

楽友
Raku-Yu

Kyoto
University
Newsletter



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Editor's notes

Several pictures used for the cover of this newsletter were drawn by Franz von Siebold, a German doctor who lived in Japan in the Edo era. He performed the significant role of communicating information about Japan, where the Government of those days had adopted a policy of continuous isolation, to international society. His distinguished services were highlighted by the "Comparative Law—Japan and Netherlands" seminar that opened in Utrecht in 1996. This newsletter also aims to provide important information about Kyoto University and the international city of Kyoto to the world, so that we may further the promotion of international exchange.

Yoshio Shiomi, Senior Editor, The Editorial Committee of *Raku-yu*

Flora Japonica P. F. (B.) von Siebold and J. G. Zuccarini, authors, 2 volumes (published: 1835-1841)

Fauna Japonica P. F. (B.) von Siebold, editor, C. J. Temminck, H. Schlegel, and W. D. Haan, authors, 5 volumes (published: 1833-1850)

Both from the collection of the Faculty of Science



The title page of *Flora Japonica*



The title page of *Fauna Japonica*

During the approximately two centuries (1639-1853) of the "national isolation" policy, Japanese intellectuals eagerly studied modern western civilization through contact with Dutch traders and the books and other materials they brought with them. Franz von Siebold, author and editor of *Flora Japonica* and *Fauna Japonica*, source of the 3 illustrations that adorn this issue's cover, was the most beloved of the western visitors to Japan. The *Narutaki juku*, a boarding school that he supervised, trained a large number of Japanese in Western medicine and science.

A physician, Siebold spent the years 1823 through 1829 in Japan, during which time he collected and researched many specimens of the flora and fauna from various parts of the country. He was assisted in his studies by Keiga Kawahara, a commercial artist from Nagasaki who sketched drawings of the life of Japan's plants and animals. His drawings became the basis for the beautiful plates that illustrate *Flora Japonica* and *Fauna Japonica*. After returning to Europe, Siebold used the materials he had collected to coauthor *Flora Japonica* with J. G. Zuccarini, a botanist. *Fauna Japonica* was authored by 3 scholars from the National Museum of Natural History, Leiden, the Netherlands.

The 3 plates reproduced here are: *shumeigiku* (Japanese anemone) (*Anemone hupehensis* var. *japonica*) from *Flora Japonica*; *segurosekirei* (Japanese wagtail) (*Motacilla grandis*); and *ayu* (sweetfish) (*Plecoglossus altivelis altivelis*) from *Fauna Japonica*. The *shumeigiku* is also called the *kibunegiku* because it grows in abundance in the Kibune district of northern Kyoto. The sweetfish and Japanese wagtail can be found in or near the Kamo River, which is featured on the back cover. The sweetfish is an essential ingredient in the summer cuisine of Kyoto. Even today many of the other flora and fauna cataloged in the two works can be found throughout the year in Kyoto and its environs.

These books were the first systematic attempts to catalog the flora and fauna of Japan for a western audience. The title page of *Flora Japonica* bears the image of a stone monument to the achievements of western botanists who preceded Siebold in Japan. On the title page of *Fauna Japonica* is shown a symbolic representation of the contemporary image of the Far East. In those days Siebold and the Dutch were the only window to the western world available to the Japanese, and at the same time the only window through which the west could obtain a glimpse of Japan.

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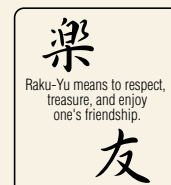
Shinya Takeda

Takahiro Tanaka

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A Note on Order of Names

As a general rule, names appearing in *Raku-Yu* are written in given name/family name order.



This name was taken from the assembly hall called "Raku-Yu Kaikan" that commemorated the 25th anniversary of the founding of Kyoto University.

Kazuo Oike Born in 1940 in Tokyo. Prof. Oike graduated from Kyoto University, Faculty of Science in 1963. He was a research associate at Disaster Prevention Research Institute from 1963 and became an associate professor in 1973. He obtained his D. Sc. from Kyoto University in 1973. He has been a full professor at Graduate School of Science since 1988 and also has been Vice-President of Kyoto University since April, 2001.

Dr. Oike's field is geophysics, and his area of specialization is elucidating the mechanics of earthquake occurrence, which is vital for the regional security of Japan. For Dr. Oike, Kyoto represents two areas of endeavor. The first is research on active seismic faults, and the second is writing *haiku*. He combines the cool-headed reason of the scientist with the rich sensitivity of the poet. One senses that these two qualities are combined to just the right degree in the way he oversees the work of his students.



Campus Located in a Basin with Active Faults

The three campuses of Kyoto University are situated along the range of mountains surrounding the Kyoto basin. At the base of the mountains are found many places famous for their beautiful autumn leaves or cherry blossoms. The autumn colors of 2002 were said to have been the most spectacular in several decades. This was due to precisely the right combination of weather conditions, such as the number of hours of daylight during the summer and the degree of coldness at the beginning of autumn that year. One of the unique properties of the Kyoto basin is that it gives rise to these special weather conditions.

The Kyoto basin was formed by the activity of active faults during the late Quaternary period. The mountain ranges surrounding the basin on three sides and the basement rock under the basin itself move vertically an average of 1 millimeter each year due to the activity of faults at the foot of the mountains. Over a period of more than a million years such movement has resulted in a difference in elevation of more than 1,000 meters. This was how the Kyoto basin was formed. During that period the basin was flooded with seawater several times.

The capital city of Heian was established in the Kyoto basin in 794, making use of its special geographical situation of being surrounded by mountains on three sides. The city flourished over a long period of time. At the same time as its own distinctive culture developed, cultural influences arrived from the Korean Peninsula and Chinese Continent. In fact, cultural trends were introduced even from Europe and the rest of the world, via the Silk Road.

The culture of the old capital is an important influence at Kyoto University, not only in research work and the education of students, but in extracurricular activities as well. There are some 100 university clubs engaged in cultural activities on an extracurricular basis. Many of them are inspired by western cultural traditions, and

others are active in areas such as Japanese traditional music.

There are also more than 90 sports clubs. In addition to clubs devoted to Japanese sports such as *sumo*, there are clubs that engage in western sports such as rugby and that have a long tradition at the university. A bust of E.B. Clark, who brought rugby to Japan in 1899, stands in the Graduate School of Letters, Kyoto University. Students also go yachting and boating on Lake Biwa. This lake is located in the Omi basin, which was also formed by the movement of active faults.

The Japanese archipelago is a new arc of island that were formed where four plates converge in the East Asian region. This is a type of region that is referred to as a tectonic belt, where frequent earthquakes and volcanic eruptions occur. Over 100 years ago, the culture of Europe, which developed on a geologically stable continent, was introduced at the time of the revolution that brought about the birth of Japan as a modern nation state. It was during this period that Kyoto University was founded in 1897 as Japan's second university. The university is a place where the cultures of east and west are contrasted and where the cultures of the world coexist. Over the years a distinctive research and educational tradition has developed, based on, for example, comparing and contrasting the natural conditions of stable land masses and tectonic belts. In 1997 the Kyoto Protocol was signed in the city of Kyoto, and in 2003 the Third World Water Forum was held there. In this way the traditions of Kyoto University, with its history of more than a century, live on in Kyoto, a city where people from all over the world gather. Diversity and intercultural exchange and sharing are key concepts as we consider the coexistence of the global society and peoples of the world in the years to come.

Kazuo Oike
Vice-President of Kyoto University

尾池和夫

Database Studies and the Infrastructure of the Knowledge Society

The major purpose of database studies is to determine how to organize a large amount of data to be used by various software packages and users. By sharing data, these software packages and people can communicate with each other. Previous inventions of knowledge sharing technologies such as printing and mass-communication have changed the world completely. We believe that the new way of sharing knowledge realized by a combination of database technology and World Wide Web usage will also change this world drastically. In this article we will discuss some of our recent results on the use of database technology and a project in the Graduate School of Informatics, related to the future knowledge society.

The Web can be regarded as a great source of knowledge, with the amount of data it contains doubling approximately every six months. Hence it is very important to develop methods to find useful knowledge within the contents of the Web. We have developed a graph-based solution referred to as a contents graph that can represent the contents of any part of the Web. Since Web pages with similar contents will have a similar contents graph, such graphs can be used for similarity-based retrieval. Compared with conventional searches based on the specification of multiple keywords,

we can get better results due to the existence of word relationships represented by the edges of the graph.

By generating contents graphs for sites containing news items, important topics and their relationships can be identified. Using archived news data, it is relatively easy to determine the transition of important topics. Furthermore, differences in the importance of certain topics to different countries can be observed by comparing the graphs of their news sites. In order to extract useful knowledge it is essential to identify Web pages having certain specified characteristics. Such Web page characterization can be realized by contents graphs.

As another example, by accumulating data from the Web, we may be able to get data on how people perceive a city. We have developed methods to identify and characterize items referred to as land marks. For each location we can obtain characterizing information for that location. This information is used by a Geographic Information System (GIS) called Kyoto SEARCH. It has an integrated user interface consisting of a contents graph for semantic navigation, a map, and corresponding URLs. A version of the system is also used in Korea.

Although there is a large amount of data on the Web, only a small percentages of it is used frequently.

These Web pages are called hot spots. An important problem with hot spots is their dynamically changing nature. As the speed of data increase on the Web is much faster than that of conventional communication lines, it is important to develop technology for efficient data retrieval. One of the more promising technologies to achieve this is

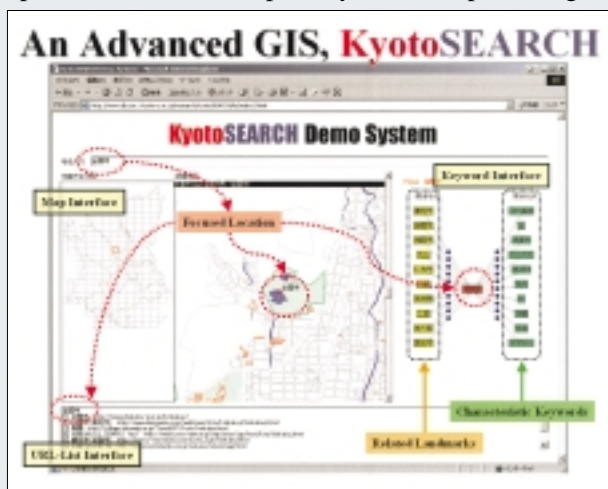
called Web cache, which operates by storing frequently used data near the place of usage. By considering the characteristics of Web data we have developed a generalized Web cache system called Web Warehouse. It has proved to be a good system in improving Web efficiency.

Information retrieval discussed above is a basis for knowledge sharing. The technique can be applied to a variety of areas including collaboration support. People in far apart locations can work together via the Internet. By storing all the operations in a database, the nature of the work can be analyzed. Furthermore, collaboration between users working at different times is possible. In a real meeting, all information is equally shared by all participants. In a distributed meeting, we can define security levels for shared documents so that some documents can be used only by authorized users. We have developed a system called VIEW Media to realize an advanced distributed collaboration environment. Web-based training is one of the many promising applications for collaboration support systems. A system called VIEW Classroom has been developed, versions of which are actually used at a high school and a university in Kyoto.

In the Graduate School of Informatics we have a 21C-COE project called "Informatics Research Center for the Development of a Knowledge Society Infrastructure". The knowledge society is a fundamental concept for the future where various types of information scattered across the ubiquitous Internet are transformed and presented as easily understandable knowledge. People and social systems share and utilize this knowledge, and new information resulting from subsequent understanding is further circulated as new knowledge.

This program promotes research on:

1. Versatile deployment of intelligent information media (media



Integrated user interface of Kyoto SEARCH (From left, city map, location map, a partial graph for semantic navigation. Bottom, a list of related URL's)

processing, artificial intelligence and related areas);

2. Information creation and circulation infrastructure (database, Web and related research);

3. Social information systems as applications of the above research (e-commerce, education, medical informatics and other applications).

Besides research and education we also encourage activities of international collaboration and social interaction. We have overseas offices in Thailand, China and the U.S. At these offices are planned environment research collaboration with Thai organizations, bases of computer science research with the Chinese Academy of Sciences, and

Web and database research with Silicon Valley companies.

As a form of social interaction we have several projects within Kyoto City. The Kyoto-One project is a plan to develop a unified network covering Kyoto by connecting various existing networks. In the ALAN-K (Advanced LeARning Network in Kyoto) project, the use of computers to help the creativity of young people is emphasized. This project is supported by Dr. Alan Kay, who invented the concept of personal computers. Presently two primary schools, one junior high school and two senior high schools are participating the project.



Yahiko Kambayashi

- Born in 1943.
- Graduate of the doctoral program, Graduate School of Engineering, Kyoto University
- Ph.D., Kyoto University
- Professor, Graduate School of Informatics, Kyoto University
- URL <http://www.db.soc.i.kyoto-u.ac.jp/usr/yahiko/yahiko-e.html>

"It is no good if you are not sure of what to answer when asked 'what and why are you going to study?' I think that having a dream is the most important thing."

With the application within society of the fruits of research in mind, Prof. Kambayashi pursues his academic work while constantly thinking about how best to accumulate knowledge and ensure that it is reused widely. He is also actively involved in collaborative work with partners outside the university. At present he is engaged in a cooperative effort involving the local community, working together with nearby high schools to develop a study system for mathematics. Another current endeavor that Prof. Kambayashi is enamored of is the project in collaboration with Alan Kay. The project, in which they are currently involved in earnest, aims to foster creativity by giving children the opportunity to experience programming in a manner similar to making things out of Lego pieces. Prof. Kambayashi aims to tackle real problems facing society from the distinctive viewpoint of an academic researcher of computer systems. His smiling countenance expresses his strong faith in his work and his kindness toward other human beings.



ALAN-K workshop at Horikawa high school. Dr. Alan Kay (first from right on second row) with primary school children.



The poster of ALAN-K project



A meeting with students. Prof. Kambayashi is also actively involved in developing the professional capabilities of young people. He is currently involved in a project that dispatches students to Silicon Valley. He feels that in his field it is essential to have experience of the American culture of competitiveness.



The Kambayashi Lab. The students working under the professor come from a variety of backgrounds. Some are graduates of the Faculty of Engineering and some come from the Faculty of Economics. Others have been working or are international students.

Facial Expression and Gaze are the Windows to the Soul? : Psychology of Social Perception.

My research field is cognitive psychology and I am interested in various aspects of the way faces are perceived, especially the ways people recognize social signals contained in a face. My current research focuses on perception of dynamic facial expressions, the effect of eye gaze on directing attention, and the relationship between emotional facial expression and gaze direction processing. All of these are concerned with elucidation of human social competence, which enables us to perceive the emotions and intentions of others, to understand relations between ourselves and others, and to modulate our behavior flexibly in face-to-face communication. For my research, I am adopting both an experimental and neuroscientific approaches that include techniques such as brain-imaging (*Figure 1*). As the neuroscience of social cognition has made great progress during the past few years, it is really exciting to devise hypotheses for psychological experiments and the interpretation of experimental evidence in relation to recent neuroscientific findings. Below, I describe some of the results of recent research carried out in my laboratory.

1. Perception of dynamic facial expressions

Though it may seem rather strange, there has been surprisingly little psychological research until recently on how dynamic facial expressions are perceived. I suspect this situation has partly stemmed from the

methodological difficulty in controlling and manipulating video clips of natural expressions as experimental stimuli. Instead of using video clips of natural facial expressions, we created computer animation clips in which we rapidly present intermediate frames to seamlessly transform a face with a neutral expression into one of six emotional expressions: happiness, anger, sadness, fear, surprise and disgust. This method makes it possible to avoid uncontrollable factors like head movement and eye blinking, also enables us to manipulate systematically parameters such as the rate of change of moving facial expressions.

Using these computer-animated dynamic stimuli, we have carried out psychological and neuroscientific experiments focusing on different stages of facial expression processing (perception, recognition of emotion, facial reaction of the perceiver, and so on). For example, we investigated how people perceive dynamic facial expressions and how their velocity affects their perception, focusing on the "representational momentum" phenomenon (*Figure 2*). "Representational momentum" denotes the phenomenon whereby the final shape or position of an transforming object is shifted ("distorted"), in the perceiver's mind, in the direction of an observed transformation. In the experiment, after watching an animated clip of emotional expression, participants reproduced on the display the image they thought

matched the last image shown in the clip. Quantitative analysis of the image produced by the participants revealed that when perceiving dynamic facial expressions, the last image participants perceived was an intensified image of facial expression and the degree of distortion depend on the velocity of the stimuli. This is the first demonstration of representational momentum in the perception of dynamic facial expression, and it implies that the human perceptual system works quite efficiently in detecting an emotional signal from another individual, which may help to predict that person's subsequent behavior.

2. Interaction between emotional expression and gaze direction

Not only facial expression but also face/gaze direction provides an important clue to another person's mental state. Recent neuroscience literature offers an accumulation of convincing evidence indicating that the same face-responsive brain areas in the occipito-temporal region (superior temporal sulcus) and in the amygdala are involved in processing both facial expression and gaze direction. This strongly implies an intimate interconnection between the two. Thus, we hypothesized that facial expression and gaze direction processing interact in the early stages of visual perception. Focusing on "the threatening face advantage" in the perception of facial expression, we investigated whether gaze direction modulates this effect by using a perceptual matching task. The threatening face advantage is a phenomenon in which angry, threatening faces are more quickly and accurately detected than are other emotional faces. As predicted, face/gaze direction affected the early visual stages of facial expression processing; a threatening face looking toward the perceiver was processed more accurately than the same face looking away. These results imply that humans have an

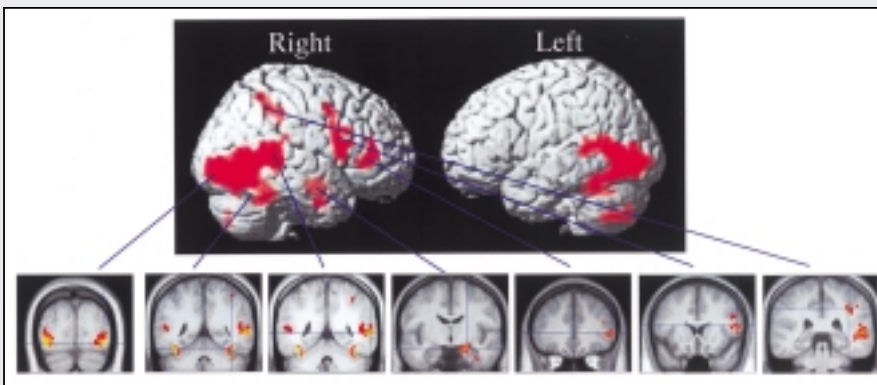


Figure 1

ecologically valid mechanism for detecting a threatening signal and efficiently avoiding imminent potential danger.

In the field of social cognition, many interesting research questions remain untouched. I hope our ap-

proach can shed light on psychological functions and their neural underpinnings that make it possible for us to understand each others' minds, and enjoy a wide variety of social interaction and communication.



Sakiko Yoshikawa

- Born in 1954.
- Graduate of the doctoral program, Graduate School of Education, Kyoto University
- Ph.D., Kyoto University
- Professor, Graduate School of Education, Kyoto University
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<http://www.educ.kyoto-u.ac.jp/division/cognit.htm>

"Right now my thinking is that by accumulating small pieces of basic research it may eventually be possible to complete the jigsaw puzzle."

Prof. Yoshikawa got the idea for her research while studying in Britain in 1989, and since then she has pursued it unwaveringly. Now she really enjoys doing her research. In recent years her research and experiments have undergone substantial change. Advances in neuroscience and primatology have made the brain itself the subject of study, and collaboration with experts in other fields has become indispensable. For her being at Kyoto University among researchers in a wide range of fields is a tremendous advantage. For example, Prof. Yoshikawa is participating in the 21st Century COE Program. With the goal set at "*knowing mind and fostering mind*", the project aims to comprehensive understanding of mental functions by integrating experimental, field, and clinical approaches to mind. This joint research project involves scholars from the Graduate School of Letters, Graduate School of Human and Environmental Studies, and Graduate School of Informatics. Picking up small pieces from many different fields, each day she comes closer to the completion of the puzzle.

• Functional role of representational momentum in facial expressions

Efficient detection of emotional signal

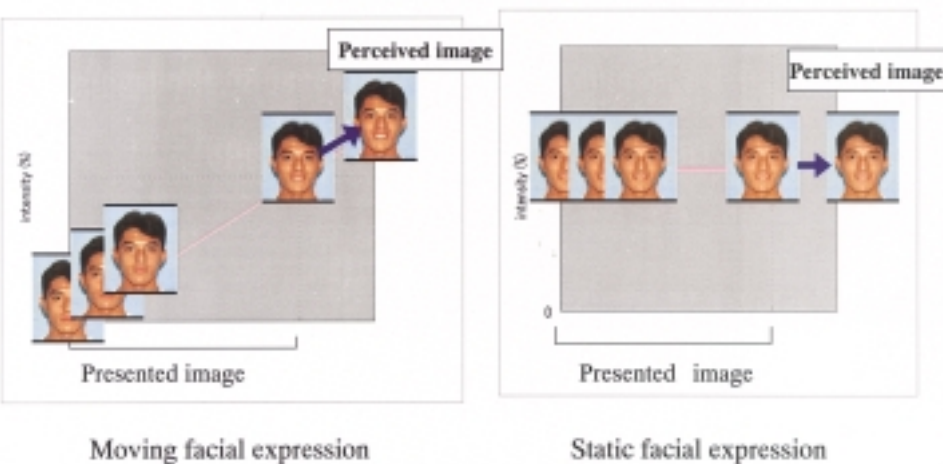


Figure 2



An experiment in progress. When advising students, Prof. Yoshikawa constantly urges having a strategy for one's research and taking a positive approach toward joint research.



The testing laboratory. Prof. Yoshikawa's research is built on an accumulation of detailed data from experiments.



Prof. Yoshikawa shows us a variety of materials as she explains her work.

Academic Center for Computing and Media Studies

The Academic Center for Computing and Media Studies was inaugurated in April 2002. It serves as an integrated information technology base within Kyoto University as well as supports super-computing service for universities across the country. Its functions cover network infrastructure, computing, database, and multimedia contents. This makes it possible to provide unified information services at all levels. The center operates 13 satellite locations across the university's campuses, equipped with a total of approximately 1,350 PCs. The center is organized into a Research and Development Department, containing 5 sections specializing in the areas of networking, computing, educational support systems, digital content, and the interfaculty cooperative research section, and an Information Services Department with a corresponding structure.

The basic concept of the center is to "seamlessly integrate virtual multimedia network environments and real world research and education environments." For example, the cooperative research section of the Research and Development Department is collaborating with the Kyoto University Fisheries Research Station on an undersea ecosystem

observation project employing an omnidirectional video camera. Once its goals are realized, it will enable researchers and students on the university campus to interactively observe underwater dynamic events in the Sea of Japan. Kyoto University is known for research involving extensive fieldworks, and this sort of seamless integration with remote sites through the use of advanced multimedia network technologies holds enormous potential for opening up new areas for future study. Another example is the work being done by the Educational Support Systems Section to design a total educational environment based on the concept of "interactive language instruction." This project embraces aspects ranging from the creation of content for teaching materials through the development of operational systems for delivering them.

With the completion of the center, Kyoto University has gained a valuable new promoter in the field of development research. By working together and sharing information, the center and the rest of the university will be able to move forward with the task of building new environments for research and education in the 21st century.



Takashi Matsuyama

- Born in 1951.
- Ph.D., Kyoto University
- Professor, Graduate School of Informatics, Kyoto University
- Director, Academic Center for Computing and Media Studies, Kyoto University
- URL <http://vision.kuee.kyoto-u.ac.jp/>

"The question of what the next step in information education should be is one of the big issues we face at this time. I believe that the area of information literacy, the study of ways to understand and make use of information structure, will play a central role in the years ahead. We are presently hard at work planning the creation of a new information education program that will ultimately allow us to provide guidance in areas extending up to information ethics."

Opening hours

North Building: 9:00 a.m. to 9:00 p.m.

Monday, Wednesday through Friday

9:00 a.m. to 4:30 p.m. Tuesday

South Building: 10:00 a.m. to 8:00 p.m.

Monday through Friday



CALL is a project created and operated as a cooperative effort by the university as a whole. It incorporates self-study functions such as a pronunciation correction program (above). The number of faculty wishing to use the CALL classrooms (left) is so large that the facilities are almost always fully booked.



Exterior of the south building. The large number of persons using the facility is said to have altered the flow of pedestrian traffic within the campus since its opening in September 2000.



Virtual studio and language instruction CD-ROMs. Approximately 20 titles have already been released based on the "interactive language instruction" concept. The virtual studio is available for the creation of such content.



The open-space laboratory. A total of 133 PCs are available for use by university students and faculty at all times.

Kyoto University International Symposium

on Post-Petrofuels in the 21st Century – Prospects in the Future of Biomass Energy –

September 3-4, 2002 :
Hotel Inter-Continental Montreal, Montreal, Quebec, Canada

When we contemplate society in the 21st century, it becomes clear that issues related to energy and the environment are the most urgent challenges we presently face. The symposium explored possible solutions to these issues by taking biomass energy as a starting point. It was held in Montreal, Canada, which has the distinction of being a world leader in the area of biomass energy research and practical implementation.

The symposium was organized around 2 topics: 1) Present Environmental Issues and Prospects for the Future; and 2) the Role of Biomass as Fuels or Chemicals. It included 17 lectures and 35 poster presentations. In particular, the poster presentations (a format being tried for the first time) functioned as an effective opportunity for a vigorous exchange of views among young researchers,

including students. The total number of attendees over the 2 days of the event was 148.

In addition to the Graduate School of Energy Science, which organized the symposium, attendees from Kyoto University also represented the Graduate School of Engineering, the Graduate School of Agriculture, the Institute of Economic Research, the Wood Research Institute, and the International Innovation Center. Each participant made proposals relating to his field of specialization. Purely by chance, the news that Canada had ratified the Kyoto Protocol was announced on the first day of the symposium. Thus the theme from Kyoto, where the protocol was signed, turned out to be a truly timely one.

URL <http://www.adm.kyoto-u.ac.jp/kokuryu/symposium/index.htm>



Symposium poster



Scene from the symposium venue

The 21st Century COE Program

List of Selected Programs in Kyoto University in FY 2002

The 21st Century COE Program is a support program launched during FY 2002 by Ministry of Education, Culture, Sports, Science and Technology with the aim of raising the level of research and education at Japanese universities and making them more internationally competitive. Since the program places emphasis on promoting the formation of worldclass research and educational centers, only research projects judged to have excellent potential in each field are to be selected to receive funding. Projects that are selected will receive generous research funds for a period of 5 years in principle. Thus, one of the goals of the program is to encourage a competitive atmosphere among universities and give new vitality to their research activities. During FY 2002 applications were

made for a total of 15 projects in 5 fields solicited by researchers associated with Kyoto University, and of these 11 were selected to

receive funding. A total of approximately ¥2 billion will be allocated to these projects in FY 2002. Plans call for applications to be solicited in 5 additional fields in FY 2003.

URL <http://www.adm.kyoto-u.ac.jp/coe21/> (Japanese only)

Field of study	Branch of learning	Program title	Program leader
Life Science	Bio Science	COE Formation in Frontier Life Sciences by Unifying Interactions	Mitsuhiro Yanagida
	Biology	Formation of a Strategic Base for the Multidisciplinary Study of Biodiversity	Toshisada Nishida
Chemistry, Material Science	Chemistry	Kyoto University Alliance for Chemistry (Chemistry for Material Conversion)	Gunzi Saito
	Material Science	COE for a United Approach to New Materials Science	Zempachi Ogumi
Information Science, Electrical and Electronic Science	Information Science	Informatics Research Center for Development of Knowledge Society Infrastructure	Yahiko Kambayashi
	Information Science, Electrical Communication Engineering	Center of Excellence for Research and Education of Fundamental Technologies in Electrical and Electronic Engineering	Mituhiko Araki
Humanities	Literature, History, Philosophy	Towards a Center of Excellence for the Study of Humanities in the Age of Globalization	Eisaku Kihara
	Psychology	Center of Excellence for Psychological Studies	Kazuo Fujita
Interdisciplinary, Combined Field, New Disciplines	Area Studies	Aiming for COE of Integrated Area Studies: Establishing Field Stations in Asia and Africa to Combine Research Activities and On-Site-Education	Tsuyoshi Kato
	Energy Science	Establishment of COE on Sustainable Energy System	Mikio Kasahara
	Disaster Science	Natural Disaster Science and Disaster Reduction	Yoshiaki Kawata

Establishment of the Fukui Institute for Fundamental Chemistry (FIFC):

Passing on the Spirit of a Nobel Laureate



Ken'ichi Fukui (1918-1998)

- 1941 Graduated from Faculty of Engineering, Kyoto Imperial University.
- 1945 Appointed assistant professor at Faculty of Engineering, Kyoto University.
- 1951 Appointed full professor, Kyoto University.
- 1981 Received Nobel Prize in Chemistry for work on frontier molecular orbitals, which are related to the roles of electrons in chemical reactions.
- 1983 Appointed emeritus professor, Kyoto University.

In 1981 Ken'ichi Fukui became Japan's first Nobel laureate in the field of chemistry, and the Institute for Fundamental Chemistry (IFC) was established in commemoration of this accomplishment. In April 2002, in a transfer of endowment, this facility came under the administration of Kyoto University (Fukui's alma mater) and was relaunched as the FIFC. Fukui was the 3rd alumnus of Kyoto University to receive the Nobel Prize, and at the time he was already doing the majority of his research work there. Now he has returned once again to his old university as the inspiration behind the research organization that bears his name. Four years after his death, the legacy of Ken'ichi Fukui as one of the greatest geniuses produced by Kyoto University will surely support and nurture the development of the new institute. As the official opening in April approaches, we spoke with Prof. Isao Morishima, Director of the institute, about the institution's vision.

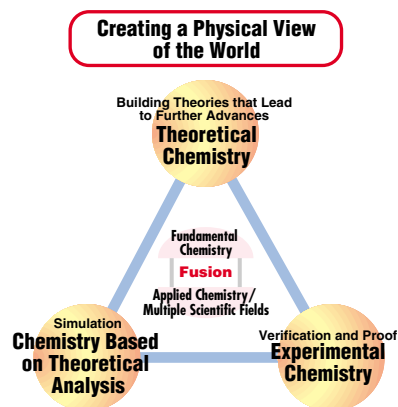
Seek out outstanding young scientists and nurture their talent

What are the goals behind the establishment of the new institute?

One is to support original research by young scientists. In other words, we want to play the role of an incubator, discovering and nurturing original talent. This is one major reason why the institute was established. Another goal is to serve as a forum based on fundamental science in which different fields can be integrated. In this way we hope to encourage the birth of original, new scientific theories.

Are you presently working to recruit young researchers?

The institute consists of two sections, one devoted to general research and the other to theoretical research. Each section has five supervisors. Their job is to discover researchers possessing original talent, in other words, promising young scientists. We are advertising publicly for young researchers with high academic qualifications, but whenever we come across someone who seems to be something special we will invite him or her to work at our institute. For this reason we have to develop something of a connoisseur's judgment in order to be able to spot the people with real talent. This is a very difficult task.



Ideal and Purpose of the FIFC

What do you mean by original talent?

In a word, persons who have the ability to come up with unconventional solutions to problems. In the past there was a tendency for the Japanese academic community to reject researchers who thought this way. That approach has worked reasonably well up to now since most of the research work being done was of the "catch up" variety. People's capabilities are like vectors. They possess both magnitude and direction. In the past it was sufficient for everyone to align their capabilities in the same direction in order to catch up with, and eventually overtake, a rival. But if you want to create something completely new, a different approach is necessary. The institute will be a place for nurturing talent oriented in many different directions.

Aiming for a "Crossroads of Knowledge": An integrated setting in which to encounter other scientific fields

What are the research principles that the institute inherits from Dr. Fukui?

I think they are symbolized by what Dr. Fukui called "the wellspring of knowledge." Basically, he believed that originality will arise to the extent that disparate fields are integrated with each other. Dr. Fukui developed his own distinctive theory



Ken'ichi Fukui's desk. It is preserved as he left it, along with several of his personal possessions.

by integrating chemistry and mathematics. And when I speak of bringing together disparate fields I am also thinking of combinations of theoretical and experimental, or of basic and applied science. Thus, I can envision scientists in applied fields spending several years at the institute working on a theoretical system. Alternatively, a person who has spent many years in a corporate setting working on technology development might set aside a certain period of time to concentrate on basic research. Achieving integration between academia and the "real world" is another of the aims of the

institute. I think it is essential that we make the institute a place where disparate scientific fields come together—a crossroads of knowledge—if we hope to realize the ideal of Dr. Fukui.

It is sometimes said that in recent years basic research in Japan has not given rise to technological applications.

All research is linked, from the cutting edge of basic research to applied science. This is because advanced research at the cutting edge deals with the fundamental nature of matter. In recent years

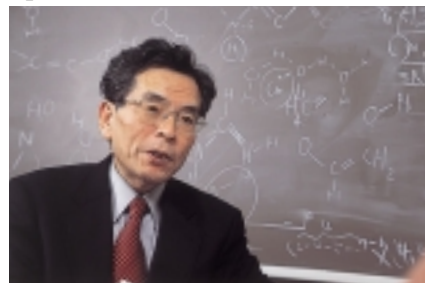
chemistry has become borderless, spreading out to embrace all sorts of new areas. Exciting new fields of complex science have arisen, such as nanotechnology and the creation of new materials. At a time such as this there is a strong need to build new theories of chemistry that will act as a motive force behind the opening up of such new fields of science.



The FIFC is located about 2 km from the university in a quiet residential neighborhood, on a site facing the Takano River. The building has a marvellous atmosphere.



Lecture hall on the 3rd floor



Prof. Isao Morishima, Director of FIFC

The formulae on the blackboard behind him remain from Dr. Fukui's research.

"I was an alien element in the Fukui's lab," says Prof. Morishima. His research involves the use of a wide range of methods from biochemistry, biophysics, physical chemistry, and the like to analyze the functional structure of proteins and clarify the construction principles of their three-dimensional structure, as well as using molecular design to produce new artificial proteins. In his career as a professor he was once critical of the methodology employed at Dr. Fukui's IFC. Now that he has been appointed Director of the FIFC he feels both surprise and an enormous sense of responsibility.

The Nobel Prize and Kyoto University

Kyoto University has five alumni who are Nobel laureates, more than any other university in Japan. The first was Hideki Yukawa, who was awarded the Nobel Prize in Physics in 1949 for his theory of mesons. In 1965 Shinichiro Tomonaga also received the Nobel Prize in Physics for his work in quantum electrodynamics and the physics of elementary particles. In 1981 Ken'ichi Fukui was awarded the Nobel Prize in Chemistry. The Nobel Prize in Physiology or

Medicine went to Susumu Tonegawa in 1987 for his discovery of the genetic principle for generation of antibody diversity. Finally, Ryoji Noyori was awarded the Nobel Prize in Chemistry in 2001 for his work on chirally catalyzed hydrogenation reactions. Of these Nobel laureates, Yukawa and Fukui served on the faculty of Kyoto University, and the university has established research institutions named after them in the hope of passing on their

legacies. In addition, Koichi Tanaka, who received the Nobel Prize in Chemistry in 2002, is an employee of Shimadzu Corporation, which is based in Kyoto. As part of the university's efforts to encourage collaboration between business and academia, he has been appointed to the position of visiting professor at the Kyoto University International Innovation Center.



Hideki Yukawa accepting the Nobel Prize in Physics

The Yukawa Institute for Theoretical Physics was established in 1953. Shinichiro Tomonaga, a classmate of Yukawa's at high school and university, assisted in the creation of the new institute which was based on a novel concept for the time.



The Fukui Nobel Prize Commemorative Plate in the Faculty of Engineering's Building No. 9. The Nobel Prize is a familiar presence at Kyoto University. The plate, displayed above the student bulletin board, is something students and faculty see on a daily basis. "Many students have their picture taken here on graduation day," one student told us before hurrying back to the lab.

Biking in Kyoto – "A Filipina's Experience"

Caroline Sy Hau



Caroline Sy Hau

Born in Manila, the Philippines, in 1969.

Ph. D., Cornell University

Associate Professor, Center for Southeast Asian Studies, Kyoto University

Dr. Hau has been working on the relationship between literature and nationalist discourse and practice in the Philippines. She is also interested in studying the everyday life of the overseas Chinese communities in Southeast Asia in which she was born and passed her childhood.

At present (July 1, 2002) 38 regular faculty members at Kyoto University are foreign nationals. She is one such person.

Biking in the city of Kyoto, Japan, is the rule, not the exception. The prohibitive costs of commuting daily by bus or train have made human power the cheapest engine of mobility within the city.

Coming as I do from Manila, the capital of the Philippines, where even walking is almost unheard of, biking literally opened new pathways for me. The twenty-minute ride from Ichijoji to the Center for Southeast Asian Studies where I work took me down the byways and side streets of eastern Kyoto, past boxes of neatly landscaped gardens trimmed with old cypress and azalea shrubs.

The route to Kyoto University was a series of dips and downward slopes, which made each early-morning ride not

exercise, but a kind of meandering. My feet barely touched the pedals as gravity did all the work. My only wish was to bike on and on, forever, with the wind coasting along my face, the slight creaking of the turning wheels; and the sensation, best of all the sensation, of being on the move, of sliding down the gray, even concrete beneath an elaborate canopy of cherry and maple.

On a bike, I could travel the length of the city all the way to Kyoto Station in the south, or go northwest toward the Botanical Gardens and, further on, Kinkakuji temple. North, south, east, west suddenly begin to make sense, and I began to adopt a bird's eye view, a visual logic that was in striking contrast to that which obtained in Manila, where visual recall was determined by adjoining landmarks, by the relativity of ground-level markers as it were.

Spring and fall are the best times for biking. Cherry blossoms and roses on the one hand, autumn foliage on the other; movement is defined by the beauty, alternately sweet and harsh, of sprouting buds and ageing trees. One wades through a shallow river of yellow leaves, passing an old house in front of which an elderly lady is beating a heavy *futon* (bedclothes) with a wooden paddle.

What I like best is the sight of other people biking: Children on their kiddie-size bicycles weave in and out of one's vision, their sturdy little legs in a piston of action and yelling. Young women in broad hats cycle away with a child or two firmly attached to the saddle behind them. Young men zip past with one hand in their pocket and the other holding a cellphone to their ear. Come rainy days, experienced cyclists show off feats of balance and bravura, clutching an umbrella while they navigate the wet terrain. Middle-aged women slip onto the seats of their moving bicycles in one fluid motion.



Dr. Hau, in front of her workplace, the Center for Southeast Asian Studies. She has been falling in love with Kyoto itself and enjoying and appreciating life in a country not her own. Ninnaji temple is one of her favorite spots in Kyoto and she is also a great fan of Takarazuka Revue.

We enjoy studying at Kyoto University and living in the ancient city of Kyoto!

Ahmad Reza Gohari and Soodabeh Saeidnia are a very close couple. They were classmates in the doctoral program of the Pharmacognosy Department of Teheran Medical Science University, and married 3 years ago. They both worked in the same laboratory and lectured at Teheran and Sari Universities until they came to Japan in July 2002.

Why did you choose Kyoto University, and what are your impressions of the university and the lab?

Saeidnia: After asking the advice of professors and researchers in our department, we decided to come to Kyoto University after it was strongly recommended by a scientist who came from Toyama University. We heard that Kyoto University has a long and glorious history and has produced many excellent scientists. In fact, 5 of Japan's Nobel Prize winners in scientific fields are Kyoto University alumni. As well as this, Prof. Honda specializes in medicinal plants of central Asia. All of this encouraged us to come here.

Gohari: And he accepted both of us. I think we are really lucky to be here, because Kyoto University not only has good facilities for learning and research, but also many specialists and scientists. This lab has 12 staff members, who welcomed us. Under the guidance of Prof. Honda and Assistant Prof. Kiuchi, we are learning much more than we expected. We have so many things to do that we often go back home very late, at 9 or 10 o'clock. We are profoundly grateful for this engrossing work environment.

Please tell us about your studies.

G: We are conducting a study of Chagas' disease, which is a parasitic disease that is endemic to South America, and not found in Iran or Japan. We are looking for one or more effective compounds to treat it derived from Iranian medicinal plants.

S: There aren't many research centers for this disease in the world. Only the University of Tokyo and Kyoto University have the equipment and facilities to pursue this research in Japan.

What are your dreams for the future?

G: We want to continue this study in Iran. This kind of research has been neglected there up to now.

S: Iran has a traditional history of phytotherapy and use of medical plants, so researchers are interested in pharmacognosy. We have realized its usefulness here, and plan to take the skills we can acquire home to our country.

What are the pros and cons for the two of you of working together?

G: Our marriage has made this a much better situation. We can help each other both professionally and personally.

S: One person can give only 50% of himself or herself, but two people helping each other can give more than 100%. What is even better is if they are married. Their ability to give is augmented. We don't feel that there are any drawbacks.

Do you have any trouble with living in Kyoto?

S: Not especially, but a little in terms of food. Japanese rice is very different from the rice we are used to in Iran. Also, there aren't any mosques in Kyoto, so every day we pray at home after work. But Kyoto is a nice city full of ancient Japanese culture and beautiful places. We find old temples and shrines very attractive. We visited some during our holidays by bicycle. They were so interesting to us. We like to come to work and travel around by bicycle. It takes only 15 minutes from our apartment to the university. On our way we can see everyday life in Kyoto.

G: In November I became sick with a kidney stone. I was taken to Kyoto University Hospital, and stayed there overnight to pass the stone successfully.



Ahmad Reza Gohari (right) & Soodabeh Saeidnia (left)

Gohari was born in Iran in 1969 and Saeidnia in 1973. They both graduated from Mashhad University and Shahid Beheshti University, then gained their Ph.D. degrees from the Pharmacognosy Department of Teheran Medical Science University. Visiting researchers, Graduate School of Pharmaceutical Science, Kyoto University

That was also a learning experience because I could observe the inside of a hospital.

How long will you stay in Japan?

S: A year at most. To save time for our research, Gohari takes private Japanese lessons offered by Kyoto University once a week for four hours, and I learn it from him at home. If we decide to stay longer, I want to learn Japanese, too.

G: Right now we are carrying out our research in a new lab. We moved last December. We were also happy to work in the old one. It was very old and distinguished; we could sense the history and tradition of Kyoto University. The Japanese people we have met in Kyoto are very kind to us. We are very lucky to be able to spend time here with them.

(Date reported: December 18, 2002)

The corridor of the laboratory building. A move to a new building is presently underway.



The medicinal herb garden. Prof. Honda says that recent advances in analysis technology have made it commonplace for completely unexpected benefits to be discovered in medicinal herbs that were previously considered quite ordinary.

The November Festival

A Grand Pageant Woven from the Energy of Kyoto University Students

November 21-24, 2002

In autumn Kyoto is full of sightseers eager to see the seasonal colors, and there are many events vying for attention. The NF's theme this year expressed the desire of Kyoto University students to top all of them. The normally quiet campus was suddenly transformed into a hive of youthful energy, giving the university an uncharacteristic appearance.

The Eve of the Festival : A Forum to Integrate the Grand Old Traditions

Eve of the Festival activities are sponsored by the Kyoto University cheerleading squad. This event is one of the best loved among the events that make up the NF. One reason may be that at every turn there are visible reminders of the prewar Kyoto Imperial University and the 3rd Higher School.

The event is held at the Yoshida athletic field. A bonfire is built in the center, and around it refreshment booths are set up. Most of them are run by university sports clubs. The idea is to support the cheerleading squad for their big moment, in order to express gratitude for their

The lively "Faculty bar." Faculty members ladle sake directly from the cask for students. This longstanding custom has even been reported on in the local newspapers.

efforts throughout the year. One of the best known refreshment booths is called the "faculty bar." Here free sake is served, paid for by members of the faculty. Every year it is a lively place. The "bar" is run by Prof. Hiroshi Okumura of the Graduate School of Engineering. He greets visitors before it opens with the words of President Takigawa (the 15th President of the university): "Never drink free liquor!" This emphasizes the idea that this bar is the one and only exception to President Takigawa's rule. Next, the cheerleading squad leads a succession of rousing cheers from the stage. As the crowd is enraptured by their skillful performance the bonfire is finally set alight. The excitement reaches its peak as the mighty flames of the fire leap into the night sky, signaling that the NF has officially begun.



In Japan, November is considered the season of school festivals. At high schools, universities, and junior colleges around the country students plan elaborate events for their campuses. During the school festival itself there are no classes. Such events are generally held between autumn and early winter. The school festival is often an excellent reflection both of the times and of the spirit of each particular school. Each year the students of Japan's universities compete to see who can put on the most distinctive festival. The Kyoto University school festival is known as the November Festival, or NF for short. This year's NF was the 44th since the inauguration of the tradition. This time around the theme was "Mr. President! We've taken over Kyoto!"



A performance wrapped in student uniforms. This style is traditional for the cheerleading squad.



The booth selling goheimochi (broiled rice cakes in Japanese style)



The lighting of the bonfire at the climax of the Eve of the Festival

Lectures, Exhibits, Events: Mirroring the Times and Young People's Feelings

During the 4 days of the November Festival a variety of events take place on campus. Everything is run under the supervision of the NF Executive Committee, which is composed of students. Individual events, however, are planned by a number of different groups, ranging from entire faculties and departments to individual clubs. Many of the events have long traditions. One is the mock trial held by the Kyoto University Legal Advice Society. It is so popular that the university's largest lecture hall is generally filled to capacity, with many of the audience forced to stand. A mock trial is staged for comic effect, offering an enjoyable performance. At the same time, the mock trial succeeds in demystifying for the audience Japan's legal world, which even today often seems quite intimidating. Then there is the "origin of the human body" exhibit put on by the Faculty of Medicine, which is always planned and carried out by freshmen. Recent advances related to the human genome have prompted many people to ask themselves, "What is life?" Sure enough, at this year's exhibit there could be seen a number of visitors earnestly peppering the students with questions.

But the real highlight of the NF is definitely the lectures. The themes and lecturers are selected to reflect the spirit of the times in which the young students and the university exist. Many of the themes this year had to do with a search for identity by both students and university. They included "The Joy of Science," "The 'Anti' Viewpoint," and "Scholarship and Reconsideration as Resistance."



A lecture sponsored by the Faculty of Economics, "Scholarship and Reconsideration as Resistance." It deals with a theme that explores the true nature of people associated with the university, and attracts people of all ages.



Visitors listen attentively to an explanation at the "origin of the human body" exhibit.

Refreshment Booths and Live Performances: The Warmth of Gathering and Mingling

The normally serene and quiet campus is filled with the laughing voices of children and the sounds of live performances during the NF. Added to the colorful decorations for the events and the many refreshment booths offering food and drink, there is abundant stimulus for all five senses. At the refreshment booths the students go all out to attract visitors. At the flea market you can see the lifestyle of today's students spread out before you. Many of the events reflect a distinctively Japanese taste, and you can see the way the planners endeavor to create a relaxing and comfortable atmosphere.

This year, the late autumn, enveloped in the burning crimson of maple leaves under a clear sky, was full of families out enjoying the weekend, groups of junior and senior high school students on school excursions, and elderly fans of the festival who return year after year. All of them seemed to be enjoying the students' NF immensely.

(Date reported: November 20 & 23, 2002)



Mock Trial 2002



A row of refreshment booths encircle the Yoshida athletic field



A performance featuring Japanese dancing

The "kid's plaza" at the center of the Yoshida athletic field. Here students and children enjoyed games and crafts.



Live performances



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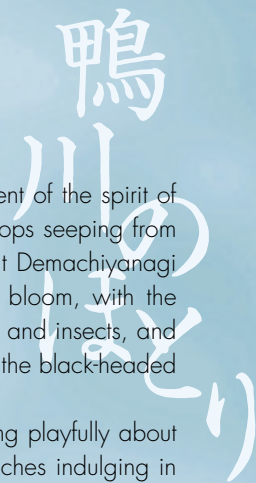
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P R O M E N A D E

京都逍遥



Beside the Kamo River A Place to Rest Amid Abundant Natural Beauty

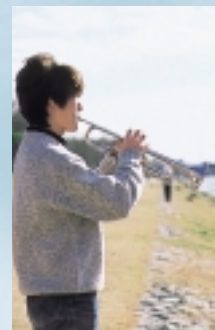
The Kamo River flows through the city of Kyoto from north to south. It has been beloved as the embodiment of the spirit of Kyoto. The river's headstream is located in Kumogahata, in the city's northwest portion. There, individual drops seeping from the rock eventually unite into a single flow that merges with the Takano River, flowing from the northeast, at Demachiyana near Kyoto University. Today the river is host to a rich ecosystem. In the spring many different flowers bloom, with the magnificent cherry blossoms taking pride of place. In the summer the river is alive with fish such as sweetfish and insects, and birds such as the wagtail and heron make their appearance. Then, as the leaves change to a deep crimson, the black-headed gulls arrive, having traveled all the way from Siberia, to announce the coming of winter.

Many people gather along the riverbed, captivated by the gurgling sound of the water and the birds flitting playfully about the surface of the river. There are joggers, married couples out for a stroll, young people sitting on the benches indulging in reading books, families enjoying picnic lunches, sweethearts huddling together. Among all this activity you're likely to see some Kyoto University students running or practicing musical instruments. For these students the area beside the Kamo River is both an athletic field for sports club practice and a familiar spot to just go and relax.

(Date of photos: Nov. & Dec., 2002)



The confluence with the Takano River, popularly known as the "Kamo Delta." The ancient woods of Tadasu no Mori, a World Heritage Site, are located nearby.



A member of the brass band club practicing for an upcoming concert. He says, "Spring is really the best time along the Kamo River; the contrast between the pink cherry blossoms and the green grass is really beautiful."



Stepping stones shaped like turtles. It is possible to walk right across to the opposite shore.



Birds playfully flying about along the water-front.



On holidays you may see parents with children feeding to the birds.