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Japan the Horned Islands

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Fox the God's messenger (Ryuouji, Nara)

In this issue

Shopping mall (Osaka)

The newsletter can be accessed at the JSPS Stockholm homepage www.jsps-sto.com

I. Prologue

Science Literacy

by Hiroshi Sano

My research field is plant science. When I was working at the Nara Institute of Science and Technology (Nara, Japan), I was often asked to give a lecture about genetically modified (engineered) organisms (GMO), particularly crops. The audience was mostly ordinary people, including office and industrial workers, farmers, housewives and students. I carefully explained the procedure of constructing GMO, and its influence on agriculture, environment and health. At that time, people were concerned with artificial manipulation of genes, and were negative to utilize GMO in practice.

Through this experience, I realized that people's idea about GMO and science was limited. They have insufficient scientific knowledge, and a biased understanding of risk and benefit. For example, many people could not grasp the concept of gene. Some were innocently surprised to know that plants have genes. A lack of such a basic scientific knowledge makes it difficult to roughly but correctly understand the current status of technology. This may cause a misunderstanding of the concept of risk and benefit. It appears that people accept the scientific technology only when they are told that it is absolutely safe.

In science and technology, no "absolutely-safe" is available. Risk is often understood as synonym of danger, but correctly it means the probability of incidents that are not predicted or expected. Specialists may say that a risk can be lowered as much as possible but not to zero. What we should do is to carefully balance the risk (usually low) and benefit (usually high) of a technology before we accept it. What we should not do is to ignore a risk, even very small, if it is beyond our control.

The Fukushima accident involves all these features. It is obvious that the risk assessment when the power plants were set up was improper, but here I would like to question the other phase; do we correctly understand the radiation effects and crises? Everyday the government and the Tokyo Electric Co. inform the level of radiation in the air, soil, water and food. They announce that the level is 2-fold, 10-fold or 1000-fold higher than the standard level, but that such levels are not directly harmful to our health currently….

Across the gate and into the sun

To believe it or not ultimately depends on the individual. At this stage, to have basic scientific knowledge or understanding ability is important. Unfortunately the majority of us is not familiar with nuclear science, and may encounter difficulties to judge the situation. Nevertheless what we can do is to objectively consider and compare data with past examples for further action. To this end, we need accurate data, and appropriate scientific knowledge. In this context, the article by Dr. Lembit Sivher in this issue is suggestive and helpful. I believe that people's science literacy certainly plays an important role to calmly cope with the Fukushima accident *(Director, JSPS Stockholm Office).*

II. Special Issue: Tohoku-Pacific Ocean Earthquake

Radiological Consequences of the Fukushima Accident Due to the Large Earthquake, and Following Tsunami, in Tohoku, Japan 14:46 local time, March 11, 2011

by Lembit Sihver[1] & Frank Van den Heuvel[2]

The earthquake and Tsunami in Japan caused close to 30,000 deaths, missing people, and an unimaginable destruction of houses, harbors, roads and industries. It is still unsure how many people did really die since even the registration registers in several villages along the Japanese coast line were destroyed, so there is no exact information about how many people lived in some areas. Since in many cases all family members died, there is no one to list them as missing. Many industries were also destroyed and in e.g. Chiba prefecture, the Ichihara oil refinery was burning for eight days, spreading heavy pollution to the surroundings. Even if the accident at the Fukushima nuclear power plant have been the main news in the media outside Japan, it will not have a major impact on the environment in the long term, even if the economical consequences of the accident will be huge for Japan. The overreaction of authorities under pressure of the public opinion are not only affecting our countries but are impacting relief efforts which could save many more lives. It is clear that the debate on radiation is an emotional one.

We wanted to write this article to first give our deepest condolences and support to all the people who have died or missed their relatives, friends or other loved ones. Our hearts are certainly with them! We would also like to provide some information to the public based on the knowledge of what we currently know. We have no opinion on whether we should provide energy using nuclear power or other ways. We do believe that providing good, correct and objective information is the best way to proceed and that an informed public is capable of making sound decisions.

To start we would first like to clarify the dose terms as this seems to add a lot to the confusion. Dose is a physical concept and is a measure of the energy absorbed in a medium per mass unit. It is expressed in a unit called Gray (Gy). However, the amount of energy is not enough to evaluate the biological effects of radiation since different types of radiation have different effects on the DNA and our cells. To get an estimate of the local biological effect, i.e. a measure of the biological damage the ionizing radiation does to molecular structures and ultimately to the cells that are made up by these molecules, we need another unit. The absorbed dose is therefore multiplied with different weighting factors depending on the type of radiation. The product of the absorbed dose and the weighting factor is called equivalent dose and is measured in Sievert (Sv). So the value of this tells us how much the cell is changed. It can be changed so that the cell dies or, if the dose is sufficiently low, it can change the cell's behavior. Note that not all changes to a cell will make it behave like a cancer cell, and the cell can also repair most of the damages very efficiently.

Finally, to estimate the total risk a person exposed to radiation will have to get cancer later in life, the equivalent doses in the different organs are summed up and each organ is multiplied by a different risk factor, since different organs have different sensitivity to radiation. The total estimated risk is called effective dose and is also measured in Sv.

In the press we see that terms like very high dose, doses higher than the legal limit etc... are being used. It is hard however to find out what is meant by a high dose and where the legal limits come from. We want to define what this means clearly in this text so that our words cannot be misused. Also we do want to point out, that radiation is dangerous and should be handled with care. However, there are many other things in our world that are also dangerous which should be handled with care. What is important is not to be too scared of them and to understand the risks correctly.

When describing the risks for people being exposed to radiation, one must first distinguish between acute

radiation illness, which a person will get immediately after exposure to very high levels of radiation, and effects which might occur later in life, e.g. cancer. The risk for getting cancer depends on many factors, including the age when being exposed to the radiation, gender, genetic background, type of radiation, dose, dose rate, etc. The risks associated with being exposed to low levels of ionizing radiation is still not totally clear, but if we use the information available from epidemiological studies of the atomic bomb survivors from Hiroshima and Nagasaki, and people being exposed to higher than normal levels of ionizing radiation due to the Chernobyl and other accidents, we can draw some conclusions.

The burning Ichihara oil refinery, Chiba

The latest report on radiation risks from The National Academy of Sciences (NAS), in US,
called "BEIR VII Report: Health Risks from Exposure to Low Levels of Ionizing Radiation report" (2005), focuses on the health effects of x-rays and gamma rays. Cancer incidence data from the tumor registries of the atomic bomb survivors are included, and it can be read that 13,000 cases of solid cancer (10,000 deaths) have been registered. This and other studies show that the risk for children is greater than for adults, e.g. the same radiation in the first year of life for boys produces three to four times the cancer risk as compared to exposure between the ages of 20 and 50. Female infants have almost double the risk than male infants.

During the Chernobyl accident, 1986, 134 plant staff and emergency workers received such a high dose of radiation that it resulted in Acute Radiation Syndrome (ARS); many of them also incurring skin injuries. The high radiation doses provided fatal for 28 of the people in the first few months following the accident, but after that not one of the workers who got ARS have died in any death directly associated with the radiation exposure according to the EU UNSCEAR report 2008. After the accident, a substantial increase in thyroid cancer has however been observed among persons being exposed to the accident related radiation as children or adolescents. For the time period 1991-2005, more than 6,000 cases were reported in Ukraine, Belarus and four of the more affected regions of the Russian Federation. A substantial portion of these cases can be attributed to drinking milk contaminated with radioactive iodine.

From these studies one can expect that approximately 1 out of 100 persons would develop cancer (solid cancer or leukemia) from a dose of 100 millisievert (mSv) while approximately 42 of the 100 individuals would be expected to develop solid cancer or leukemia from other causes. Normally it is assumed that lower doses produce proportionally lower risks.

Knowing all that, we can determine what quantities of dose we call high or low. "Extremely high doses" are those that induce radiation poisoning with lethal effects (e.g. 5 Sv or higher), then we will call "very high doses", those that have deterministic effects, 1 Sv or higher. "High doses" are those which will have a significant impact on the non-deterministic effects and will increase cancer rate in a population, 100 mSv is a reasonable threshold for this, with mSv denoting one thousand of a Sv. "Low doses" are those that are below the previous threshold but above the natural background of around 1 mSv, which is the dose that everybody is exposed to due to the fact that radiation comes from all types of sources naturally, for example cosmic radiation, radiation from rocks, taking an airplane, or going for a ski trip, which is also very variable depending on where you live. In addition to the natural background, we get on the average around 2 mSv comes from inhalation of radon gas in our homes, and around 0.5 mSv from medical examinations. Finally, "very low doses" are those below the background radiation. Legal limits are set in such a way that the implantation of a nuclear facility or hospital facility is indistinguishable from the background (i.e. having something like that in your neighborhood should not change the incidence of cancer) and is therefore usually set to about half of the background (e.g. 1 mSv the legal limit for the public).

What radiation levels are there in the surroundings of the Fukushima Daichi nuclear power plants in Japan? Just after the blast of unit 2, at Fukushima Daichi plant, on Tuesday, March 15, dose rates up to 400 mSv/h were reported unit 3 and 4 by the media, but then dropped back to 0.2-0.6 mSv/h, with occasionally local high spikes. Dose rates up to above 1000 mSv/h have later been reported at specific places at the site and a significant amount of contaminated water has been released to the ocean.

Japanese government first evacuated the local residence within a 20 km radius of the Fukushima nuclear power site, and recommended the people who live between a 20 km and 30 km radius to remain indoors. Later the government recommended that also people living between a 20 km and 30 km radius of the site should evacuate. The reported dose rates within the evacuated zone have been of the order of 0.01-0.2 mSv/h, i.e around 200-4000 times higher compared to the normal background of around 0.05 μSv/h.

According to the experiences from the atomic bomb survivors, Chernobyl, and other low dose exposures, an excess dose of around 0.10 mSv/h during one month would cause less than one extra cause of cancer in 100 persons within their lifetimes. This should be compared to that around 42 individual in 100 persons will develop cancer from other reasons. Note that the doses provided from the authorities are in mSv per hour. This means that if the dose rate at one place is 0.10 mSv/h, one mSv is delivered to a person who stays in that spot for ten hours. So if he only stays there for half an hour he receives half the dose. In this way people can work in areas with high dose rates when you limit the time these people spend in these areas. That is why people work in shifts. The effects of radiation do have a limited cumulative effect but for most cases it will not last longer than a year, hence the limits on yearly exposure. It is also very important to remember that a high dose to a hand or foot is much less of a problem than if the whole body would receive that dose.

The most exposed people are the heroes, called "Fukushima 50" - the workers trying to regain control of Fukushima Daiichi nuclear power plant. They are allowed to be exposed to up to 250 mSv, and according to media, 19 of them have up to now been exposed to levels above 100 mSv, and several of them close to 200 mSv, which is still well below the levels where you can achieve ARS but leads to a small increased risk for cancer later in life. Their willingness to also take other risks connected to this work, e.g. risk for explosions, fires, make them anyway indeed to heroes.

A final source of confusion is the difference between ionizing radiation and radioactive contamination. The first are particles of sizes smaller than an atom, they can be photons (electro-magnetic radiation), electrons, protons, neutrons or other ions. The photons also need to have sufficient energy, enough to cause ionization in molecules. Radioactive substances are
a source of radiation. They are much larger than the particles just mentioned and can sometimes be seen by the naked eye or even be of macroscopic size. The contamination occurs when the particles are small enough (more like dust) so that it can be deposited on the skin or clothes or contaminate the food. Because it can get close to you the doses coming from the particles can be quite high locally and when ingested they can sometimes stay in the body for longer times, more particularly if the type of material is used chemically in the body. An example of the latter is iodine which is stored in the thyroid. That is why it is recommended to eat iodine tablets if there is a risk of being exposed to radioactive iodine.

The iodine tables serve to overload the thyroid with iodine so that no additional radioactive iodine will be taken up by the gland. When eating or drinking contaminated food or liquid, you might also get a higher dose because the time you spend with the substance in the body is longer than if just being exposed to it for a shorter time outside your body. A bright side is the fact that radioactive substances become less and less radioactive over time. So if you wait long enough there will be less or no ionizing radiation from the source, but how long you need to wait depends on the so called half life of the nuclide which is different for different radioactive nuclides. The half life tells after how long of a time half of the amount of the nuclide is gone. For example iodine-131 has a half life of 8 days, and cesium-137 has a half life of 30 years.

Below are some questions which the authors of this article obtained in the end of March from a random

group of people working for a women's magazine having various educational backgrounds. So these are questions asked by people with limited knowledge on this subject. We hope that answering these questions using the knowledge described above will provide a better understanding. Please, notice that some of the questions and answers are already out of date since the situation at Fukushima Daichi is changing on a day to day basis.

Q1: Is a meltdown still possible
A1: Most likely three of the reactors have already got partly meltdowns, but the cores are confined within the reactor tanks, which is located inside the containment vessels. However, there has been leakage of radioactive water from unit 2 to the surrounding because of at least one crack in the system of concrete trenches and tunnels.

Q2: What if the molten substance melts into the earth. Could it lead to explosions (China Syndrome?)
A2: No, the molten substance cannot lead to explosions

Q3: If it doesn't explode, what happens to the area where it gets into the earth?
A3: The soil in that area will then be contaminated and should not be used. Since the reactor is built into a concrete vault, this is highly unlikely. This was not the case at Chernobyl.

Q4: We don't hear anything anymore about this radioactive cloud. Did she drift towards the ocean? If so, is the fall out of this cloud harmful for everything in and around the sea? When will we see effects of this.
A4: The concentrations are low as well as the possible radiation dose obtained is low or very low in terms of the way we have defined these quantities.

Q5: They are constantly pouring water on the units at Fukushima. Does the water evaporate? Doesn't that give off poisonous fumes?
A5: When partial meltdown occurs it is likely that the fumes contain radio-active material. Most of the content will decay very fast. The longer living radio-active materials will still be there. They are not poisonous in the classical sense. They are radioactive and will lose the radiation over time. The measurements of the fumes have been measured in Japan and do contain iodine and cesium again in concentrations that will not affect health as we explained above.

Q6: What with everything being imported from Japan? Should these be checked for radioactivity? Maybe a stupid question, but should everyone landing in Stockholm coming from Japan be tested for radioactivity?
A6: Testing stations have been set up to alleviate concern, but only very, very minor levels of radioactivity have been detected.

Q9: What is it about the iodine pills? How do they work, are they themselves harmful? Are they also for people older than 60?
A9: The iodine pills serve to overload the thyroid with iodine so that no additional iodine will be taken up by the gland. The radio-active iodine then does not stay in the body, reducing the dose. They work for everyone; however the latency (the time it takes for cancer to manifest itself) is about 30 years for thyroid cancer. This means that most people will have died from old age.

Q10: Do we know what the effects are of radiation exposures? Can children withstand less than grownups?
A10: See our explanation, and yes children are more susceptible and have a much longer life ahead of them.

Q11: You can become contaminated by the air, but is it also possible through eating food. Does it have different consequences or effects?
A11: Contamination on the skin can be washed away, while ingested contamination stays for some time inside the body, and is also close to the internal organs, and is therefore more dangerous.

Q12: Does a gas mask or living in a bunker help if being exposed to a radioactive cloud?
A11: A gas mask that keeps particulates out will definitely help not to get them into your lungs. A bunker is good for the radiation itself, not necessarily for the contamination unless it has a closed circuit or effective filter.

Q13: Can you ever find out whether a cancer was due to an exposure to radiation.
A13: If the radiation was high and we have a lot of

cases, like in the Chernobyl accident, then we can be sure. However, for individuals it is almost impossible as the cause of cancer is usually rooted in a combination of different causes, genetic, environmental and in some cases stemming from infection (e.g. HPV).

Q14: What is the difference between an atomic bomb and an exploding nuclear plant?
A14: The nuclear plant explosions in the Japan case were due to hydrogen gas which was built up inside the plant. An atomic bomb is far more powerful and is based on a very fast chain reaction. In a nuclear plant the chain reaction is very controlled, not like in a atomic bomb, and was stopped automatically at the first sign of the earthquake.

Q15: Does it really help to wash with soap and water after a radioactive contamination?
A15: Yes, washing away the dust will help. Of course this does not help for ingested contamination.

Q16: When someone has been radio-actively contaminated is it then a given that you get cancer, or is one person more susceptible than another?
A16: One person is more susceptible than another. However it is not a given. It highly depends on the dose as outlined above.

Q17:This is a question pertaining to a newspaper article saying that of the 300 people now designated as the Fukushima 50 (because they worked in 50 person shifts) in the plant half of them will die of radiation poisoning, the other half will have a shortened life expectancy and a higher risk for cancer. Also one should never eat sushi again. What is true about this?
A17: Our information does not show those type of dose levels. What we know is that they are currently held to get a total dose of 250 mSv, which puts them in the high dose category, and therefore volunteers were selected. The messages that you hear that they evacuate the control area are when the dose rates are of that level that they would reach the maximum level too soon.

Q18: Why do authorities keep saying that the radioactivity that ends up in our atmosphere and the tens of thousands of liters of radioactive water that have now been dumped in the sea are “harmless”?
A18: Because they currently are of such concentrations and content that they are, taking into account the knowledge we outlined above.

Q19: How far does a radioactive cloud have to travel to be completely “dispersed”?
A19: It depends on the original content and concentration of the cloud. Going half way around the world will disperse a cloud from Japan with the levels measured there to very low dose levels.

Q20: People say that you also get irradiated while flying? How much is that? If so, isn't being a pilot a dangerous occupation?
A20: A flight from central Europe to Japan will provide around 0.05-0.07 mSv. Average doses for airplane pilots are of the order of 2 to 3 mSv per year. Being a pilot can be dangerous, but more due to stress, changing times zones, accidents and terrorists. But flying is still not as dangerous as driving your own car.

Q21: Is it possible to buy a radiation dosimeter for your own use, so that you can take it anywhere with you?
A21: Everything is possible, although not cheap. However, if you want to be worried that is the best way to go. The dosimeter will give you a reading all the time due to background radiation. If you do not know how to interpret the reading you will be more worried all the time *([1]Professor, Chalmers University of Technology, [2]Professor, University of Leuven).*

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Note from a Forensic Odontologist

by Hisako Saitoh

The Tohoku-Pacific Ocean Earthquake struck Japan, 14:46 Japanese time, March 11, with the disastrous tsunami hitting the shorelines of Iwate, Fukushima and Miyagi only 20 minutes afterwards. The next day at 10pm, I headed out for Iwate Prefecture, by Japanese national police agency to do postmortem examination, consisting of three forensic pathologists and two forensic odontologists (including me) from Chiba University and one forensic odontologist of Nihon University School of Dentistry. We went by Chiba prefectural police's cars to the city of Rikuzentakata which had been severely damaged. The dead bodies had been taken to a gymnasium of a junior highschool in the city, in which we also did postmortem examination. I was quite shocked just to see the mere amount of bodies. We worked constantly for three and a half days, but still only examined around 130 dead bodies. There were several aftershocks which shook the gymnasium, and I was often frightened. We left Iwate on the evening of the 16th, and arrived back in Chiba in the morning of the 17th.

It has passed 13 days after the earthquake. The police is responsible for the identification of the unknown bodies, but I think that the identification using dental findings, fingerprints and DNA typing requires long periods of time, because the antemortem materials have been lost due to the wave the media has not really covered this issue, but in my opinion, the death investigation system in Japan has been insufficient, and I hope this present system will now get reviewed properly. Japan can sometime have a tendency to turn a blind eye to something unpleasant, but we live in a country where large-scale disasters could happen to anyone at anytime and anywhere. In many aspects, Japan is at a crucial stage, and the government should at least secure a minimum of security.

The effect of the problems at the Fukushima nuclear plant will concern use ven longer. According to the recent reports governmental officials advise the Japanese people not to be swayed by foreign media or to pay attention to exaggerated foreign news. I do not know the truth of everything, but the mountain of corpses and 360 thousands evacuated people are real. My hope is that Japan can make this into an opportunity to be reborn as a strong nation prepared for natural calamities *(Assistant professor, Department of Legal Medicine Graduate School of Medicine, Chiba University).*

My Experience of the Earthquake

by Kazutoshi Ono

I am from Tohoku area, but when the Tohoku big earthquake struck Japan, I was working at JSPS office in Tokyo. Since all Japanese are used to earthquakes since childhood, we first thought nothing of it. However, the trembling increased in strenght and from the wall and floor creaking noises was heard. Even Japanese people could no longer be calm. A young woman next to me began screaming hysterically and I actually thought this would be my final day. When the quake had subdued, we were still in shock and could not do anything but re-live what just had happened. After calming down, my first thought went to the safety of my family and friends. I tried to call them but my cellphone did not work, since everyone was using theirs at the same time. The cellphones turned out to be as useless as a toy in this emergency situation. Finally I got in touch with my family using twitter and fortunately they were all safe.

The social networks really did a great job in this earthquake, helping people to confirm the safety or the tragic loss of loved ones. Within 1 day after the earthquake, I could reach all of my friends living in Tohoku area, the centre of the earthquake, except one who lived in Rikuzentakada which was totally destroyed by the tsumani. Consulting common friends, I updated his information to the Google Person Finder. My duty was now to check the information every hour, even when working. This was very stressful, but seven days later I received information that he had evacuated to a temple. On March 22th, I got a mail directly from him saying his house had been completely destroyed by the tsunami but that he was still alive. After reading the mail, I could not help shedding tears of pride for his fighting spirit *(Program Coordinator, JSPS Stockholm Office).*

III. Reports

JSPS Sweden Alumni Club
General Assembly & Seminar
by Lisa-Mi Swartz

In March, JSPS Sweden Alumni Club held its annual General Assembly followed by a seminar at the Museum of Far Eastern Antiquities, Stockholm.

The general assembly discussed the previous year's activities and planned for the coming year., if interested, please access the minutes via www.jsps-sto.com.

There has been an increased interest in BRIDGE re-invitation program, and reports from returning BRIDGE-fellows will be published in this newsletter.

The seminar *Japanska kläder då och nu* (Japanese fashion – today and yesterday), was an open event, carried out with the support of the Museum of Far Eastern Antiquities. The speakers were Petra Holmberg, the museum's Japanese collection curator and Anna Pettersson, Stockholm University. Petra Holmberg introduced the kimono and other Japanese costumes to the audience, and Anna Pettersson described various modern Japanese subcultures. Satoko Salme and Komaki Yuu, Japanese Association in Stockholm, held a demonstration of how to wear a kimono while exhibiting beautiful traditional Japanese clothing. The seminar draw a big audience and ended with a delicious sushi-eating mingle-time *(Secretary, JSPS Stockholm)*.

Kimono-demonstration

JSPS Finland Alumni Club
Joint Event with the Japanese Embassy
by Taijiro Tsuruoka

On March 4, 2011, the JSPS Alumni Club in Finland and the Embassy of Japan in Finland held an event at the Japanese ambassador's residence in Helsinki. Embassy of Japan in Finland yearly organizes a gathering of former Japanese government scholarship recipients. This year, the event also celebrated the recent founding of the Monkasho Scholarship Alumni Finland.

Ambassador Murayama and FAC Chair Antero Laitanen

At the seminar, Ms. Anni Kynsilehto made a presentation in fluent Japanese. She is the first degree holder from a university in Japan send as Monkasho Scholarship from Finland. She introduced her four years' life of study at the University of Tokyo.

The presentation was followed by Professor Atsuhiko Shinmyo, Vice President, Nara Institute of Science and Technology, whose lecture was titled "New Trend of Plant Biotechnology. " The lecture was easy to understand for the audiences and it attracted great interests and questions.

After the seminar, the Monkasho Scholarship returning students interacted with members of JSPS Alumni Club in Finland. It was a fruitful event, and hopefully it will enhance mutual collaborations between Monkasho and JSPS Fellows *(Program Coordinator, JSPS Stockholm)*.

JSPS Colloquium

Direct Imaging in Bio/Medical Science

by Taijiro Tsuruoka

Sponsored by the JSPS Stockholm Office, the above-titled colloquium was held at Lund University on 18 January. The event was planned by Prof. Yoshinori Fujiyoshi, Kyoto University, and Prof. Reine Wallenberg, Lund University, who were respectively referred by Prof. Osamu Terasaki, Stockholm University, and Prof. Sven Lidin, Lund University.

Over recent years, there has been a growing fusion between research in biology/life science and physics/chemistry. This interdisciplinarity is accelerating the advancement of biology by providing new openings for elucidating various mechanisms needed to sustain life. In seeking to better understand biological functions, “direct imaging” is becoming increasingly important as it allows selective visualization of the microstructures of specific molecular parts of an organism.

Under the sub-themes “Importance of imaging and image processing,” “TEM techniques,” “Optical imaging,” and “Magnetic resonance imaging/PET,”

Prof. Fujiyoshi’s lecture

leading researchers from Sweden and Japan delivered presentations on the latest progress made and unique approaches employed in the direct imaging field. Some 50 researchers and students participated actively in the colloquium, some coming all the way from Stockholm and Linköping. A poster session gave young Swedish and Japanese researchers an animated opportunity to exchange views and hone their expertise as the field’s future trailblazers *(Program Coordinator, JSPS Stockholm)*.

JSPS-KVA Seminar

Yeast Biotechnology: Cold-induced Expression System & High-throughput Reporter Assay with Novel Secretory Luciferase

by Satoru Ohgiya

Japan-Sweden collaboration seminar organised by JSPS and KVA (Swedish Royal Academy of Science) was held at Stockholm University on 19 October, 2010. I herein report on a road to the seminar and my experiences in Sweden.

The first e-mail from the JSPS domain arrived on 9 June, 2010. The e-mail said, "You have been nominated by Swedish Royal Academy of Science and we are pleased to invite you to Stockholm to have a seminar as a JSPS-KVA seminar". This jokey e-mail was not removed from my mail list since it was quite pleasant for me. However, the second e-mail from my best collaborator, Prof. Barbara Cannon of Stockholm University, made me recognise that the previous mail was serious. She has submitted an application to KVA long ago to invite me to Stockholm and was thus surprised when she received an e-mail from KVA. She told me that you now got the first place in a queue. Some days later, I received another e-mail from JSPS for the details of the JSPS-KVA seminar. The story finally became true.

I have been working in Prof. Cannon and Prof. Jan

Nedergaard Lab in 1998-1999 as a JST (Japan Science and Technology Agency) fellow and a postdoctoral fellow of the Wenner-Gren Institute. After returning to Japan, my research topics have changed several times and thus we could not share the same research topic for years. However, we have kept in touch each other over decade.

The seminar entitled "Yeast Biotechnology: cold-induced expression system and high-throughput reporter assay with novel secretory luciferase," was held at a lecture room in Stockholm University. I opened my lecture with several slides concerning a Nobel laureate of the year in Chemistry, Dr. Suzuki of Hokkaido University. Since I am also working in Hokkaido University, the first Nobel winner in our university was the hottest topic at that time. In a few slides, I tried to find some common points between Dr. Suzuki and me. Unfortunately, the date of our lectures is the biggest difference, but I found that the names of our wives are the same. Indeed, this was trivial introduction of my lecture, however, I always feel that teachers must start a lecture with amusing introduction to keep student's attention in Japanese university. I always felt that all attendants in Sweden actively participate to the lectures whereas students in Japan are generally passive in university lectures. This is a serious issue of education in Japan.

My lecture consisted of two parts as below. These new biotechnological tools have been developed for innovation of yeast biotechnology in industry and basic research. I introduce these techniques briefly.

(1) Cold-inducible expression system in Saccharomyces cerevisiae. Expression at low temperature has been often employed for aggregate-prone proteins in Escherichia coli. We have developed cold-inducible expression system in yeast since yeast can grow at lower temperatures such as 4-10 ˚C than E. coli does. Together with the use of a cold-inducible promoter identified by microarray analysis, we confirmed that the cold-inducible expression system in yeast was suitable for the expression of various proteins. The expression efficiency of GFP (Green fluorescent protein) in our cold-inducible expression systems was the best among the commercial yeast expression systems. In addition, we have succeeded to produce various human proteins which could not be expressed in E. coli. Our expression system was commercialised by a Japanese company.

(2) High-throughput reporter assay with novel secretory luciferase. Yeast reporter assay has been used for not only molecular biology experiments but also applications such as the measurement of endocrine-disruptors (YES assay, Yeast estrogen screen assay). However, conventional yeast reporter assay was laborious and time-consuming due to the use of an intracellular enzyme, b-galactosidase as a reporter protein. In order to overcome this problem, we employed a novel secretory luciferase, Cypridina noctiluca luciferase (CLuc) for the yeast reporter assay. The CLuc yeast reporter assay was developed and commercialised by a Japanese company. Since the CLuc enzymatic activity can be measured with a aliquot of culture medium, it is quite easy to perform time-course experiments. The CLuc reporter assay can be automated in part by lab automation system with a microplate format for whole determination steps indicating that the CLuc reporter assay is suitable for high-throughput analysis. As a few examples, I demonstrated the determinations of transcriptional activity of more than 500 promoters in yeast genome and the determinations of secretion ability of more than 500 signal peptides in yeast genome. These strong promoters and useful signal peptides would be applied for the production of various proteins. We believe that the CLuc reporter assay would be a powerful tool for various bioassays in yeast.

After my presentation, we had many discussions. As expected, most of questions were related to molecular mechanisms of our technology. I explained those though some were still unknown. Some participants were interested in our technology in terms of the integration of our systems into their research. I also have good suggestions from participants. This would be the most important consequence of the JSPS-KVA seminar.

On 20 October, 2010, I took a X2000 train to Gothenberg to visit Dr. Nielsen's lab of Chalmars University. Dr. Nielsen focuses on systems biology and synthetic biology of yeast from basic science at molecular levels to industrial application. I had not visited his lab but I thought that our interests were very closed. When I visited his lab, many stuffs and postdocs came to me by turns to show their research topics. It included basic mechanisms of protein secretion in yeast and production of useful chemicals using yeast cells at an industrial scale. I talked the related results in our lab so that we made exchanges of our knowledge. Through these discussions, we have recognised that our goals were very closed. Recently, Dr. Nielsen and I have submitted a proposal of international collaboration research to a JST program of "Strategic Japanese-Swedish Cooperative Program

on Multidisciplinary BIO." This is another result of my visit to Sweden.

After only 5-hour stay in Gothenberg, I took a return train to Stockholm. At evening, Prof. Sano, the Director of JSPS Stockholm Office, Prof. Cannon, and I together with partners had a nice dinner at Stockholm. I often felt that time in Sweden passes much slower than in Japan, but such dinner time exceptionally flies.

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I would like to thank Prof. Cannon for the preparation of the seminar and the arrangement of Dr. Nielsen's lab visit. I also thank Prof. Sano, Ms. Kamoshita, Mr. Tsuruoka and other JSPS stuffs for supporting my lecture and my trip. The trip for the JSPS-KVA seminar was very fruitful and successful for me *(Professor, AIST)*.

The Nobel Prize Ceremony 2010

by Yuko Kamoshita

December 10, 2010, the Nobel Prize ceremony was held in Stockholm. This week, called the "Nobel Week", the Nobel Foundation hosts various events including the annual award ceremony and banquet. Since this year's laureates included, two Japanese scientists, Professor Emeritus Akira Suzuki (Hokkaido University) and Professor Negishi Yoshikazu (Purdue University, USA), the interest from Japanese media was big and Japanese journalists accounted for more than half of the press staff registered.

The Nobel lecture in Medicine or Physiology was held at Karolinska Institute. The laureate, Professor Edwards G. Robert was absent due to ill health. In his place, his wife Ruth Robert was present to receive the greetings from the appreciative audience. The next day the lectures in physics, chemistry and economics took place at Stockholm University Aula Magna, an auditorium which seats more than 1000 people.

The award ceremony is always held December 10 to commemorate the day of Alfred Nobel's death. The venue is the Concert Hall, which is beautifully decorated with flowers. Majestic music is performed by the Royal Stockholm Philharmonic Orchestra during the event.

Marcus Storch, Chairman of the Board of the Nobel Foundation, held the first speech. He pointed out the passage where Alfred Nobel says that "It is my expressed wish that in awarding the prizes no consideration what so ever shall be given to the nationality of the candidates, but that the most worthy shall receive the prize, whether he be a Scandinavian or not". Mr. Storch also warned against the current trend of too much emphasis on applied research by universities and political establishment. "Basic research is important for the human development", he concluded.

The Nobel medals for physics, chemistry, physiology

and medicine, literary, and economy were then awarded by the King. In chemistry, Professor Negishi, Emeritus Professor Suzuki as well as Professor Richard F. Heck received the medal after a speech by Professor Jan-Erling Bäckvall on their achievement.

After the ceremony the guests moved to the Blue Hall in the City Hall, where the Nobel Banquet is held. The empty space of the Blue Hall looked stunningly different, decorated with colorful flowers and a bountiful of candles. The feast started with the toast to the King by Marcus Storch, which was followed by the King's toast to Alfred Nobel. At the end of the banquet, Professor Negishi made a speech in which he stated "the aim of the research is not for a prize but the prize or reward is coming after it".

Thanks to the will of Alfred Nobel, Sweden has both got a great worldwide network amongst cutting-edge research and an opportunity to once a year gather, the most prominent scientists as well as the interest from the world during the Nobel Week. Nobel's legacy is indeed great *(Deputy Director, JSPS Stockholm Office)*.

IV. Science & Culture

Medical Imagery in an Imaging Society

by Max Liljefors

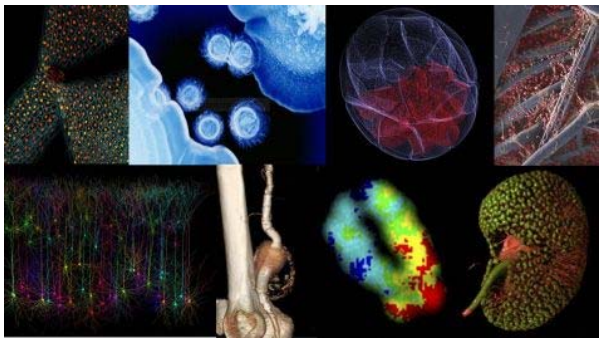
The medical sciences have become increasingly dependent on computer-aided imaging technologies, such as computer tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET), etc. Those technologies have enlarged dramatically the accessible amounts of data about the human body; data which algorithms compute into visual expressions, since images have proven to be an often superior means to organize large data sets and to derive useable information from them. Medicine has thus become a "pictorial science", which produces and communicates knowledge to a large degree through pictures. In American philosopher of science Don Ihde's words, visualism dominates science today.

Medical imagery is often aesthetically intriguing, and the interior of the body is in itself a fascinating motif for most people. Therefore medical visualizations attract much attention in society at large; in popular science, popular culture, and the visual arts. It is no exaggeration to say, that people today understand – and misunderstand – science mainly through its images.
As they spread throughout culture, medical images blend with other pictorial genres and conventions, and become part of the incessant flow of images in contemporary picture society. From the cultural scientific point of view, images are notoriously polysemic, i.e. they usually mean different things to different people. Furthermore, they are almost always perceived to be meaningful, even if no concrete information is derived from them: pictoriality in itself signals some kind of order or purpose, even if it is not put in words. This generic feature of images has consequences for how medical pictures are understood by the general public.

Metadata about the production of a medical visualization does normally not accompany the picture when it migrates into culture at large. Hence, its visual characteristics stand for themselves, as it were, and easily take on new connotations. One could say that in their journey from the laboratory to culture, medical images typically are emptied of data and become filled with cultural meaning instead. Therefore, a layperson who lacks the expertise to decode the specific data of a medical visualization may nevertheless perceive the picture as highly meaningful and saturated with significance.

The cultural impact of the X-ray image at the end of the 19th century is a case in point. Besides their medical implementations, X-ray machines became popular attractions at world fairs and amusement parks, shoe vendors used them to examine their customers' feet, and wedding photographers made X-rays of the hands of newly-weds, in which the rings stood out with symbolic clarity.

Moreover, scientists, esotericists, and artists alike pondered the implications of the X-rays' apparent victory over opaque matter. Even a renowned inventor like Thomas Alva Edison is reported to have speculated that the X-rays would help man to eventually defeat death. The cultural fascination of the X-rays prompted imprecise, yet persuasive ideas about man's liberation from the constraints of corporeality in a "forth dimension", and about the "dematerialization of matter". Such ideas influenced modern artists like Pablo Picasso and František Kupka in their developing of new ways to depict reality, as fragmented into tiles (Cubism) or translucent color planes like (Orphism).



Today medical research institutions reach out actively with their images. The Wellcome trust, for instance, a major British financier of medical research, holds over 40.000 biomedical images in an open-access, online database. The eight pictures below have been chosen in the 2011 Wellcome Image Awards for being "striking and technically excellent", and are thus specifically highlighted for public interest. A few

general observations can be made regarding their aesthetics.

First, their exquisite detail, sharpness, and color intensity let the beholder know that they are indeed made to be looked at: they offer themselves as candy to the eye! A visual rhetoric of clarity and accessibility is at work here, which to some extent belies the complex, multi-stage physical-chemical-mathematical process of producing the pictures. In that sense, those images do not only speak of the human body, but are also visual statements about science, about what science is and can do.

Secondly, the images appear unrelated to lived corporeality. It is very difficult for the layperson to understand why the images look like they do, or to grasp the functional and proportional relation between their looks and any sensory experience of his or her own body.

Thirdly, they depict the bodily interior without any reference to the gestalt of the human figure as a whole. In that, biomedical imaging differs from traditional anatomy, which, since its beginning in the Renaissance, retained a recognizable relation between the depicted body parts and the body as a whole. Biomedical images today, by contrast, portray human vitality disconnected from the human figure, on the microscopic levels of cells, genes, synapses, etc – a biology shared by animal or even organic life in general. It is thus probably impossible for the average viewer to distinguish, among the pictures shown here, those that depict the human body from those that depict the body of a mouse. (You can find out at www.wellcomeimageawards.org) In that sense, biomedical visualizations amount to what may be called a "de-anthropomorphizing" of the human image; the stripping of recognizable human traits from the image of the human.

In conclusion, medical imaging today is both realistic and imaginary. On the one hand, its wealth of detail, simulated light, shadings, and plasticity, make things look tangible and real. On the other hand, the pictures present a corporeality that is strictly imaginary; not in the sense that it does not exist (obviously it does), but because it is inaccessible to direct experience, and hence can only be imagined *(Associate Professor, Lund University)*.

Plant Strategies for Surviving the Swedish Winters

by Matsuo Uemura

This summer, I had a chance to stay in Umeå, a university town located at 63.5°N in northern Sweden. One of the most thrilling experiences for me to live close to the Arctic Circle is the quick changes in day-length and temperature. The day-length in Umeå is getting shorter by six or seven minutes every day (about three times faster than in Japan), and the temperature can make a sudden and great drop (even to sub-zero degrees in August) with a swift change of weather—from the cloudless azure sky to heavy snow fall.

I am O.K. in such conditions because I am lucky to have a refuge (a very cozy apartment provided by the university). I can stay in my room for hours with a warm cup of coffee or tea—or even better, a glass of good beer. I look out my window but don't see the brown hare I saw the day before. Maybe it is hiding in a warm shelter, too. I watch the snow falling on grass leaves and paper birch trees. Being immobile, the plants stay outside however cold and dark it gets. How do they survive the winters with freezing temperatures that can get -40°C or even below? The plants evolved very clever and fascinating adaptive mechanisms called as "cold acclimation." This is an interesting phenomenon that has been intensively studied and the results of research have been applied to various practical uses to improve adaptability of crops to non-optimum growth temperatures.

The ways of plants to survive in freezing conditions vary greatly depending on species. The majority of herbaceous plants, including many important crops (e.g., wheat, barley and rye) and vegetables (e.g., spinach, cabbage and turnip), tolerate freezing by a mechanism called "extracellular freezing." When the temperature goes down below the freezing point at a rate of a few degrees per hour for example (this cooling rate may be rather "fast" and typically temperature goes down at less than one degree per hour in nature),

ice formation occurs at extracellular spaces in plant tissues. Plant cells are not tightly packed usually and there are spaces between cells, in which the bacteria and other substances serve as nuclei for ice formation. Furthermore, it is likely that the ice forms outside the cells first because the solution in the extracellular space has a lower osmotic concentration than that inside the cell. Once ice is formed outside the cell, intracellular water is absorbed at the surface of extracellular ice crystals due to differences in the chemical potential between ice and water at subzero temperatures. Consequently, cells face severe dehydration; it is estimated that more than 80% water is lost at -10°C due to freeze-induced dehydration (please see the figure below for how cells are shrunk during extracellular freezing process). Thus, for the plants in the temperate region and farther north to survive the winters, they need to tolerate not only the freezing temperature but also ice crystal formation and severe dehydration in their bodies.

How do plants manage to tolerate these stressful conditions? They start preparing themselves as early as the late summer or early fall. They accumulate sugars and other neutrally charged compounds with low molecular weights and high water solubility. These compounds help stabilize the complex components in cells, including the membranes, proteins and nucleic acids. In addition, the increase of osmotic concentrations in cells prevents water from freezing at subzero temperatures, which also keeps cellular complex components intact. Often, roots and other root vegetables taste sweeter in the winter. It is in fact a result of an endogenous adaptation mechanism of the plants to tolerate winter (not to please the humans and other consumers with the sweater taste, of course).

Another noticeable change in plant cells for winter survival is the changes in membrane compositions and the functions of the membrane to maintain cellular reactions as smooth as possible at freezing temperatures. This is what I became most interested in when I started my graduate study at the Institute of Low Temperature Science, Hokkaido University, Japan, and the subject I still work on more than three decades later. Plant membrane, specifically the plasma membrane, which is the primary site of freezing injury, significantly and actively change their composition from late summer to autumn. Particularly, the plasma membrane becomes enriched in phospholipids with more unsaturated acyl chains. In many plant species, one of glycolipid class, glucocerebrosides, concomitantly decreases in the plasma membrane. These changes result in collection of more water molecules at the surface of the membrane and fluidarization of the membrane under low temperatures. Furthermore, protein, which is the other important member of the membrane, responds well to the changes and its composition is altered considerably at low temperatures. Some of these cold-responsive proteins have protective functions against dehydration, oxidative and/or other abiotic stresses. In addition, proteins associated with membrane trafficking pathways and membrane repair are also responded to cold.

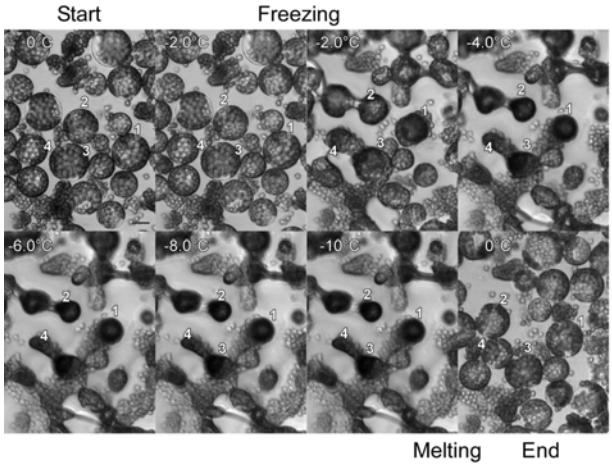


Figure
Cryomicroscopic photographs of plant protoplasts isolated from Arabidopsis leaves during freezing process. Protoplasts, which are isolated from Arabidopsis leaves after treatment with cell wall digestion enzymes, were first ice-inoculated at -2°C to induced extracellular freezing, frozen at a slow cooling rate of 0.1°C/min to -10°C and then returned to 0°C. During freezing, all protoplasts reduced in their size as a result of freeze-induced dehydration. Upon thawing, a number of protoplast gained their original volume, indicating that they can tolerate severe changes in their volume and eventually survive a freeze-thaw cycle. Photographs were prepared by Yukio Kawamura and Tomokazu Yamazaki (Iwate University).

Then, how do these changes of protein result in increase in freezing tolerance of plants and help them survive in severe winters? With the incredibly fast advance in plant genomics research in recent years, the very fundamental knowledge of the ways of plants to respond to cold (and shortening day-length) has become available. The complete decoding of genome sequences in several plant species, in addition to the subsequent bioinformatics and gene expression analyses, gives us a large amount of information on plant responses to environmental stimuli. Phenotypic responses of plants to cold seem to be genetically regulated in a tight and sophisticated way. Several independent and cross-talking pathways contribute to

adaptation of plants to tolerate winter conditions (such as soluble compound accumulation and membrane changes described above). One of the master genes in plant survival in winter is a transcription factor (a.k.a., CBF/DREB) that regulates a number of downstream target genes and, hence, cellular adaptation processes to low temperatures. We now know that in several plant species, overexpression of CBF/DREB transcription factor by gene transformation techniques will result in a significant increase in their freezing tolerance as well as tolerance to other environmental stresses such as dehydration and salinity stresses. This means that when molecular aspects of cold adaptation are further elucidated, a wider range of application will become available to improve plant performance under severe stressful conditions.

Researchers studying plant stress responses are now facing to a new challenge. It is no doubt that global climate changes are happening, but the direction and significance of the changes are not predictable at all. For example, the global temperatures in general have been increasing in the last 100 years or so, but it does not mean that the temperatures are increasing in a uniform way in every corner of the globe. Sudden drops of temperature, unexpectedly early arrival of winter following an unusually warm fall, and a very late frost just after bud break of fruit trees in spring have been reported in various places of the world. For the plants to survive in such unpredictable and unprecedented conditions, they have to be equipped with specific mechanisms to protect themselves. That can happen as a result of natural selection in a time scale of evolution. But the invisible hand of nature may not work fast enough this time if we are to leave a sound environment in generations to come. That is the new challenge for the study of plant stress responses. The more studies are needed and the results must be shared among those involved in the area. In the JSPS Colloquium 2011 in Stavanger, Norway, we share newest knowledge about the plasticity of plant's adaptation abilities and discuss best ways to develop research programs for further understanding. We hope that the Colloquium will serve as a ground for further understanding of plant adaptabilities to the changing environment. Our research should have a role in mitigation of adverse effects of the human-induced climate change on plants and in turn non-plant organisms. I certainly hope that devastating corruption of the relationship between human and non-human communities can be avoided *(Professor, Cryobiofrontier Research Center, Faculty of Agriculture, Iwate University)*.

Festival (8)

Hinamatsuri – Doll Festival

by Lisa-Mi Swartz

Hinamatsuri or Girls' Day, is the Japanese Doll Festival which is held annually on the third day of the third month, March 3. Although not a national holiday, this day is widely celebrated as a day when families pray for the happiness and prosperity of their daughters and wish for them to grow up healthy and beautiful.

The celebration takes place both inside the home, at some temples and seashores. Tiered platforms for *hina ningyo* (ceremonial dolls) are being displayed and decorated and special food is being prepared.

The origin of *hinamatsuri* is an ancient Chinese practice in which the sin of the body and various misfortunes are transferred to a straw doll, and then removed by setting the doll afloat on a boat and sending it down a river to the sea, supposedly taking

Dairi bina in a peach blossom

troubles and bad spirits with it. This custom, called *hina okuri* or *nagashi bina*, still exists in various areas. The Shimogamo Shrine (part of the Kamo Shrine, Kyoto) celebrates the *nagash bina* by floating dolls

between the Takano and Kamo Rivers to pray for the safety of children. Since fishermen complained about catching the dolls in their nets, the boats are nowadays taken out of the water and being brought back to the temple and burnt.

A traditional hina dan

In a family where a baby girl is born, parents or grandparents often give a set of dolls, *hina ningyou*, to the baby at her *hatsuzekku* (a girl's first *hinamatsuri*). A traditional set of dolls can be very expensive and are therefore often passed on from generation to generation. There are various grades of sets, and some full sets cost more than a million yen (around 70.000 SEK). However, since many Japanese live in small houses, royal couple versions, with only the Emperor and the Empress dolls, is getting popular nowadays. The *hina* dolls are normally displayed at home from mid-February, but are often removed immediately after the festival following the superstition that the girl will marry late if the dolls are still displayed after *hinamatsuri*.

The custom of displaying dolls began during the *Heian* period (794-1185). The traditional set consists of 15 dolls which are replicas of an ancient emperor, empress and their subordinates; the dolls are arranged in order on a seven-tier platform together with other decorative items and ceremonial food. The dolls wear beautiful ancient court costumes of the *Heian* period. The costume of the Empress is called *juuni hitoe*, a twelve-layered ceremonial robe. Today the *juuni hitoe* is worn only at the Imperial family's wedding ceremonies. When wearing *juuni hitoe*, the hair is gathered at the neck to hang down the back and a fan made of Japanese cypress is held in the hands.

The *Kantou* region and *Kansai* region have different placement orders of the dolls from left to right, but the order of dolls per level are the same. The platform, *hina dan*, is covered with a red carpet with rainbow stripes at the bottom.

The platforms of a full-sized *hina dan*, contains as follows:

The First platform holds the two imperial dolls (*dairi bina*); the Emperor (*Odairi sama*) holding a ritual baton and the Empress (Ohina-sama) holding a fan.

Second platform

The Second platform holds three court ladies *(sannin kanjo)*, who each holds sake equipment.

The Third platform holds five male musicians *(gonin bayashi),* who each holds a musical instrument, except the singer who holds a fan.

The Fourth platform displays two ministers *(daijin)*; Minister of the Right and Minister of the Left. The Minister of the Right is depicted as a young person, while the Minister of the Left is much older. Just below the ministers there is a mandarin orange tree to the right and to the left a cherry tree.

The Fifth platform holds three helpers or *samurai* who are protectors of the Emperor and Empress.

The Sixth platform holds items used within the palatial residence, such as *tansu* (chest) and utensils for tea ceremony.

The Seventh platform contains items for imperial outings.

The *hina dan* is often decorated with branches of peach blossom since *hinamatsuri* coincidence with the peach blossom season in the old lunar calendar. It is therefore also known as *Momo no sekku* (Festival of Peach Blossoms).

The traditional food associated with *hinamatsuri* are *chirashi zushi* (fish, omelette and vegetables on a bed of *sushi*-rice) and a soup called *ushiojiru* containing clams still in the shell. *Shirozake* (sweet white *sake*) is often being served together with *hishimochi*, which are diamond-shaped rice cakes. The *hishimochi* are colored red/pink, white, and green. The red is for chasing evil spirits away, the white is for purity, and the green is for health. As for sweets you will often see *sakura mochi* which is bean paste-filled rice cakes with cherry leaves and peaches.

Sakura mochi

If you would like to go on *hina* doll watching, Sendai is the place to go. For over 100 years, the Shounai area in Yamagata Prefecture has organized tours with information and maps to enable people to see the beautiful craftwork of the *hina* dolls at various places around Sakata, Tsuruoka and other towns in the area. Since 2008, Yurihinjou, which is situated just across the prefectural border in Akita, has taken up the competition. In March, visitors can follow the Yurihonjō *hinakaidō* (Yurihonjou city *hina* doll route, which is a route of over 50 different locations around the city where you can watch displays of *hina* dolls *(Secretary, JSPS Stockholm)*.

Promenade (8)

Butterfly and Tsunami

by Hiroshi Sano

The length of coastline of the Japanese Archipelago is ca. 30,000 km. About half of it faces the Pacific Ocean. The northern coastal region of *Honshu* (one of the four main islands) extends over 1200 km with a complicated geographical structure. The northern part of this region is referred as Ria Coast. It consists of parallel bays which are separated by ridges (or small capes). The region is called the *Sanriku* District. People have long dwelled in the bottom of each bay, forming small but independent villages.

Nature is rich there due to diverse vegetation, mountainous environment and less dense population. Forests consisted of deciduous trees, rocky coastal cliffs and the *Satoyama* near villages possess many species of wild plants, birds, and insects. Examples are *Aquila chrysaetos* (golden eagle, *inu-washi*), *Lilium maculatum* (lily species, *hama-yuri*) and *Zephyrus* butterflies.

The 2011 earthquake directly affected these regions. The Tsumani was amplified when it came to the end of narrow bays, reaching as high as 38 m over the sea level. It destroyed not only villages but also habitats of wildlife.

*

In 1953, a small orange-colored butterfly was found in *Tanohata* village, which was seriously damaged by the recent Tsunami. The butterfly, identified as *Coreana raphaelis* (*Chosen aka-shijimi*), belongs to the family of Zephyrus hairstreaks. It has been known to distribute in very limited areas surrounding the Japan Sea; namely in east coasts of Russia, Korea and China, but no record was available from Japan at that time. Its food plant, *Fraxinus japonica* (Japanese ash, *toneriko*), was abundant in the village for practical use.

Coreana raphaelis

When I was a graduate student at the Tohoku University, Sendai, Japan, I visited *Tanohata* village to observe this rare butterfly. It actively flew around or silently rested on leaves of *F. japonica*. I noticed that trees were small, often planted on the ridges of small fields near dwelling areas. I found the butterfly only in such restricted areas and no in other spots.

This means that *Coreana raphaelis* belongs to the wildlife of *Satoyama* (village forest, see “Promenade” in the No. 6 issue of this Newsletter). The Tsumani has certainly swept away its habitat. Because the distribution area is limited, the butterfly may be endangered. Currently I do not have any concrete evidence for it, but I hope that their habitat, and habitats of other wildlife will rapidly recover in the near future *(Director, JSPS Stockholm Office)*.

V. News & Announcements

Academy Funding to Finnish-Japanese Research on Living & Housing

by Riitta Tirronen

The Academy of Finland and the Japan Society for the Promotion of Science (JSPS) have agreed to reinforce Finnish-Japanese cooperation in research on living and housing. The Academy will grant a total of EUR 1 million to four research projects in this field. The JSPS will provide funding to the Japanese partners involved. The projects will be incorporated into the Academy's new Research Programme on the Future of Living and Housing, which will be launched in 2011.

"Research carried out in Japan on living and housing is very interesting and of a high scientific quality. What's more, Japanese researchers are interested in the same thematic research areas as Finnish researchers. Objects of mutual interest include housing requirements arising from an ageing population, development of sustainable energy solutions and traffic solutions," Programme Manager Petteri Pietikäinen explains.

Academy funding to four research projects

Katsuyuki Haneda (Aalto University) receives EUR 240,000 for his project that will investigate the application of wireless communications and networks with a view to improving the quality of medical treatment and daily healthcare. The project aims to establish a scientific foundation for planning and testing wireless systems for medical and healthcare needs. The research is expected to generate results that will promote the wellbeing of an ageing population.

In her project, Marketta Kyttä (Aalto University) will carry out comparative studies on ecosocially sustainable environments both in Finland and Japan. The project will investigate what elements are essentially needed so that an ecologically sustainable urban community in Finland and Japan could also be socially sustainable and qualitatively of a high standard, i.e. an environment that supports people's quality of life, everyday life and wellbeing. The aim is to combine the perspectives of individual and social wellbeing in the living environment with discussions on the conditions of ecologically sustainable community structures. Academy funding to the project comes to EUR 240,000.

Juha Röning (University of Oulu) receives EUR 240,000 for his project that will develop interactive context-aware systems for energy-efficient living. The aim is to develop an interactive context-aware and sensor-based feedback and control system with a view to supporting energy-efficient housing. The system is expected to self-motivate inhabitants to be aware of their energy consumption habits and thereby to reduce their energy costs and emissions.

In her research, Liisa Tyrväinen (Finnish Forest Research Institute) will focus on the stress-reducing qualities of urban green areas and investigate cultural differences in the use of green settings in everyday living environments. The research results will be applicable in land use planning and urban green area management and are thereby expected to improve the quality of living environments. Academy funding to the project comes to EUR 240,000 *(Communications Manager, Academy of Finland)*.

Further information:

- Programme Manager Petteri Pietikäinen, Academy of Finland, tel. +358 400 362 808, petteri.pietikainen(at)aka.fi
- Science Adviser Aki Salo, Academy of Finland, tel. +358 9 7748 8244, aki.salo(at)aka.fi

New JSPS Stockholm Office Staff

My name is Kazutoshi Ono, and I am the successor of Mr. Taijiro Tsuruoka. I come from Tohoku University, where I was in charge of exchange student programs. This is my first time to live in a country outside of Japan. I first thought it would be a somewhat tough time, but since all Swedish people have been really kind and accommodating, I am now happy to regard Sweden as my home country for the next year. I enjoy being active, playing sports and working out. If I can be of any assistance, please feel free to contact me.

Kazutoshi Ono, Program Coordinator

Fellowship Information

If you are planning to visit and perform research in Japan, the JSPS Stockholm Office is ready to provide you with useful information on the JSPS fellowship programs. The JSPS fellows are usually recruited in each fiscal year (beginning in April and terminating in March of the following year).

Two ways of applications are available. The main route is (A) to prepare application forms through your host researcher at the host-university or institution in Japan. The host will send all documents to the JSPS Head Office, Tokyo. You may be able to ask your host researcher in Japan to apply for it in advance. This route is open for researchers in almost all countries outside of Japan. JSPS have about 10 awardees for each call. As for the deadline of each application, please find the table as below.

The other route (B) is to apply through the nomination system in relevant countries, where the applicant lives. In this case, the country must be assigned as a partner country by JSPS (note that not all countries are assigned as JSPS partner). This route is in principal, open only for researcher who is a national of such country.

For example, if you are a Swedish researcher, you can apply through the nomination system of the following programs, depending on your career and research field: Post-doctoral fellowship (Standard-KVA, SSF, VINNOVA and Short-term-KVA) or Invitation fellowship (Short-term-VINNOVA).

You can find necessary information through the website of JSPS Head Office (as below) or JSPS Stockholm Office (http://www.jsps-sto.com/ →Menu :Fellowship). *(Taijiro Tsuruoka, JSPS Stockholm)*

Program (Main Route)	Duration	Application Dead line(※1)	Commencement of fellowships (※2)
JSPS Postdoctoral Fellowship Programs For Young post-doctor etc. http://www.jsps.go.jp/english/e-fellow/postdoctoral.html	(Standard) 12 to 24 months	<1st Call> 30 Aug 2010 - 3 Sep 2010	Apr 1, 2011 – Sep 30, 2011
		<2nd Call> 6-12 May 2011	Sep 1, 2011 – Nov 30, 2011
	(Short-term) 1 to 12 months	<1st Call> 4-8 Oct 2010	Apr 2011 – Mar 2012
		<2nd Call> 22-26 Nov 2010	Apr 2011 – Mar 2012
		<3d Call> 31 Jan-4 Feb 2011	Jun 2011 – Mar 2012
		<4th Call> 4-8 Apr 2011	Aug 2011 – Mar 2012
		<5th Call> 6-12 May 2011	Sep 2011 – Mar 2012
		<6th Call> 1-5 Aug 2011	Dec 2011 – Mar 2012
Invitation Fellowship Programs for research in Japan For Professor or mid-career Researchers etc. http://www.jsps.go.jp/english/e-inv/main.htm	(Long-term) 61 days to 10 months	Sep 3, 2010	Apr 1, 2011 – Mar 31, 2012
	(Short-term) 14 to 60 days	<1st Call> Sep 3, 2010	Apr 1, 2011 – Mar 31, 2012
		<2nd Call> May 12, 2011	Oct 1, 2011 – Mar 31, 2012

※1 These deadlines are for the head of the host institution to submit the application to JSPS Head Office; the time frames for applicants (host researchers)to submit their applications are normally earlier.

※2 Successful candidates must start the Fellowship in Japan during these periods.

JSPS Fellowships

Post-Doctoral Fellowship Short – through KVA, STINT

Kungliga Vetenskapsakademien and STINT are now calling JSPS Post-doc fellowship short with commencement FY2011

Upcoming JSPS Colloquium

Capturing the Sun

30-31 May (Mon-Tue), 2011
Venue: Beijer Hall, The Royal Swedish Academy of Sciences

Tentative Programme

General
Speakers: Lars Hammarström, Tetsuroh Muramatsu, Joakim Byström, Yoshiaki Nakano

Thin Film Cells Including Industrial Aspects
Speakers: Marika Edoff

Solar Cells Based on Nanotechnology
Speakers: Takashi Fukui, Lars Samuelson

Organic (polymer) Solar Cells
Speaker: Shinzaburo Ito, Olle Inganäs, Villy Sundström

Grätzel Cells
Speaker: Hironori Arakawa, Ryuzi Katoh, Anders Hagfeldt, Licheng Sun

Solar Fuels (photosyntheses & artifical photosynthesis)
Speaker: Kazunari Domen, Stenbjrön Styring, Johannes Messinger

Solar Fuels (photobiological systems)
Speaker: Hajime Masukawa, Peter Lindblad

Solar Concentration (electricity & solar fuels)
Speaker: Yutaka Tamaura, Robert Pitz-Paal

Register at www.kva.se by 15 May, 2011
The colloquium is open to all and free of charge.

Abiotic Stress from Genes to Biosphere

Organizers: Vaughan Hurry, Umeå University & Matsuo Uemura, Iwate University

20 August (Sat), 2011
Stavanger, Norway

This Colloquium will be held as a Pre-Conference Meeting of the Scandinavian Plant Physiology Society Congress 2011. For further information, see http://www.spps.fi/cgi-bin/SPPS.pl

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