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Japan the Horned Islands

JSPS Nordic & Baltic Newsletter (4)

2009 Summer/Autumn

Paddy field (Kyoto)

In this issue

Rice plant *(Oryza sativa)*

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

I. Prologue

Paddy Field

by Hiroshi Sano

During summer to autumn, travelers in Japanese rural areas often see large and well-maintained fields of rice, referred to as "paddy field" (*Tanbo*). In autumn, the fields turn yellow, and people anticipate a good harvest. Although the total annual production of rice has declined from 15 million tons to 9 million tons during the past 50 years, the scenery of the remaining paddy fields conveys a feeling of security and comfort to most Japanese people.

The annual yield of grain in the world is approximately 2 billion tons. The major grains are wheat, maize and rice, each yielding ca. 600 million tons. Among them, rice feeds more than 50% of the world population, being the most efficient and important food.

Rice is a tropical plant and cultivated primarily in Asian countries, where the hot and humid climate is best suitable for its growth. The reproductive potential of rice is high, yielding 1000 grains from one grain, a marked contrast to that of wheat, less than 100 grains per one grain. Due to its ability to grow in water, rice does not suffer from detrimental effects of repeated cultivation, which increases the probability of disease and nutrient problems as seen in many other crops. Indeed, some paddy fields have continuously been used for over 1000 years in Japan.

Although rice has many advantages as a food plant, its cultivation has been tedious and time-consuming. Much labor and team works were required. For example, the paddy field must be accurately horizontal to maintain the water level. The irrigation system must be constructed to equally distribute water to all paddy fields. Seedlings were one by one manually transplanted from the nursery to the main field. When water resource was scarce, multiple groups had to negotiate and/or fight against each other to secure their water. To accomplish all these matters, a tight collaboration among farmers was a prerequisite (Tomiyama, 1974). The best place to carry out these conditions was certainly a "village (*mura*)".

Until the beginning of the 20th century, more than 80% of the Japanese population dwelled in rural villages, engaging in agriculture, primarily in rice cultivation. The relationship among villagers was tight, forming specific ways of thinking, behavior and life stile: strong cooperation, kindness to the acquaintance but exclusion of outsiders, establishment of a powerful leader, and absolute obedience to him, no acknowledgement of a distinct ability and activity, and many others. In a word, independent behavior, or individualism, was not welcome because it seriously disturbed the village life, and eventually the rice production.

Today, only 0.3% of Japanese population is farmer, many others are living in large urban areas, engaging in industrial, servicing, and transporting works. Nevertheless, the slowly and stably built way of thinking described above appears to have been well transmitted to, or imprinted on peoples' mind regardless of the occupation.

Many foreign scientists visiting research institutes in Japan are first surprised to find how diligently researchers work, how faithfully they obey orders from the boss, and how closely cooperate with colleagues. After a while, they also find less independency, grouping tendency and strict hierarchy (Romani, 2008). All these features could be explained by the idea of "paddy field". It is not a matter of "good or bad", but the historical backbone of the Japanese way of thinking. Perhaps visitors can better understand the "mysterious" behaviors they sometimes encounter, if they know the roots or bases of the Japanese mind.

*

Another and the most serious problem is poor communication ability in non-Japanese languages (Romani, 2008). In 1990, Edwin O. Reischauer described that one of reasons why Japanese have special difficulties in learning foreign languages is the very advancement of Japanese culture. "Even the most advanced specialities can be studied in Japanese… It is not necessary for a Japanese to master a foreign language to pursue almost any advanced line of study… As a consequence, foreign language study becomes only a peripheral aspect of education". To overcome such a disadvantage (for at least internationalization), Professor Reischauer strongly suggested young Japanese students to go against their natural social tendencies, being reticent and downright timid, a deeply ingrained cultural trait.

This may be a valuable information for all foreigners who stay in Japan and need to communicate and collaborate with Japanese people to create a harmonious relationship.

(References: Laurence Romani, Relating to the Others, Stockholm School of Economy Press, 2008; Kazuko Tomiyama, Water, Green and Soil, Chuou-Kouron Publishing Co., 1974; Edwin O. Reischauer, The Meaning of Internationalization, Seibido Publishing Co., 1990)

(Director, JSPS Stockholm Office)

II. Reports

JSPS Colloquium

Frontiers in Nanobiotechnology from Engineering to Application for Cells

by [1]Helene Andersson-Svahn, [2]Toshiro Ohashi

The JSPS Stockholm Office held a Sweden-Japan joint colloquium on “Frontiers in Nanobiotechnology From Engineering to Application for Cells” at the Albanova University Center, Royal Institute of Technology (KTH) on the 4th of June 2009. Five internationally distinguished young professors were invited from each country for oral talks and 17 PhD/MS students were advertised for poster presentations. The colloquium attracted about 70 delegates, around 60 and 10 participants from Sweden and Japan, respectively, including professors, scientists, students and company researchers. In the opening remarks. Prof. Hiroshi Sano (Director, JSPS Stockholm Office) explained the activities of the JSPS Stockholm Office including the objective of the JSPS colloquium followed by a brief introduction of this colloquium by Prof. Toshiro Ohashi (Hokkaido University).

Oral session

There has been a continuous and growing interest in the field of nanobiotechnology, ranging from cell biomechanics to applications for cell analysis such as integrated microanalysis systems. This trend is proved by the fact that nanobiotechnolgy is designated as a priority area to be strategically promoted by the Council for Science and Technology Policy, Government of Japan. It is greatly expected that further development of the fusion of nanotechnology and biotechnology will realize a paradigm shift in medical technology. Areas related to nanobiotechnology are diverging and expanding rapidly as mentioned above, but are interrelated and share the goals of contributing to human health and well-being. In this regard,

Poster session

the overall objectives of the colloquium were to provide an opportunity where researchers can inform others of their interests and potential contribution of their knowledge and techniques through interdisciplinary discussions, giving possible future directions for further research.

The scope of the colloquium covered cell biomechanics, biomaterials for cell and tissue engineering, bio-actuated microsystems, microfluidic technology and nanobiotechnology for single cell analysis, and materials science with applications in cell biology. The oral presentations were delivered in 4 technical sessions. All of the presentations featured cutting-edge researches in the wide range of areas and were of very high quality. The number of questions provided by the delegates after each presentation indicated significant interest in the topics, giving constructive suggestions. The poster presentations were scheduled as “Coffee break at Posters” between the oral presentations and “Aperitif and buffet dinner at Posters” in the evening. These were a good time for discussing student’s work with them over drinking and for making new friends. Through the colloquium, mutual friendships were more formed between Sweden and Japan, and the facts that a network between researchers was created and young researchers were stimulated in order to go deeper inside the understanding of the field of nanobiotechnology were a great result of the colloquium. In the concluding remarks, Prof. Helene Andersson-Svahn (Royal Institute of Technology) summarized the colloquium and express our grateful thanks to all delegates and the JSPS Stockholm office.

On the next day (5th), lab tour was organized for the Japanese delegates by Prof. Helene Andersson-Svahn at Royal Institute of Technology and by Prof. Agneta Richter-Dahlfors at Karolinska Institute. It was an excellent opportunity to view their labs and to discuss with their lab members

Overall, the colloquium was certainly a great success. The outcome of the colloquium is scheduled to submit to a special issue of Journal of Biomechanical Science and Engineering (JBSE) published as the official journal of the Japan Society of Mechanical Engineers (JSME) in the beginning of 2010. Finally, we would like to express again our sincere thanks to the JSPS Stockholm office, Prof. Sano, Director, Ms. Mouri, Deputy Director, Ms. Ysui, Officer, Ms. Lisa-Mi, Officer for their great continuous efforts before and during the colloquium and financial support.

【Invited speakers】
Sweden:
Jonas Tegenfeldt (Assoc. Prof., Lund University/ Gothenburg University)
Helene Andersson-Svahn (Prof., Royal Institute of Technology)
Mats Nilsson (Assoc. Prof., Uppsala University)
Agneta Richter-Dahlfors (Prof., Karolinska Institute)
Johan Nilsson (Assoc. Prof., Lund University)
Japan:
Masaru Tanaka (Assoc. Prof., Tohoku University)
Satoru Kidoaki (Prof., Kyushu University)
Taiji Adachi (Assoc. Prof., Kyoto University)
Keisuke Morishima (Assoc. Prof., Tokyo University of Agriculture and Technology)
Toshiro Ohashi, (Prof., Hokkaido University)

([1]Prof., Royal Institute of Technology, [2]Prof., Hokkaido University)

JSPS Finland Alumni Club Inauguration Ceremony

by Rumiko Mouri

Mr Murata (left) and Dr. Laitinen (right)

A formal establishment ceremony of Finland Alumni Club was held in Turku, Finland on June 5, 2009, with about 35 people attending the opening ceremony.

Initially, a volunteer's board set it up in 2007. During these two years, they held two thematic seminars in Joensuu and Rovaniemi respectively. Their activity has been aiming at creating a social network with former JSPS fellows and related researchers to promote the scientific exchange between Finland and Japan.

The board members have also held regular meetings to discuss about the management of the club. Through these activities, 49 people are now registered members or associate members. Since FAC now has managed to attract many new members, it was deemed appropriate to hold this formal establishment ceremony.

The event started with greetings from Mr. Murata, Executive Director of JSPS head office. He addressed his gratitude to the guests, speakers, sponsors and members for their cooperation. He also explained about JSPS activities and the situation about scientific exchange between the both countries.

Next, Mr.Tanaka, Minister of Embassy of Japan in Finland held a congratulatory address where he hoped to see the academic and friendly relationship between both countries strengthen through the activities of the club.

Thereafter, the outline of Finland Alumni Club was explained by Dr. Laitinen, Chairman of FAC, and the Bylaw of the club was distributed.

Finally, the alumni association member badge was presented to Dr. Laitinen by Mr. Murata.

After the ceremony, FAC summer seminar was held. The club invited speakers from both countries. The lectures held concerned the subjects of functional foods and future perspectives of super conductors, which interested many of the participants, and at the get-together afterwards FAC's object of an active exchange seemed to be successful.

Regarding the detail of seminar, Dr. Eija Säilynoja, organizer of the seminar and board member, is contributing a report which you can find in this news letter.

(Deputy Director, JSPS Stockholm Office)

FAC Summer Seminar

by Eija Säilynoja

In the beginning of June on a quite windy Friday afternoon, the JSPS's Finnish Alumni members gathered together for Summer Seminar in Finland. The seminar venue located next to a beautiful Ruissalo public park in the city of Turku. Turku, Finland's oldest city and former capital, is located in the Southwest coast of Finland. Ruissalo, on the other hand, is like a public garden for Turku citizens. The park is known for its unique oak deciduous woodland with number of rare plants and birds. Even though the weather was not the best possible, we could enjoy the green and beautiful nature around us.

Prior the scientific seminar the JSPS Alumni Club Finland (JSPS FAC) was formally set up. The seminar it self, was third annual seminar organized in Finland. The other ones were held in Joensuu (General Assemble and Seminar 2008) and Rovaniemi (Seminar 2008). This time 32 participants were attending to our seminar, which were more than any other years so far. We were lucky to get excellent speakers from both Japan and Finland. The aims of the presentations were fascinating and interdisciplinary.

One of the main topics of the summer seminar was functional food. Experts from Finland and Japan entertained us by telling how important the correct balance of the stomach bacteria is. By combining healthy food and natural bacteria like lactobacillus, people live a healthier life and are not so likely to be exposed to sicknesses like influences and diarrhea. There are very close co-operation between Japan and Finland on this field.

Other fascinating topics were superconductors and the origin of the universe. It is really amazing what superconductors can do. Levitating full sake (酒)) barrel or sumo (大相撲) wrestler; they looked unreal enough, but they are just a top of the ice peak. A "levitating" train, it is the most famous application of the superconductors. Those high-speed trains based on superconductor technology are reality already today.

Seminar participants

The next JSPS FAC General Assembly seminar will be held in Espoo, our second largest city, at 31.8.-1.9. 2009. The seminar will focus on the Multi-phase Methods on Sustainable Materials and Processes *(PhD, Stick Tech Oy.*

Nice Memory of Turku
15 Years Collaborative Research with Finnish Scientists on Probiotic Research

by He Fang

On 5th of June, I had the great pleasure to be in Turku for JSPS Alumni Club Finland organized by Japan Society for the promoting of science (JSPS) Stockholm office. I really enjoyed this well organized meeting in one of the best resorts places in Turku, although it was raining and colder compared to usually in this season

.

My first visit to Finland was as early as in 1994, almost 15 years ago. Since then, I have been to Finland once or twice for every year. Especially, I have spent one year in Turku University from 1999 to 2000 as senior visiting scientist finically supported by TEKS and Valio Co., Ltd. I and my family greatly enjoyed the last days of 20th century in Turku, and celebrated the fist day of 21th century there. It might be that I am one among few scientists in Japan who have been so early, and so long time involved in collaborative researches between Japan and Finland, and experienced the advanced ability of Finland in international competition in scientific researches and related technology development.

Takanashi Milk Products Co., Ltd. which I am working for has an exclusive license agreement with Valio Co., Ltd, the biggest food company in Finland since 90s, for using Lactobacillus GG (LGG) in Japan, a well known Finnish probiotic strain, although it was originally isolated in USA. I have worked for Takanashi's LGG from the beginning until now, and have worked with Finnish scientists in various ways. One of the biggest progress obtained from our collaboration is that the fermented milk prepared with LGG, [Japanese name is ONAK HE GG!], was successfully approved as FOSHU (Foods for Specified Health Use) in 1996. FOSHU system was the world's first authorized approval system of health-claim labeling for food products and has very high reputation for functional food, and our LGG product was the first probiotic FOSHU product in Japan. After 1996, Japanese dairy and food industry followed us and used the same approaches to get FOSHU approvals for the probiotic products including some famous brand products such as Morinaga's "Bifidus Plain Yoghurt", Meiji's "Meiji Bulgaria Yoghurt LB 81" and Yakults Honshu's "Yakults". Therefore, such collaboration between Takanashi and Finnish scientists in the 90s has greatly contributed to the development of the functional food market in Japan.

In 1999, I was send to Turku University, a research group led by Prof. Seppo Salminen and Erika Isolauri, to participate in an undergoing research project for the possibility to use LGG for allergy. The achievements from this project was later published in Lancet of 2001, and received world attention especially from Japan, finding that probiotic, such as LGG can reduce the risk of allergic diseases by remodeling the human immunity. These results greatly encouraged the Japanese scientists to focus more on the possibilities for probiotics to human immunity as well as gut health, and increased the confidence of the Japanese food industry and market to use probiotics more. This was considered among the key factors to cause the probiotic bloom in 2002 which greatly stimulated the probiotic market in Japan. I was very happy to be in Turku while this study was conducting and learnt so much from this project. In that one year, I also published 5 manuscripts, and made several oral and poster presentations at International conferences in EU, although I spent much more time with my family compared to working in Japan.

Summer in Finland

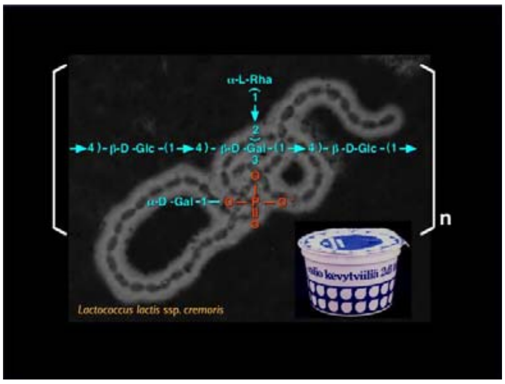
During the past 15 years, I have been constantly impressed by the high quality and effective working style of Finnish Scientists as well as their hard work. Finnish people have so many similarities in personality with Japanese people and are very easy to get to. Finnish people are very honest and serious; therefore it will be a great pleasure to work with them.

Before going to Finland, I was told that Finland is very cold in winter and so on. However, we found that the local life was comfortable during the stay there with my family. Summer in Finland was so nice, even better than people can image. There are so many memories for our family from summer of 1999 in Finland. One is that, as shown in attached picture, we happened to dine at the same small restaurant in out of Turku as Mr. Martti Ahtisaari, Finnish president in 1999. I still remember that no one in the restaurant was surprised when Mr. Ahtisaari and his wife came into the restaurant. Mr. Ahtisaari and his wife ordered dinner just like normal customers, and enjoyed their own time as everyone there. The atomshpes there was so peaceful, and relaxed. The young son of the owner came to play the piano and got tips from Mr. Ahtisaari and other customers. This is the image of Finland for me, a natural, democratic and peaceful country *(PhD, Takanashi Milk Products Co.,Ltd.*).

First Visit to Finland

by Haruki Kitazawa

I had a great opportunity to visit Finland by the invitation of JSPS Finland Alumni Club Opening ceremony and summer seminar. As for me, it was the first visit to Finland and it gave a wonderful impression. Finland was the exact country that I had really wanted to visit because my MS thesis was relating to immunological function of Finnish ropy sour milk, Viili. I have studied it as one of my research topics for over 20 years



capsular lactic acid bacterium as a starter culture of Viili and the chemical structure of posphopolysaccharide produced by Lactococcus lactis ssp. cremoris

Before my visit, I had got the impression via media and people who had been to Finland, that Finland has beautiful scenery and very warm national character, although a little bit shy, that is very much like Japanese. Indeed, Finland was the exact country I had imagined. Easy to become familiar with for a first time visitor like me, even in big cities like Helsinki and Turku. I had a fantastic time with real sauna and Finnish food. When I strolled along the street, I stopped by the restaurant Kahvila Suomi, which was a location stage of the Japanese movie, “Kamome Shokudo”. When coming back to Japan, I could relive memories from Finland once again by watching the movie.

In this seminar, I presented information about Food for Specified Health Uses (FOSHU), which is a Japanese system authorized by the Ministry of Health, Labor and Welfare, and our current topics of food functional research includes the Viili study. I could complete my task, much thanks to the interest from researchers studying in different fields. In Finland, there is currently also a growing interest in certain lactic acid bacteria strains and their products that have been supposed to provide specific health benefits. Related studies are well developed in mainly University of Turku, University of Helsinki and Valio Ltd., which have collaborated with many other countries. The studies on anti-allergic probiotics and anticariogenic xylitol are examples of their world-famous topics.

JSPS has several international collaboration programs for the development of worldwide research projects and will definitely progresse well through the support of Academy of Finland. I also would like to contribute to the good relationship between both countries as a kind of “Research Bridger” through the probiotic or immunobiotic food functional study.

At the end, I have to say many thanks to JSPS Finland Alumni Club and JSPS Stockholm office, and also Prof. Seppo Salminen for the warm invitation and hospitality. I really hope that the Club will be a great success and develop successfully *(Assoc. Prof, Tohoku University)*

My Affectionate Relation to Japanese Science and Culture

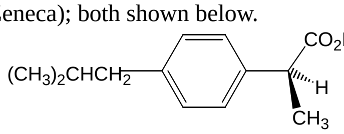
A JSPS Alumni Club Board Member’s Background and Experiences

by Stig Allenmark

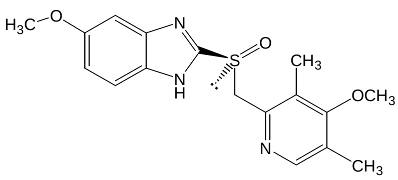
Becoming absorbed by organic chemistry

When I started my postgraduate studies in Lund in 1959, I had decided that it was within organic chemistry I wanted to work, mostly because it was a laboratory discipline where you usually could see a result directly from the experiments made. It is perhaps difficult for other people to understand, but to me such a simple operation as a recrystallization of an organic compound was a matter of great pleasure. To see the growth of beautifully formed crystals (which in itself is one of the wonders of Nature) made me quite happy.

At that time I was working with compounds which could catalyze their own reduction and it was up to me to try to determine the mechanism behind this phenomenon. Therefore, I had to measure reaction rates and study how these were related to the structure and geometry of the different compounds I investigated. This was how my interest in stereochemistry started; a passion that has been lifelong. Having finished my PhD in Uppsala in 1966, I continued my stereochemical research by working with compounds that can be resolved into two forms, each of which composed of molecules which are mirror images of those of the other form. Such resolutions can be made in a variety of ways and are today of great importance within the pharmaceutical industry. This because the two mirror-image forms (called enantiomers) often show different behaviour in a biological system. Therefore, many drugs are marketed as single enantiomers today. A well-known example is found in (S)-Ibuprofen (Ipren, an anti-inflammatory agent), another is (S)-Omeprazole (Nexium, an acid secretion inhibitor, marketed by AstraZeneca); both shown below.



Ipren



Nexium

In 1982 I started to investigate a technique for direct separation of enantiomers by liquid chromatography on a column containing a protein (bovine serum albumin, BSA) immobilized to a solid support. The results from this work were very encouraging and eventually led me to write a book in this field which was first published in 1988, with a second edition (and with translations into Russian and Japanese) issued in 1991.

Since these chromatography columns provided an excellent analytical tool for the determination of enantiomer composition, I soon started a study of reactions which possibly could yield a single enantiomer, i.e. microbial and enzymatic reactions. Kinetic resolution means that the two enantiomers in a racemate react at different rates to form a product under the influence of an enzyme catalyst present in a microorganism or added to the reaction medium. The stereoselectivity of the reaction is readily determined by observation of the enantiomer composition shown by the chromatogram from samples taken at different reaction times. Thus, lipase-catalyzed reactions were found to be quite efficient for the kinetic resolution of acids like Ibuprofen.

The virgin tour to Japan

My first trip to Japan took place in 1986 when I attended a conference in Chiba near Tokyo. There I met Yoshio Okamoto (who later became professor at Nagoya University) and his previous supervisor Koichi Hatada, then professor at Osaka University. Their main interest was polymer chemistry and particularly the use of chiral polymers for enantiomer separation, so naturally we had a lot to discuss. My visit to prof. Hatada's home on this occasion has been described previously in a JSPS Alumni Club Newsletter. My next stop on this trip was in Himeji; this since I had been invited by the Daicel Chemical Company located there to give a lecture. My host at Daicel was Dr. Tohru Shibata who kindly showed me around and gave me a nice guidance through the famous Himeji castle (Japan's oldest, still preserved castle).

The Daicel company had originally started as a producer of cellulose-based articles, but had later, due to a close collaboration with the polymer chemists in Osaka and Nagoya, come to prepare chromatography materials based on cellulose derivatives and also packed columns for enantiomer separation. Today, the company has subsidiaries world-wide and their columns for this purpose are totally dominating the market. There is a big demand from pharmaceutical companies all over the world of columns for preparative separation and subsequent pharmacological testing of the individual pure enantiomers.

Subsequent trips to the east

In 1994 I made my second visit to Japan. There was a conference in Kyoto I had the opportunity to attend and after that I had an invitation from prof. Okamoto to visit his department at Nagoya University. Since these events were separated by a weekend and I was equipped with a Japan Rail pass, I took the opportunity to go by train to Kanazawa on the northwest coast (where I went to see the botanical garden Kenroku-en) and then to Toyama. From there I went by a local train over the Japanese Alps and arrived eventually in Nagoya. The next two days, during which prof. Okamoto was my host, I gave two seminars, one at his department and the other at a chemical company in the city. My route then went to Himeji, like it had eight years earlier, because I had been invited to lecture at Daicel Chemical Company. After that I made an excursion to Kobe before I went back to Tokyo, my arrival and departure destination. In Tokyo I gave a final lecture at Sankyo Pharmaceutical Company and on the next day it was time to leave the country which had given me so much of friendliness, magnificent views and valuable experiences.

A visit to Daicel Chemical Company, Himeji

Some of my Japanese friends (Prof. Okamoto, my host in Nagoya to the right)

A delicious meal

Three years later, in 1997, I was given the opportunity to return to Japan again since I had been awarded a JSPS Fellowship, which allowed me to stay in the country for over a month as a visiting professor. It was a very rewarding but also tiresome trip in the country which included lecturing at a symposium on chirality held in Nagoya, at a Taniguchi conference in Sanda, at Tokyo Metropolitan University, at Tohoku University, Sendai, at Kitasato University, Tokyo, and at some other places. A participation in an organic chemistry conference in Kyoto was also included in the program. My free time during this visit permitted travel to places like Matsue, Hiroshima, Matsumoto, Nagano and Karuizawa in the Nagano prefecture, where I familiarized myself with an onsen for the first time – a truly exhilarating experience.

I have been to Japan on two further occasions. In 2003, a chirality conference was held in Shizuoka, situated on the southeast coast not too far from Mount Fuji. This time I was accompanied by my wife and we spent a very nice mini-vacation by travelling around after the meeting, among other things going to the hot springs in Kinosaki at the northwest coast. Another conference in the same series was held in Busan, South Korea, in 2006. Since prof. Okamoto attended the same meeting and had invited me to Nagoya, I went afterwards with him and one of his colleagues, prof. Eiji Yashima, to Nagoya for a few days.

Life as an emeritus

My retirement in 2001 did not change very much in my way of living. I continued to teach an undergraduate course in analytical organic chemistry, dealing mainly with organic stereochemistry and related analytical methods. I also started collaboration with a group at the department working in the area of spontaneous resolution and am now assisting the group with determination of absolute configuration by means of ab initio quantum chemical calculations using time-dependent density functional theory (TD-DFT) methods. Although my last PhD student had her dissertation in 2004, i.e. over five years ago, I still miss the daily contact with the members of my former research group, many of which are now employed by AstraZeneca in Mölndal. I continue to receive articles for peer review from various scientific journals and thanks to Internet and e-mail facilities it is possible for me to keep contact both with my Japanese colleagues and other friends in the community of the chemical sciences.

I have liked my visits to Japan so much that I hope to be able to go there once again. If this turns out not to be possible, I am still very pleased that my son is going to spend about a month in Tokyo at the Riken Brain Science Institute in Wako-shi quite soon. I am sure he will like Japan as much as I do and will follow the tradition set by his father to visit the country as often as he can.

The author, Stig Allenmark received a MSc from Lund University in 1963 and a PhD degree in organic chemistry at Uppsala University in 1966. A main theme in his research has been to study the stereochemistry of organic molecules, particularly such compounds that can exist in mirror-image forms. He has been professor at the University of Gothenburg since 1985. After his retirement in 2001, he has still been active at the chemistry department; among other things as teacher at a course in analytical organic chemistry.

(JSPS SAC Board Member, Professor Emeritus, Göteborg University)

II. Science & Culture

What Are "High-Temperature" Superconductors?

by [1]Hisao Yamauchi, [2]Maarit Karppinen

It was more than 20 years ago when a "high-temperature" superconductor was discovered (1986) and subsequently ignited "fevers" not only in the academia but also in various sectors of human society, *e.g.* business and even politics. In fact the spring meeting of American Physical Society held in New York March 1987 was nicknamed "Superconductor Woodstock". People who paid attentions to this kind of exotic material wondered (a) how high the superconductivity transition temperature (T_c) would be raised and (b) what kinds of practical application would come out in "near future". Here in the following presented are a brief history of superconductivity and an overview of status quo of the high-T_c superconductor (which is a more logical naming than the "high-temperature" superconductor, though still ambiguous as will be discussed in the text) together with a bit of its future prospects for answering Questions (a) and (b) aforementioned.

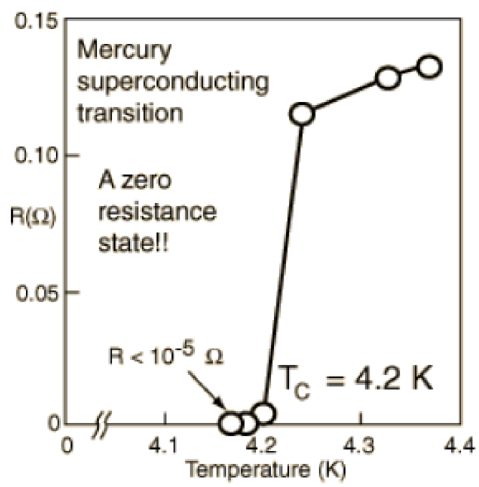


*Fig. 1: resistance vs. temperature data for mercury by Kamerlingh-Onnes (from http://hyperphysics.phy-astr.gsu.edu/Hbase/Solids/*scdis.html)

About half a century after the renowned *Oranda* physician von Siebold's (1796-1866) final return from Japan back to Leiden in *Oranda* (≡ Holland ∈ the Netherlands), in the very city Heike Kamerlingh-Onnes of the University of Leiden succeeded in liquefaction of helium (1908) and soon discovered "superconductivity", *i.e.* the disappearance of electrical resistance of mercury at a very low temperature (1911) (see Fig. 1). It is worth to note that this happened in an era when the foundations of modern natural sciences including statistical thermodynamics, quantum mechanics and relativistic theories were being established. As for his 1908 achievement, Kamerlingh-Onnes had started with training students for mechanical technologists to materialize a never-existed-before efficient pump for liquefying helium gas (the boiling temperature of which is 4.215 K at normal pressure). After this success he fully utilized his advantageous "low-temperature" techniques to participate in the then-hot debate on the electrical resistance of metals at very low temperatures employing the then-purest metal, *i.e.* mercury. Kamerlingh-Onnes did not overlook an abrupt drop of the resistance about 4.2 K and immediately recognized the importance of the phenomenon, *i.e.* zero-resistance, and named it superconductivity.

Over the following half a century after the discovery "whole scope" of the superconductivity phenomenon had been revealed: (1) Zero resistance (= perfect conductivity: 1911), (2) Meissner effect (= perfect diamagnetism: 1933), (3) Magnetic flux quantization (in the mixed state of the Type II superconductor: 1957), and (4) Josephson effects (in a pair of weak-linked superconductors: 1962). Thus it is clear that "superconductivity" does not mean only zero-resistance or perfect conductivity, *i.e.* Property (1). The abnormal Property (2) is indispensable from the thermodynamic point of view. Properties (3) and (4) were derived from the Ginzburg-Landau (GL) theory (1950) and the Bardeen-Cooper-Schrieffer (BCS) theory (1957), respectively. The microscopic BCS theory has predicted the limit of T_c at ~30 K. In spite of various theoretical and experimental attempts to obtain higher-T_c superconductors, superconductivity remained as an uncommon phenomenon occurring only at very low temperatures in some particular metals. In fact the highest T_c value had not exceeded 23.2 K (of Nb_3Ge) up until 1986 when a high-T_c superconductor with $T_c \approx 30$ K was discovered by Bednorz and Müller in Zürich. It should be reminded that some chemical elements had been found to become superconducting under high pressures, though they are non-superconducting at ambient pressure. Recent high-pressure techniques (by Shimizu group of Osaka University) confirmed superconductivity even in *e.g.* solid oxygen and pure iron, and further made it possible to reach the currently highest T_c value of ~20 K at 48 GPa for Li among pure elements (2002). Here note that there is no "official" definition of high-T_c superconductivity. However it has been a common sense to use the BCS limit as the criterion. In this respect recently-discovered superconductivity in MgB_2 (which was available from a shelf in Akimitsu laboratory of Aoyama-gakuin University in Tokyo: 2001) with $T_c \approx 39$ K is marginal.

Fig. 2: maglev train MLX01-2 at JR's Yamanashi test track which has recorded the highest speed of 581 km/h (from Wikipedia)

In spite of the fact that T_c values of "practical" superconductors did not exceed 20 K, which meant that only usable coolant was liquid helium, a wide range of applications of superconductivity had been vigorously developed. For power applications type-II alloy (*e.g.* Nb-Ti with $T_c \approx 9.5$ K) and intermetallic compound (*e.g.* Nb_3Sn with $T_c \approx 18$ K) superconductors have been engineered based on vortex (≡ quantized magnetic flux) pinning techniques into wires and then various shapes of magnets which yield fields stronger than any other permanent conventional electric magnets. Among notable applications included are widely-used magnetic resonance imagers (MRI) for diagnostic medicine, Japan-Railway's magnetically levitated linear-motor-car train system (JR-Maglev: 1962 -) (see Fig.2), European Organization for Nuclear Research (CERN)'s Large Hadron Collider (LHC: 2008 -), a futuristic global project for nuclear fusion or International Thermonuclear Experimental Reactor (ITER: 2007 -), and so on. Behind these "super"-technological applications the type-II superconductor engineering has been highly developed based on Property (3), *i.e.* the concept of vortex pinning for enhancing the maximum superconducting current density, J_c. At the same time applications of Property (4), *i.e.* Josephson effects, have also been pursued for uses for highly sensitive magnetic sensors. Among such uses well known are superconducting quantum interference devices (SQUID) for magnetometers, particularly neuromagnetometers for magnetoencephalography (MEG) to study human brain functions (research of which has been intensively performed at Low Temperature Laboratory, Helsinki University of Technology: see Fig. 3). Very high frequency devices have also been developed based on Property (4).

Fig. 3: magnetoencephalographer of the Brain Research Unit at Low Temperature Laboratory, Helsinki University of Technology (courtesy of Veikko Jousmäki)

There had been no firm theoretical and experimental evidence for superconductivity at temperatures above the BCS limit of ~30 K, and accordingly the boiling temperature of liquid nitrogen (= 77 K) up until 1986, as mentioned previously. The paper from Zürich on "possible" high- T_c superconductivity in the Ba-La-Cu-O system became highlighted only after Tanaka group of University of Tokyo had confirmed bulk superconductivity with $T_c \approx 28$ K in their La-Ba-Cu oxide sample by means of a SQUID magnetometer and reported the results at MRS meeting held in Boston December 1986. The value of T_c was immediately enhanced to ~40 K by replacing Ba by Sr. At the beginning of 1987

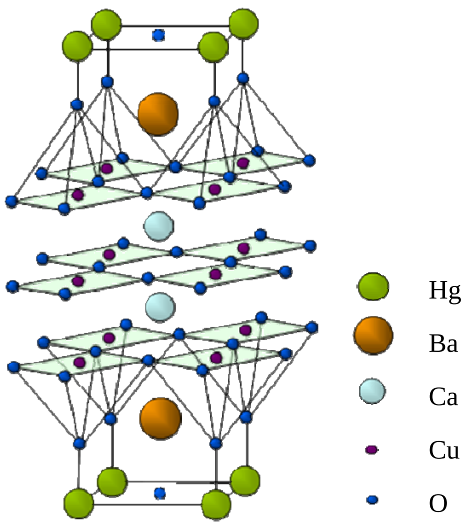


Fig. 4: crystal structure of mercury-based copper oxide $HgBa_2Ca_2Cu_3O_z$, with the current-highest T_c = 135 K

another miracle was reported by Wu *et al*. of US that a material in the Y-Ba-Cu-O system exhibited T_c as high as ~90 K, significantly exceeding the boiling temperature of liquid nitrogen. That is, a dream on the superconductivity T_c had come true. All these new material discoveries ignited the high-T_c fevers aforementioned. Moreover a year after Maeda *et al*. of NIMS, Tsukuba synthesized Bi-Sr-Ca-Cu oxides with T_c well above 100 K (1988). Since then till today enormous amount of effort has been made in the high- T_c superconductor research all over the world. Especially after realization of “real” high- T_c superconductors that are superconducting with liquid nitrogen as coolant, many “scientific” reports as well as patent applications of very-high T_c or even “room-temperature” superconductors were publicized. Such materials that are difficult to be reproduced by others have been called USO’s, *i.e.* unidentified superconducting objects, or lies (in Japanese).The current highest value of T_c was recorded in1993 at 135 K under normal pressure for $HgBa_2Ca_2Cu_3O_z$ (see Fig. 4). It was reported that this value was shifted up under very high pressures and/or by doping fluorine in $HgBa_2Ca_2Cu_3O_z$. As of today high-T_c superconductors with T_c > ~77 K, *i.e.* superconducting with liquid nitrogen as coolant, are all copper oxides. If the BCS limit , as previously defined, is employed as the criterion of high-T_c superconductors iron pnictide (≡ compounds of P, As, Sb or Bi) superconductors recently discovered (by Hosono group of Tokyo Institute of Technology: 2008) need to be included in the high- T_c superconductor category, as some iron pnictides exhibit T_c > 30 K,(but no higher than ~55 K).

Fig. 5: high-Tc superconductor (HTS) cable cooled with liquid nitrogen (from http://global-sei.com/super/cable_e/index.html)

Now that high-T_c copper-oxide superconductors with T_c up to 135 K (under normal pressure) are reality, there have been significant progresses in both basic and application research. Nonetheless yet have not been established any theories that are as sound as and as useful as the BCS theory (for metallic or conventional (“low-temperature”) superconductors). Thus Question (a) aforementioned shall still remain to be answered. That is, chances are yet to materialize real “room-temperature” superconductors. As for Question (b), applications using liquid nitrogen as coolant have been highly developed and still being developed. The Bi-Sr-Ca-Cu oxide superconductors (with T_c = 85 ~ 108 K) have been successfully processed into ribbon-tapes (with silver sheaths) and then into wires through powder-in-tube (PIT) techniques. The techniques thoroughly based on a unique property of the Bi-Sr-Ca-Cu oxides, the crystals of which have double Bi-O layers glued with a van-der-Waals bonding such that the crystals may easily be cleaved upon applying shearing-stress during the PIT process. Note that no other high- T_c superconductive materials possess this “gifted” property, though they are of similar layered structures (and therefore can be categorized into “homologous series”). One of the most attractive and promising applications of such wires is for electric power transmission via high-T_c superconductor cables cooled with liquid nitrogen – please remind that this had been a dream of dreams of superconductor scientists and engineers before the discovery of high-T_c superconductors. Such cables have already been materialized (see Fig.5) and have been tested for uses in real power networks. Actually 350-m long cable was successfully inserted in a commercial power line connecting two sub-stations in Albany, New York March 2007. In this test only 5% of electricity was lost. Thus superconductor power cables are obviously eco-friendly. Recently (in April, 2009) University of Tokyo announced “Solar-TAO Project” for providing electric power to its Atacama Observatory being under construction on 5,640-m high Mt. Chajnantor of the Andes neighboring to Atacama Desert of Chile (see Fig. 6): this observatory is located highest on the globe. The

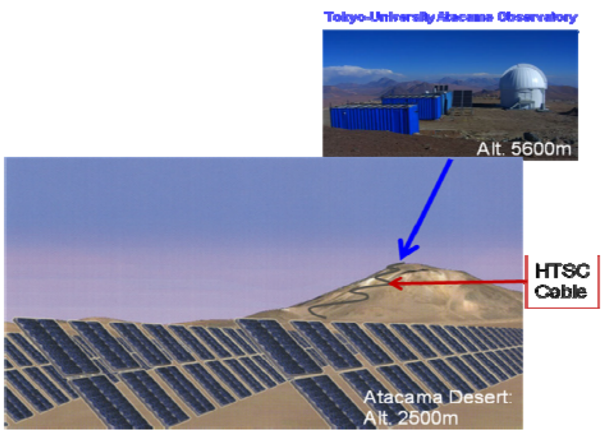


Fig. 6: image of the University of Tokyo’s Solar-TAO (Tokyo-University Atacama Observatory) project (sketched with figure components from http://www.ioa.s.utokyo.ac.jp/SolarTAO/index.html)

project includes the transmission of solar-cell electricity (to be generated in the Atacama Desert) via high-T_c superconductor cables cooled with liquid nitrogen. It should be mentioned that there have been announced various multi-national projects for international/intercontinental power lines and networks using high-T_c superconductor cables to transmit solar electricity over long distances, as solutions for "Green Energy".

There are still many important properties of high-T_c superconductors and their applications which have been already developed or under development, but here no space is available to mention them all. After all it has become clear that "high-temperature" superconductors functioning with liquid nitrogen are now in our hand and the phenomenon will be occurring often in our neighborhood. Let us remember that both Questions (a) and (b) are open to be answered more clearly in future.

Acknowledgement: We are grateful for the support by TEKES of Finland through a Finland-Distinguished-Professor Program (FiDiPro: No. 1726/31/07).

(1 Finland Distinguished Prof. @ Helsinki Univ. of Tech. ∊ Aalto Univ. and Emer. Prof .of Tokyo Inst. of Tech., 2 Acad. of Finland Prof. @ Helsinki Univ. of Tech. ∊ Aalto Univ.)

Festival (4)

The Enjoy Japanese Hot Springs -Onsen-

by Lisa-Mi Swartz

Guidebook to Hakone from 1811

To soak oneself in an *onsen*, a natural hot spring, is truly one of the most enjoyable Japanese experiences. The volcanic nature of Japan provides plenty of springs. Japan has thousands of *onsen* scattered along its length and breadth and they are highly popular all across Japan. Every region of the country has its share of hot springs and resort towns, which come with them.

Onsen should not be confused with *sentō*, which is an indoor public bath house where the baths are filled with heated tap water. An *onsen* by definition is a bath with naturally hot water from geothermally heated springs. The legal definition of an *onsen* includes that its water must contain at least one of 19 designated chemical elements and be 25°C or warmer before being reheated. When the *onsen's* water contains distinctive minerals or chemicals, the *onsen* establishments usually displays what type of *onsen* it is. Different types of *onsen* can be; sulphur *onsen* (硫黄泉 *iō-sen*), hydrogen carbonate *onsen* (炭酸泉 *tansan-sen*) or iron *onsen* (鉄泉 *tetsu-sen*), but you can also find *onsen* containing radon or metabolic acid. *Onsen* water is believed to have beneficiary effects derived from its mineral content. A good soak in the proper *onsen* is said to heal aches and illnesses, such as arthralgia, chronic skin diseases, constipation and so on. A particular *onsen* may feature several different baths, each with water containing a different mineral composition. The different *onsens* will boast about their special waters or mineral compositions and the healing properties these may contain, but common for them all are that they have a relaxing effect on your body and mind.

The presence of an *onsen* is often indicated on signs and maps by the symbol ♨ or the kanji, 湯 (*yu*, meaning "hot water") and sometimes the simpler hiragana character ゆ(*yu*) is used. Traditionally, *onsen* were public bathing places located were the hot springs came to surface. Today *onsen* come in many varieties, many hot spring baths belong to a *ryokan* (inn), while others are still public bath houses. A large number of *onsen ryokans* have booth indoor bathing facilities as well as outdoors (*rotenburo*). Many are built to melt in with, while at the same time enhance the natural surroundings, with some *rotenburos* spectacularly situated in the mountains, in canyons or along rivers, lake or sea shores.

To spend a night at an *onsen ryokan* is one of the most popular holiday activities among Japanese people, and after trying it yourself it is not difficult to understand why. But for the first time visitor, there are some etiquette surrounding onsen bath that is good to know.

Rotenburo at Takaragawa Onsen, Gunma-ken

Usually an *onsen* guest starts the visit at the gender separated dressing rooms with 男 for men and for 女 women. Before entering the bath, you are supposed to wash yourself in an adjoining washing area. This area is usually equipped with low stools and washbowls. The washbowls are used to rinse the body with water from either a tap or the *onsen*. As in all Japanese bath, soap is a big no-no in the bath, so be careful to only use it in showers and washing areas, and rinse well before entering the *onsen*. It is customary to bring a small towel into the bathing area, which is used for multiple purposes. You could use it as a wash cloth, or help you enhance your privacy while outside of the water. When squeezed from water, it will actually be enough to dry yourself on, but once you enter the bath, keep the towel out of the water. Many think it soils the water, and instead wraps it around the head to help feeling cool in a steaming environment. *Onsen* water can be very hot for someone not used to it, with typical temperatures of 40 to 44 degrees. If you are interested in the possible healing effects of the *onsen* water, you are not to rinse your body with tap water after finished soaking, for the minerals to have full effect on your body.

Onsen in Japan are enjoyed naked. While a majority of baths are gender separated, some are mixed and some establishments have both, gender separated and mixed sections, for example, in the case that there is just one spectacular *rotenburo*, which the owner wants to make accessible to all. Others solve the delicate problem by arranging special time slots for each gender. Some gender separated *onsen* also have the possibility of *kazokuburo* (family baths), which you book exclusively for your own group and where you can choose to mix.

One point to keep in mind is that people with tattoos are usually not welcomed at *onsen*. The original reason for this is that tattoos have been closely associated with members of the *yakuza* (Japanese organized criminal gangs). Even though tattoos have become a fashion statement in many places, still modern complex in big cities like the Ooedo-Monogatari-Onsen (see below), keep the ban.

Japanese Macaques enjoying a rotenburo

Onsen are today a central feature of Japanese domestic tourism, drawing Japanese couples, families or company groups who want to get away from the hectic life of the city to relax.

Increasing in number are modern hot spring complexes, which offer a range of baths, massage services, saunas and sometimes conventional swimming pools, water slides, etc. In Tokyo, where there is a shortage of natural hot spring water on the surface, some new hot spring complexes are retrieving their water from a depth of more than a kilometer below sea surface, such as Ooedo-Onsen-Monogatari which is located in Tokyo's Odaiba area.

A trip to an *onsen* is a truly relaxing get-away no matter if you chose a *ryokan* set in the countryside far from the buzz of the city, or if you prefer a day-trip to a big city complex. Many times you only need to bring yourself, since the *onsen* will keep you with *yukata* (cotton-kimono) to wear while you are there and the washing rooms are usually equipped with shampoo, lotion, tooth-brush and so on.

This might be the ultimate Japanese experience for body, mind and soul. If you have the opportunity, do not hesitate to try *(Assistant, JSPS Stockholm Office).*

East Meets West on a Plate (3)

Eggplants with Miso

by Elisabeth Sano

Among foods derived from soybeans, fermented soybean paste known as *Miso* is an important ingredient in Japanese cuisine. It is a high-protein seasoning made from soybeans, grain (usually rice or barley), water, salt and *koji* (fungus *Aspergillus oryzae* culture).

There is no similar food in the West. *Miso* has a varied range of colors, from deep chocolate browns to creamy beiges, textures, flavors and aromas. The distinct and complex flavor varies according to the regions and climate where it is produced. *Miso* can be roughly classified in 3 basic types: *Aka-miso* (red-miso, dark brown), *chu-miso* (medium-miso, light brown) and *shiro-miso* (white-miso, beige, mellow and slightly sweet). No two of the many available *miso* varieties taste the same.

Miso can be blended to fit one's taste. Traditional dark brown *miso* has almost a meaty flavor that makes it ideal for the preparation of meatless dishes. The white *miso* is subtly sweet and creamy, it can be used in delicate sauces or dressings. *Miso* contains only 5.5% to 14% sodium chloride (99% in table salt). It is a concentrated source of protein, vitamin B12 and other essential nutrients. *Miso* is a living cultured food containing lactic acid forming bacteria, health-giving microorganisms and digestion-aiding enzymes. Traditional *miso* can be kept for months in a cool spot, but refrigeration is preferable. Freezing spoils the texture and aroma.

People who want to make the transition toward a balanced meatless diet while still maintaining a proper intake of high–quality protein should use soybean food served together with grains. *Miso* contains many amino acids lacking in grains. When it is used as a regular part of a grain-based diet, the quality of the protein combination can be raised to the same level as that found in most meats. Relying more on plant protein and less on meat has a strong impact on food budget, health, body-weight and ecological environment.

By alkalizing the blood, *miso* soup (*miso-shiru*) is said to wake up the nervous system and offer ample nourishment, stamina and energy that last all morning. That is why many Japanese start their day with a bowl of *miso* soup. An aid to digestion and assimilation, it is also said to relieve acid indigestion and settle an upset stomach. *Sake* (rice-wine) lovers agree in saying that *miso* soup is very helpful in case of a hangover.

Miso is highly valued by cooks for its unlimited versatility. It can be used in soups, as a seasoning in many dishes, as a pickling agent and in desserts. The simple recipe below can be served hot or cold, with rice, noodles or as a spread for bread.

Eggplants with miso

Ingredients (photograph 1)

- 2 large eggplants, peeled and cut into small cubes
- 2 small to medium onions cut into thin slices
- 2 small to medium carrots cut into julienne strips
- 1 tablespoon vegetable oil
- 1 and a half tablespoons miso (not the white type) (photograph 2)
- Half teaspoon sugar or honey (optional)
- Ground white sesame seeds and finely minced green onions for garnish
- 1 teaspoon sesame oil (optional)

Photograph 1

Photograph 2

Methods:
Soak the eggplants in water for 5 minutes and drain.
Heat the oil in a pan, add the eggplants and sauté for 3 to 4 minutes.
Add the onions and carrots and continue to sauté stirring constantly for 2 minutes over medium heat.
Add water (or soup stock) to barely cover the bottom of the pan. Cover, bring to a boil and cook over low heat until the vegetables are tender.
Add the miso and sugar creamed in a small amount of water.
Mix well and simmer over medium heat until all liquid has been reduced (photograph 3). Add sesame oil.
Just before serving, garnish with sesame seeds and green onions (photograph 4).

Photograph 3

Photograph 4

Note: Miso can be purchased in oriental food stores and in health stores. Chu-miso was used for this recipe. You can choose the type and adjust the amount of miso to fit your taste. Green beans or 1 sliced green pepper can be used instead of the carrots.

Nature Watch

Spider Lily and Swallowtail

Lycoris radiata (spider lily) opens a large red flower in September, and is therefore called as “*Higan-bana*” (autumn equinox flower).

It preferentially grows in open meadows, such as the edge of rice paddy fields. After hibernation during summer, a flower shoot appears directly from the bulb without forming leaf. When it synchronously flowers in a colony, the field turns brilliant red, showing a clear contrast to yellow/green color of rice plants.

When flowers end, leaves of 30-50cm length appear, engaging in photosynthesis during whole winter, and die in the next spring. Such a life cycle is reverse to ordinary plants, which usually grow during warm seasons. Perhaps *L. radiata* has evolved to take an advantage of spatial and temporal vacancies due to the “resting” phase of many other competitors.

Papilio xuthus (swallowtail butterfly, *Ageha-cho*) is commonly seen in urban areas, meadows and woods. In autumn, it visits any available flowers for nectar, among which *L. radiata* appears to be one of the favorites. Although it feeds on citrus family plants such as orange, the combination of the two makes typical scenery of autumn nature in Japan *(Hiroshi Sano).*

Promenade (4)

Hiking at the Foot of the Tanigawa Mountains

by Renkichi Takata

Tanigawa-dake (Mt. Tanigawa) and surrounding peaks are about 2000 meters high and located 150 kilometers north of Tokyo. They make a natural barrier between the *Kanto-heiya* (*Kanto* plateau) and the *Echigo* regions (*Niigata* Prefecture) and confer distinct geographical differences between the two such as dark, snowy winter in the former and dry, sunny winter in the latter.

Tanigawa-dake mountains are covered with deep snow during winter and, even in summer, much snow remains in the valley. The east side of the mountains consists of rugged cliffs and valleys, being attractive for rock-climbers. There is one road crossing the valleys. It connects *Kanto* to *Echigo* through a pass and was often used by travelers in the old days. The hiking course shown here is the route to visit these valleys through the old road at the foot of the *Tanigawa-dake.*

Take the *Joetsu Shinkansen* at Tokyo Station, and you will arrive at *Joumo-kogen* station after 1 hour and 20 min. Take a bus to *Minakami* railway station. Then change the bus to *Tanigawa-dake* ropeway station. The bus tours take 45 min in total. From the ropeway station you can start hiking through the paved road. Soon you will see the information office and a small museum on the left.

The road with gentle slope goes through a deep forest of deciduous trees. After a 30 min walk, you will reach the first valley, *Machiga-sawa*. You will reach the second valley *Ichinokura-sawa* after 30 min from *Machiga-sawa.* This valley is the most famous among many valleys in *Tanigawa-dake* for its magnificent scenery. Here you can see huge and steep cliffs with much snow. The cliffs are approximately 1000 meters high and extend directly to the top of the mountain. On the rock wall at the roadside you can find many memorial panels for climbers who got lost in this valley. Cars must park at the entrance, and you can enjoy a quiet walk thereafter.

You will reach the third valley *Yuuno-sawa* after 30 min. Along the road, you can see old stone hedges constructed in Edo period. After a 15-min walk from *Yuuno-sawa*, you will find a narrow road on the right, leading down to the *Yubiso* River. There is a guidepost at the corner (written only in Japanese). Descend this road and you will find a cottage on the left after 15 min. Then turn to the right and go to the road in the forest along the river. After 1 hour and 30 min you will reach the roadway. Turn to the left and you will find a bus stop to *Minakami* station. If you walk 10 min further, you will reach *Do-ai* railway station and you can take a train to *Minakami*, although there are few trains at this station.

The best season for hiking in this area is May and June, when much snow is still left in the valley and trees are covered with fresh green leaves. October and November are also recommended when the forest is colored with yellow and red leaves. You should avoid weekends if you want to have a quiet walk. Check the train and bus schedule carefully, and note that the guideposts in the mountain are all written in Japanese *(Professor Emeritus, Ehime University.)*

IV. News & Announcements

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 is (B) 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 (Long-term and Short-term.) or Invitation fellowship (Short-term. Application deadline is announced by 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). *(Hitomi Yasui, JSPS Stockholm Office)*

Program	Duration	Application Dead line(※1)	Commencement of fellowships (※2)
JSPS Postdoctoral Fellowship Programs http://www.jsps.go.jp/english/e-fellow/postdoctoral.html ＃long	(Standard) 12 to 24 months	<1st Call> 2009.August31-Sep.4	2010.April 1 ～ 2010.September 30
		<2nd Call> 2010.May6-12	2010. September 1 ～ 2010. November 30
For Young post-doctor etc.	(Short-term) 1 to 12 months	<1stCall> 2009.October 5-9	2010.April 1 ～ 2011.March 31
		<2nd Call> 2009.November 24-27	2010.April 1 ～ 2011.March 31
		<3rd Call> 2010.February 1-5	2010.June 1 ～ 2011.March 31
Invitation Fellowship Programs for research in Japan http://www.jsps.go.jp/english/ e-inv/main.htm	(Long-term) 61 days to 10 montshs	2009.August31-Sep4	2010.April1 ～ 2011.March31
For Professor or mid-career Researchers etc.	(Short-term) 14 to 60 days	<1st Call> 2009. September 4	2010.April1 ～ 2011.March31
		<2nd Call> 2010.May 12	2010.October1 ～ 2011.March31

※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.

Other Grants

JSPS offers you opportunities to work with Japanese researchers or to attend international meetings. Now we are opening the recruitments as below. Please look into them, and if you are interested we very much welcome your application.

[ESF-JSPS Frontier Science Conference Series for Young Researchers]
JSPS and the European Science Foundation (ESF) starated in 2003. This conference provides young European and Japanese researchers with opportunities to attend lectures from and engage in discussions with leading international experts in their research field. It also allows the participants to sharpen their perception of future prospects for advances in the field, while building peer networks.

Conference Theme FY2009: Contact Zones of Empires in Asia and Europe: Complexity, Contingency, Causality
Date: 27 February 2010 - 4 March 2010 (6 days)
Venue: Fukuoka (Kyushu University)
Expenses: JSPS and ESF bear the conference, travel and lodging costs.
How to Apply: Apply for it through the electronic application form of ESF.
Deadline for Application: 5 November 2009
URL: http://www.jsps.go.jp/english/esf-jsps/index.html
http://www.esf.org/index.php?id=6169

[JSPS Core-to-Core Program]
JSPS conducts this program for the purpose of building and expanding a cooperative international framework in cutting-edge fields of science among universities and research institutions in Japan and the following 15 western nations; US, Canada, Austria, Belgium, Finland, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland, UK, Australia, and New Zealand.

Applicant Eligibility:
1. Japanese universities and research institutions or a graduate department within them are eligible to become a Japanese core institution. To qualify, they must possess sufficient research funds, research facilities and human resources, and be capable of taking the initiative in implementing the overall research project.
2. A full-time researcher employed at the Japanese core institution who is appointed as a co-chair of the project.

* You should ask your counterpart researcher in Japan to apply for this program and you have to find funds within your country equivalent of the JSPS fund.

Project Period: From April 2010 through March 2012 (under the FY2010 call)
Project Funding:
1. JSPS provides Japanese core institutions with the following funding;
   Up to ¥20 million per fiscal year
2. JSPS will cover the following major expenses of the Japanese core institutions.
   i. International travel expenses
   ii. Domestic travel expenses
   iii. Costs of expendable supplies
   iv. Conference expenses
   v. Honorariums

Deadline for Application: 15 October 2009
URL: http://www.jsps.go.jp/english/core_to_core/index.html

We would appreciate if you would share this information with people who might be interested.

Re-Invitation Program - starting autumn 2009

JSPS is preparing for a new grant scheme, "Re-Invitation program", and its call will start in this autumn, 2009. This program is open only for former JSPS fellows and it will allow them to revisit and do research in Japanese research institutions again. Under this program, the researcher can stay in Japan for 14days-2months with a round trip airfare and maintenance allowance of 15,000 JPY per day. Further information will be released from the Head Office in the near future.

(Hitomi Yasui, JSPS Stockholm Office)

Colloquium – September 5, 2009

The JSPS Stockholm Office presents a Sweden-Japan joint colloquium on"Advances in Cellular Reprogramming and Stem Cell Biology" at Karolinska Institute, Nobel Forum on the 5th September 2009.

Programme

Lecture

Keynote Lecture: *Dr. Shinya Yamanaka (Kyoto University)*

Session I: Chair: *Dr. Thomas Perlmann (LICR)*

Methods to generate quality iPS cells, *Dr. Keisuke Okit, (Kyoto University)*

Genome Modification Strategies in Stem Cells, *Dr. Harri Savilahti (University of Turku)*

Hypoxia Enhances the Generation of induced Pluripotent Stem Cells, *Dr. Yoshinori Yoshid, (Kyoto University)*

Session II: Chair: *Dr. Shinya Yamanaka*

Neurodegenerative disease-specific induced Pluripotent Stem cells research, *Dr. Haruhisa Inoue (Kyoto University)*

Optical Projection Tomography (OPT) imaging of the developing and diseased pancreas, *Dr. Ulf Ahlgren (Umeå Centre for Molecular Medicine)*

Reproducing the pathogenesis of CINCA syndrome in vitro with patient-specific iPS cells, *Takayuki Tanaka, PhD student (Kyoto University)*

Multiple sclerosis and CNS stem cells, *Dr. Lou Brundin (Karolinska Institute)*

Session III: Chair: *Dr. Jan Stenman*

Endoderm differentiation from ES cells, *Dr. Henrik Semb (Lund Stem Cell Center)*

Towards Regenerative Medicine Strategy for Kidney Diseases, *Dr. Kenji Osafune (Kyoto University)*

Transcription factor programming of dopamine neurons and other neuron types,, *Dr. Thomas Perlmann*

Four short presentations from young scientists:

An efficient assessment of the safety of induced pluripotent stem cells, *Mari Ohnuki, PhD student (Kyoto University)*

The Secrets of the Potential of Distinct Stem Cell Lines: Histone Acetylation, Gene Expression and Differentiation, *Dr. Rosita Bergström (Karolinska Institute)*

Characterization of six factors for generating induced Pluripotent Stem cells, *Koji Tanabe, PhD student (Kyoto University)*

Reprogramming of neural stem cells into microglia by the activation of the transcription factor PU.1, *Dr. Magda Forsberg (Karolinska Institute)*

Session IV: Chair: *Dr. Haruhisa Inoue*

iPS Cells for Cardiovascular Research, *Dr. Jun Yamashita (Kyoto University)*

Wnts on the Brain: Canonical Wnt Signaling Regulates Organ-Specific Assembly and Differentiation of CNS Vasculature, *Dr. Jan Stenman*

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