of creature group that last eternally. Cultivation plants and domestic animals are, of course, to be included.

Edible insects like crickets are suitable to

grow in small space. Guinea pigs also seem to be suitable to be transferred as they were fed in the house of South America as source of meat. Some kind of intestinal bacteria of New Guinea highlander create, from ammonia, essential amino acid for human kind are worth while to be transferred. Euglena (Fig.2) is especially useful as they are plant and at the same time animal. Recently Japanese company has succeeded in increasing Euglena in large scale (euglena Co. Ltd. <http://www.euglena.jp/>).

They can convert CO_2 to O_2 and using fertilizer they yield nutrition of plants and of animals.

Automatic recreation of living things from genes is required.

Bacteria may be kept unchanged for a long time simply by freezing and recreated to living state?. Micro organism in the intestines (gut flora) may be necessary for healthy living. Micro organism living in the skin may necessary for healthy living as well.

Bacteria in the ground seem to play important role for growing crops as well. The detail is not elucidated yet. The crops suitable for soilless growth are to be transferred to space colonies. Concerning virus, it is questionable to transfer, but it may be impossible to exclude them from transfer.

Large amount of biological researches is necessary for the project and can be developed even now. In space colonies that rotate around star, silicon computers should be used utilizing light energy of star. Space colonies seems to be the best solution because it dose not necessitate suitable planet. Even if there are suitable planets with water, they seem to be rather dangerous to live on. As there may be

dangerous bacteria against which our immune system does not respond. So even if the space ship reaches near planet with water, revival of genes to life should be done in space colony. Transfer to the planet will be done after checking of existence or not existence of dangerous pathogens by sending live mice and later sending inquiry persons wearing protect suits.

Zero discharge technique of resources should be developed for space colony life, where only the star light energy is necessary. The system can be researched and developed in orbit around earth. If such system is developed, it can be used to evade stronger sunlight in future in space colonies. Even perfect zero discharge technique of resources may be impossible, people can use small resources from asteroids.

A part of the proposed research is useful for near future.

The history of earth revealed that mass extinction has happened many times.

The dinosaur exterminated by the impact of a big meteorite. There is another possibility of mass extinction by intensification of eruption activity like largest mass extinction at the end of Paleozoic of approximately 250 million years ago. Today, through environment deterioration of 1 - 2 years, many people can survive eating kept grain, canned foods, retorts, instant noodles, and dried fishes and meats. But the deterioration period may be much longer.

Space guard center is now functioning and, in future, meteorite trajectory will be changed from collision to earth. But even if it fails, many genes and living humans in the space colony around earth or at Lagrange point of earth can rebuild the green earth,

unaffected by the tragedy. Moon base seems to be available as well. Underground base seems to be available as well. Intensification of eruption in long term, similar to that caused largest extinction at the end of Paleozoic, is more difficult but many people can survive in space colonies or moon base. Probably we should leave considerable energy source for future to launch space colonies, instead of consuming all for present life.

In another case, many scholars of genetics warn that development of medicine will endanger human being. As medical science and technology develop, even sickly people are saved and leave descendants. From personal point of view, I want to share their happiness. But in long term, it will endanger whole future human being. If we have established long term preservation of genes and revive them to life not automatically but manually, we can save human being. First we keep genes of present healthy persons and second after ten thousand years later, when human being is suffering, genes are revived to persons and by usual marriage they can decrease the number of genetic defects of people to approximately half. It is said, that when Buddha was born, he said "I am the only one admirable in the heaven and on the ground" . It is too awful to say so. But it is very nice to say "I am the life. I am the resurrection. I came to save people from extinction"

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