FOR IMMEDIATE RELEASE
June 27, 2005

2005 BLUE PLANET PRIZE: ANNOUNCEMENT OF PRIZE WINNERS

Professor Sir Nicholas Shackleton (U.K.)

For contributions to palaeoclimatology, particularly in identifying the glacial – interglacial climatic cycles and identifying the role of carbon dioxide as well as changes in the Earth's orbit in causing them; this aids us in better predicting future climate change

Dr. Gordon Hisashi Sato (U.S.A.)

For developing a new mangrove planting technology in Eritrea and through its utilization thus showing the possibility of building a sustainable local community in the poorest area of the world

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This year marks the 14th awarding of the Blue Planet Prize, the international environmental award sponsored by the Asahi Glass Foundation, chaired by Hiromichi Seya. Two Blue Planet Prizes are awarded to individuals or organizations each year that make outstanding achievements in scientific research and its application, and in so doing help to solve global environmental problems. The Board of Directors and Councillors selected the following recipients for this year.

1. Professor Sir Nicholas Shackleton (U.K.)
Emeritus Professor, Department of Earth Sciences, University of Cambridge
Former Head of Godwin Laboratory for Quaternary Research

It is important to know and understand climate change over the past in order to simulate future climate change more reliably. Professor Shackleton has focused his attention on the geologically most recent period in the earth's history, the Quaternary which covers about the last 1.8 million years. He has developed a method to analyse more accurately the fluctuations in size of ice sheets which developed many times during this interval, and has made major contributions to palaeoclimatology. Through understanding global climate change during the Quaternary, he is sounding a warning that we should be aware that increase in global warming gas may possibly trigger a rapid climate change in the future similar to those that have happened in the past, and is urging that the human race must make efforts to control the release of greenhouse gases.

2. Dr. Gordon Hisashi Sato (U.S.A.)
Director Emeritus, W. Alton Jones Cell Science Center. Inc.
Chairman of the Board, A&G Pharmaceutical, Inc.
President, Manzanar Project Corporation

Dr. Sato has long dealt with the task of trying to cultivate food in a harsh environment such as a desert, from his past experience of being relocated during World War II in a relocation camp in the California desert for those of Japanese descent. After realizing aquaculture in the desert, he has furthered his aim of planning food production and environmental conservation based on ecology and by developing a new mangrove planting technology in Eritrea. He has developed a technology of raising livestock through its utilization thus showing the possibility of building a sustainable local community. His achievements which have proved a practical measure to enable economic self-sustainability in the poorest area of the world are significant and are demonstrating to the world the importance of a way of living which regularly uses the technology of environmental conservation and humanity.

Both recipients will be awarded a certificate of merit, a commemorative trophy and a supplementary award of 50 million yen.
The awards ceremony will be held on October 19, 2005 (Wednesday), at the Tokyo Kaikan (Chiyoda Ward, Tokyo). The commemorative lectures by the prize recipients will be held at the United Nations University (Shibuya Ward, Tokyo) the next day, on October 20 (Thursday).

*This press release may also be viewed on the Internet from June 27, 2005 at www.af-info.or.jp.

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Profiles of the 2005 Blue Planet Prize Recipients

Professor Sir Nicholas Shackleton

It is important to know and understand climatic change over the past in order to simulate future climate change more reliably. Professor Shackleton has focused his attention on the geologically most recent period in the earth's history, the Quaternary which covers about the last 1.8 million years. He has developed a method to analyse more accurately the fluctuations in size of ice sheets which developed many times during this time, and has made major contributions to palaeoclimatology.

After graduating from Cambridge University with a BA in physics, Professor Shackleton received a PhD with a thesis titled "The Measurement of Palaeotemperatures in the Quaternary Era" in 1967. In this study he modified a mass spectrometer so that it could analyse tiny fossils which are found in the cores drilled from the ocean floor sediments. He analyzed the oxygen isotope ratio in the fossil shells of foraminifera from all over the oceans showing that the pattern of variation in isotope ratios is similar in sediments from the same era from all over the ocean. It is known that over the tropical oceans, light water with lower ^{18}O content evaporates more easily, and by selectively raining water with higher ^{18}O content, the water vapor (as clouds) is carried to the higher latitude with progressively less ^{18}O. Eventually, it is accumulated in the polar region as snow containing much less ^{18}O, than the ocean from which it came. Thus ice sheets are always formed from snow containing a few percent less ^{18}O than the oceans. He realized that during an ice age when ice sheets up to 3 km thick covered North America and Scandinavia and containing enough ice to lower the ocean level by 120 meters, the remaining ocean water must have been enriched in ^{18}O by a measurable amount. Thus he had discovered a method for reconstructing the history of global (mainly Northern Hemisphere) ice volume through the succession of ice ages.

In 1973 he analyzed a core from the western tropical Pacific that contained evidence of the most recent reversal of the Earth's magnetic field that occurred about 780,000 years ago. It was obvious that the ice-volume cycles that he reconstructed occurred roughly every 100,000 years. Now when he analyzed sediment cores he knew that each successively older ice-age cycle that he observed could be correlated with the corresponding cycle in the first core; hence he had discovered a method for assigning an age scale, based on the 100,000-year cycles in the first core.

Further work on the cyclicity in the sediment cores revealed that the major cyclice was in sync with the major changes in the eccentricity of the Earth's orbit, which supported the "Milankovitch hypothesis", and a paper was published in 1976 together with Drs. J. D. Hays and J. Imbrie that rigorously validated this idea. In the 1920's and 1930's Professor Milutin Milankovitch of Belgrade University made calculations of the solar radiation to the earth surface over the last to 600,000 years ago considering three elements: earth orbit eccentricity, angle of its rotational axis (obliquity) and precessional changes. He hypothesized that these changes caused the glaciation that had occurred during that time, but this idea was not generally accepted as correct. Hays, Imbrie and Shackleton showed the periodicity of 19,000

Attachment

Remarks from the Award Recipients upon Notification of their Selection

Professor Sir Nicholas Shackleton

"The Blue Planet Prize is by far the greatest honour I have been offered in my life, and it is a special pleasure that it comes from Japan.

My own scientific work has been concerned with aspects of global change in the geological past. I am very gratified that the Asahi Glass Foundation believes that my research has been of importance to those who are primarily concerned with the future of the earth's environment.

For me, one of the greatest attractions of life as a research scientist is the opportunity to collaborate with scientists from many different nations, with diverse backgrounds and approaches. During my career, I have worked with scientists from at least twenty different countries. I wish to take this opportunity to thank them all for enriching my life scientifically, culturally and socially. The University of Cambridge has supported my research activities throughout my career, enabling me to work outside traditional disciplinary boundaries.

Thank you for this wonderful recognition."

Dr. Gordon Hisashi Sato

"I am deeply grateful to receive the Blue Planet Prize, presented by the Asahi Glass Foundation. I am honored to join the company of past recipients of this prize, who are making major contributions toward solving global environmental problems.

I share this honor with the wonderful people of Eritrea. I began traveling to their war-torn, impoverished country in 1987, with the goal of establishing a sustainable economy to bring famine relief. Since then, we have established the only profitable, self-sustaining seawater agricultural program in the world- a program that has also resulted in significant environmental benefits. The 800,000 mangrove trees now thriving in the inter-tidal land along the Eritrean coast not only yield excellent fodder for growing herds of livestock that help feed thousands of Eritrean citizens, but also increase fish in the sea by providing a nutritious and protective habitat.

I hope that the Blue Planet Prize will not only help us expand our program in Eritrea, but will also allow us apply what we have learned in other regions of the world, bringing not only famine relief, but also diminishing tsunami damage and the problem of global warming.

Thank you for recognizing and supporting our mission to fight hunger while helping preserve our planet for future generations."

and 23,000 years (precessional changes), 41,000 years (obliquity) and 100,000 years (eccentricity) are all detectable in deep-sea sediment oxygen isotope and other records. For the first time it became possible to examine how the climate of different regions of the Earth responded to a well-understood external forcing (orbital changes).

From a geological point of view, this important discovery provided a much more precise and accurate way to construct an age scale for sediment cores, because it was possible to use all the three orbital periodicities together. Professor Shackleton was able to gradually extend the orbitally-calibrated age scale back 30 million years. This provided accurate dates for reversals of the Earth's magnetic field and for evolution and extinction of marine organisms.

After French and Swiss scientists discovered that there was less carbon dioxide in air bubbles trapped in ice from the last glacial period, he used the carbon isotope ratios in fossil foraminifera to reconstruct past carbon dioxide concentrations. His reconstruction was surprisingly similar to the first record obtained by French scientists from the Vostok ice core in central Antarctica. In a later study he showed that carbon dioxide was a major contributor to past global climate change during the period and that in fact the main features of climatic variability over the past million years can be explained taking account of Earth orbital changes as well as natural carbon dioxide changes. This work made a contribution to our understanding of global greenhouse gases (especially carbon dioxide) which may induce drastic climate change in the future.

Recently he has been working on the detailed record of the last glacial cycle. It has become known from the study of ice cores from Greenland that the earth had experienced drastic warming and cooling such as temperature difference of 10 degree within 30 years. These changes can also be found in sediment cores from the North Atlantic and by coordinating a European team Professor Shackleton was able to reconstruct many aspects of this variability including the European vegetation whose pollen can be found in the marine sediment. He points out that researchers are coming to a consensus that the rapid climate changes at that time were caused by sudden changes in ocean currents. As an example, the warm current from the Gulf Stream, which functions as a heat conveyor belt to the north Atlantic, was weakened or stopped in the past. There is a fear that in the future such a change might be triggered by global warming induced by human activities.

Professor Shackleton has had a major influence on the development of Palaeoceanography and Palaeoclimatology, and has served central roles in several international research projects. He has published more than 200 papers including highly renowned ones, taught and brought up many young researchers, and has been a major thrust in these field with his highly positive attitude. Besides serving as Director of the Godwin Institute for Quaternary Research, he has served many key positions such as the President of the International Union for Quaternary Research. He also played a big role in the international Ocean Drilling Program.

Professor Shackleton is distantly related to the Antarctic explorer Sir Ernest Shackleton and his father was described as the last of the great field geologists. Due to his father's research activities, he spent his childhood in east Africa and with his father's influence he chose geology for his career. He later looked back and described by saying "I liked to go out into the fields and wander across the countryside, and chose geology as my career, but I've spent most of my life in the lab doing analysis." He had an idea that by knowing the past global climate and eventually the earth's environment through the research in geology, this will enable us to find a way to tackle the issue of global environmental change in the future, and thus contribute to society. He has poured in his enthusiasm into understanding global climate change during the Quaternary which is also considered as the human era, and he is sounding a warning that we should be aware that increase in global warming gas may possibly trigger a rapid climate change that has happened in the past again in the future, and is urging that the human race must make efforts to control the release of greenhouse gases.

In addition to his studies of palaeoclimatology and palaeoceanography, Professor Shackleton plays the clarinet and has been an avid collector and has extensively studied the history of the instrument.

Biographical Summary

1937	Born June 23, in London
1961	B.A. University of Cambridge
1964	M.A. University of Cambridge
1965-72	Senior Assistant in Research, University of Cambridge
1967	PhD University of Cambridge
1972-87	Assistant Director of Research, Sub-department of Quaternary Research, Cambridge
1974-75	Senior Visiting Research Fellow, Lamont-Doherty Geological Observatory, Columbia University
1975-2004	Senior Research Associate, Lamont-Doherty
1987-91	Reader, University of Cambridge
1988-94	Director, Sub-department of Quaternary Research, Cambridge
1991-2004	*Ad hominem* Professor, University of Cambridge
1995-2004	Director, Godwin Institute of Quaternary Research, Cambridge
2004-present	Emeritus Professor, University of Cambridge

Awards

1985	Fellow of The Royal Society
1990	Fellow, American Geophysical Union
1995	Crafoord Prize, Royal Swedish Academy of Science
1998	Knighthood (for services to the Earth Science)
2000	Foreign Associate, US National Academy of Sciences
2002	Ewing Medal, American Geophysical Union
2003	Urey Medal, European Association of Geochemistry
2003	Royal Medal (Royal Society of London)
2004	Vetlesen Prize, Columbia University
2005	Founder's Medal, Royal Geographical Society

Dr. Gordon Hisashi Sato

Dr. Sato has long dealt with the task of trying to cultivate food in a harsh environment such as a desert, from his past experience of being relocated during World War II in a relocation camp in the California desert for those of Japanese descent. With the Algae -> Brine shrimp -> Fish food chain in mind, he has researched the theme of cultivating algae in the desert by utilizing seawater and sunshine which are abundant even in a harsh environment such as a desert along the sea, and eventually realized aquaculture in the desert. He has furthered his aim of planning food production and environmental conservation in famine stricken developing countries based on ecology and by developing a new mangrove planting technology in Eritrea that is called the world's driest area. He has developed a technology of raising livestock through its utilization thus showing the possibility of building a sustainable local community by improving local people's livelihood, and eventually made a pioneering contribution to promoting food production and greening of the desert.
His achievements which have proved a practical measure to enable economic self-sustainability in the poorest area of the world are significant and are demonstrating to the world the importance of a way of living which regularly uses the technology of environmental conservation and humanity.

Dr. Sato was born on December 17, 1927 in Los Angeles as a child between a first-generation Japanese immigrant father and a second-generation mother. From his upbringing, he grew up with a traditional Japanese values such as social obligations and respect for human feelings. During World War II for two years, he was relocated to Manzanar Relocation Camp in the California desert with his family. This made a significant influence on his future life and was the trigger for him to nurture sympathy towards people aggrieved and to build an idea to produce food in barren land. He graduated from Manzanar High School and after the war, as an American soldier, landed in Hakata, from Korea, seeing his parents' native country for the first time.

After returning to the United States, he studied biochemistry at University of Southern California, Los Angeles, while he was working as a gardener in Pasadena where CalTech was. He happened to have had a chance at CalTech to see Max Delbruck who later received the Nobel Prize in Physiology or Medicine and have him listen to his story. Max Delbruck earnestly listened to his desire to enter CalTech and arranged for him to take an examination and supported him to be accepted as a special student, and also supported him economically. These events changed Dr. Sato's life dramatically and he never forgot the indebtedness he owed and nourished an idea that education was fundamental to bringing up people, and he himself also provided opportunities for young people to get an education. Later, while he was the director of the W. Alton Jones Cell Science Center, he supported many Chinese and now he supports young people from Eritrea to be educated in the United States.

Dr. Sato was influenced in the laboratory at CalTech, by people such as Renato Dulbecco, James Watson, and Niels Jerne, who each received the Nobel Prize in Physiology or Medicine, who were in the lab those days. After doing research under Max Delbruck and earning a PhD in biophysics in 1955, he further carried out research at UC Berkley and University of

Colorado Medical School. In 1958, he became assistant professor of Graduate Department of Biochemistry at Brandeis University in Massachusetts. He served as associate professor and professor at Brandeis till 1969, and during that period he achieved the isolation of differentiated cells by isolating for the first time a clonal mouse neuroblastoma which when electrically excited forming neurites. He moved to University of California San Diego (UCSD) and was professor of biology till 1983. There he succeeded, with Izumi Hayashi, in cell culturing in hormonally defined medium devoid of serum and clarified that a specific hormone and a growth factor are necessary for cells. The development of a method using hormonally refined medium, not using serum containing complicated components, not only marked the beginning of the development in molecular cell biology, but also was an innovative achievement which led to the development of bio-industry with industrial production of useful substances utilizing animal cells. Dr. Sato made a significant contribution scientifically mainly in mammalian cell culture.

While at UCSD in the early 1980s, he began to work on how to produce food in a severe environment such as a desert, and started the research of growing algae in the desert with aquaculture utilizing the food chain in mind. He named this Manzanar Project from his past experience at the relocation camp for people of Japanese descent in the California desert during World War II. In 1983, he move from UCSD to the W. Alton Jones Cell Science Center in Lake Placid, New York and began to work in earnest on the Manzanar Project, which targets to realize a healthy sustainable life even for those people suffering hunger in a severe environment. Production facilities were built in the Atacama desert in Chile and in Fujian Province in China in the mid-1980s based on the research results. Unfortunately, as there were no active support from the local people, new location was sought and found Eritrea. The reason that Eritrea was selected was said to be that the country was under Ethiopian rule at that time and the people were oppressed and suffered from starvation and Dr. Sato felt sympathy in its resemblance to those Japanese Americans during World War II, and was attracted by the diligence and self-initiative of Eritrean people.

Dr. Sato began practicing aquaculture in the Northern Eritrean coastline in 1986 and the local people soon accepted his dedicated effort.

In practicing aquaculture, in order to protect the bank around the pond, mangroves were planted and as an experiment mangroves were planted above sea level and irrigated with seawater. Mangroves grew in the short term in either place similar to their natural habitat. From this fact, an idea surfaced that by changing the desert shoreline into mangrove forests will eventually be a more positive approach in enabling people to raise livestock and making them economically self-sustaining.

Dr. Sato taught lessons to people to challenge and not to be afraid of being criticized, and at that time he followed those lessons and took on the challenge. And the project to plant mangrove trees on the Eritrean coastline began. Before that, mangroves only grew on 15% of Eritrean coastline where annual rainfall of 20mm flowed into the sea, but its area was limited to about 100m from the shoreline. This small amount of rain was thought to have provided the nutritional elements necessary for the mangrove to grow and a chemical analysis based on a similar research approach as in the case of serum-free culture was conducted and it was disclosed that the seawater lacked nitrogen, phosphorous and iron among the nutritional elements necessary for the mangrove to grow. Then, he devised the basic technique to provide

these elements slowly to the mangrove. It is a method of burying a plastic fertilizer bag filled with 500g of 3:1 mixture of urea and diammonium phosphate and, on one surface, three holes with a 2mm-diameter nail were punctured near the mangrove young tree planted between the tidal lines. The bag contained two of the lacking elements, nitrogen and phosphorous, and they seeped out from the small holes punctured on one surface. The young tree was surrounded by a cage made of iron wire in order to protect it from being washed away and at the same time to be the source of iron. By providing nitrogen, phosphorous and iron gradually with this method, he succeeded in growing more than 800 thousand mangrove trees.
The leaves and the fruits became feedstock for livestock and the lumbers became building materials and fuel. Fish and shellfish began to create their habitat around the mangrove and provided food, and birds began to gather looking for fish. It became possible to grow mangroves easily and at low cost in area where in the past was thought difficult. This enabled the Eritrean local people to plant voluntarily by themselves without any outside aide and provided them a revolutionary mean to free themselves from poverty. This simple and clear method can be appraised highly as a practical example which proved that economical self-sustainability can be made possible while improving the environment even in developing area where there is a harsh natural environment.

The humble and down-to-earth approach Dr. Sato has taken, as a scientist, to tackle the root cause of poverty has earned him high respect and reputation from Eritrean national and local governments, from academia to the local people. The ecosystem in the Red Sea, the villagers and their livestock are already benefiting from Dr. Sato's idea and his work.

What Manzanar Project is aiming to do is to allow people living in a harsh environment like a desert become self-sustaining by creating a sustainable economy. Dr. Sato's activities are different from the previous aids from developing countries to Africa by not giving goods but providing a mean of food production together with a mean for people to become self-sustaining, which indicates how future aids should be.

Biographical Summary

1927	Born on December 17, in Los Angeles
1944	Graduated Manzanar High School
1951	BA Biochemistry, University of Southern California
1953-55	Teaching Assistant, Microbiology, California Institute of Technology
1955	PhD Biophysics, California Institute of Technology
1958-63	Assistant Professor, Graduate Department of Biochemistry, Brandeis University
1963-68	Associate Professor, Graduate Department of Biochemistry, Brandeis University
1968-69	Professor, Graduate Department of Biochemistry, Brandeis University
1969-83	Professor, Biology Department, University of California, San Diego
1983-92	Director, W. Alton Jones Cell Science Center. Inc.
1987-present	Distinguished Research Professor & Director of the Laboratory of Molecular Biology, Clarkson University
1992-present	Director Emeritus, W. Alton Jones Cell Science Center. Inc.

Awards

1982	Rosentiel Award, Brandeis University
1984	Member, National Academy of Sciences
2002	The Rolex Awards for Enterprise
2002	Lifetime Achievement Award, Society for In Vitro Biology
2005	Distinguished Alumni Award of the California Institute of Technology

Report on the Selection Process (14th Annual Prize, 2005)

A total of 1,100 nominators from Japan and 1,400 nominators from other countries recommended 129 candidates. The fields represented by the candidates in order of numbers, were ecology (40), environmental economics and policy making (19), atmospheric and earth sciences (15).

The candidates were drawn from 38 countries, with those from developing countries numbering 18 persons, or 14 % of the total.

These candidates were individually evaluated by each Selection Committee member, then the committee was convened to narrow down the field. These results were examined by the Presentation Committee, which forwarded its recommendations to the Board of Directors and Councillors. The Board formally resolved to award the Prize to **Professor Sir Nicholas Shackleton**, and **Dr. Gordon Hisashi Sato**.

The contents of the press release may also be viewed at the Asahi Glass Foundation's Internet web site. Please visit us on-line at:

http://www.af-info.or.jp

Message to the Japanese public

Professor Sir Nicholas Shackleton

The Blue Planet Prize is the most distinguished award offered for research into the natural environment of planet earth. It is an incredible honour for me to have been selected as the recipient of this prestigious award.

I have sought to devote my scientific career to improving our understanding of climatic and environmental change in the geological past. I am confident that by studying the past, the world-wide scientific community can learn how to reduce our negative impact on future climate. This is now truly the greatest challenge facing the human race.

Dr. Gordon Hisashi Sato

I am honored to receive the Asahi Glass Foundation's Blue Planet Prize. It is extremely meaningful to have the acknowledgement and support of this well-respected organization. I am especially gratified that through this foundation, the country of my ancestors is working to preserve our environment.

This award will enable me expand my work in Eritrea and in other countries. The lessons we have learned about self-sustaining economies in Africa are applicable elsewhere - even in Japan, which currently produces only 40 percent of the food it consumes.

By combining creative thinking and science, we can fill a great many of the world's needs. Thank you for helping make that happen.