

(資料：フォーラム要旨集)

第2回名古屋大学博物館国際フォーラム

次世代教育と国際連携

International Forum

Youth and Science: Museums for the Young Generation

Program and Abstracts

Nov 1st to 4th 2006, Nagoya, Japan

THE NAGOYA UNIVERSITY MUSEUM (NUM)

The Nagoya University Museum

Second International Forum 1 – 4 November 2006

Youth and Science: Museums for the Young Generation

The Museum

Nagoya University Museum (NUM) was established in 2000. Since then it has made substantial progress across a range of activities. In particular:

- The use of collections and their associated data for research and education within Nagoya University.
- The development of new methodologies for the curation and preservation of collections.
- The promotion of public understanding of, and interest in science by the presentation of past achievements and ongoing research, especially at Nagoya University.
- The formation of working partnerships with other museums and related institutions in Japan and abroad.

The Forum

This is the second International Forum to be convened by NUM. In this series of meetings a range of international and Japanese speakers present their views and share experiences about significant issues faced by NUM and other equivalent institutions.

The topic for this second Forum is ***Museums for the Young Generation***.

Teenagers are the hardest sector of the public to persuade to visit museums. Once they are old enough to decide for themselves how they will spend their time, if they are not obsessed by school work, they would rather demonstrate their independence by spending time with friends or at all the variety of leisure attractions that are open to them. With this background:

- How can museums and science centres play an effective role in persuading young people to take an interest in science?
- What can we do to encourage teenagers to take science seriously as a topic for study at University level?
- How can the public activities of museums coordinate effectively with school education?
- How best can we share the experiences of the various organizations operating in this field?

Forum Program

Youth and Science: Museums for the Young Generation

Program

1st November: Keynote speech and Forum Session 1

Keynote speech to Forum delegates and invited guests from Nagoya University and elsewhere.

- 10:00–12:00 Keynote speech “Teenagers and science-based museums”
Dr Walter Staveloz (*Director, International Relations, Association of Science-Technology Centers, Washington DC, USA*)
- 12:00–14:00 Lunch
- 14:00–17:15 Forum (1) Museums and young people: the national perspective
(*Chaired by: Drs G Clarke, H Yoshida*)
- 14:00–14:15 ○ **Dr T Nishikawa** (Director, NUM)
○ **Dr K Tsukada** (NUM)
○ **Mr S Nishimoto** (Nagoya City Science Museum, NCSM)
○ **Dr S Iwasaki** (The National Science Museum, NSM)
○ **Dr K Matsuoka** (Toyohashi Museum of Natural History)
○ **Dr S Inokuma** (Nemuro City Museum History and Nature)
- 17:00–17:15 Summary
- 17:30–19:30 Welcome dinner

2nd November: Forum Session 2 and Local Visit

A number of short presentations from international delegates (Australia, Germany, UK, Korea, China, Mongolia) with a special focus on the role of university museums.

- What role can a university museum play to benefit the corporate life of its parent institution?
- Is its main function to act as a university shop window for members of the public, or to provide teaching aids for students?
- How does basic research fit into the activities of staff?

(Open discussion on the issues raised. What lessons can be learned and what is the way forward?)

- 9:00–12:00 Forum (2) of Museums and young people: international experience
(*Chaired by: Drs H Yoshida and G Clarke*)
- **Dr G Clarke** (Museum Consultant, The Natural History Museum, London, UK)
○ **Mr D Ellis** (Director, University Museum, University of Sydney, Australia)
○ **Dr J Scholz** (Head of Bryozoology, Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt-am-Main, Germany)
- (10:30–10:45 Coffee break)
- **Dr S-R Choi** (Director, Museum of Mokpo National University, Korea)
○ **Dr Q Zhang** (Prof. Nanjing University, School of Earth Science, China)
○ **Ms N Manchuk** (Mongolian University of Science and Technology, Mongolia)

- 12:00–12:30 Concluding remarks
- 12:30–13:00 Move to Tokugawa Art Museum
- 13:00–14:00 Lunch in Tokugawa Japanese Garden
- 14:00–16:30 Visit to the Tokugawa Art Museum led by **Dr H Yotsutsuji** and presentation about activities for young people.
- 16:30–17:00 Return to NUM

3rd and 4th November: Stone hunting in Unuma

A practical demonstration of one of NUM's activities designed to attract the next generation of scientists.

3rd Nov. (Fri)

- 9:00–10:30 Move to Unuma (by bus)
- 10:30–13:00 Stone hunting and lunch
- 13:00–14:30 Return to NUM
- 14:30–16:00 Lecture and practical investigation of stones

4th Nov. (Sat)

- 9:00– 9:30 Move to seminar house
- 9:30–11:00 Stone knife crafting
- 11:00–13:30 Lunch (using stone knives in preparation of curry)
- 13:30–14:00 Concluding remarks

END of Forum

Special Lecture

Teenagers and Science-Based of Museums

Teenagers and Science-Based Museums

Walter STAVELOZ

*Director, International Relations, Association of Science-Technology Centers,
Washington DC 20005-6310, USA*

A lot of research tries to find out what has caused the reduction in interest of young people for science studies and scientific careers. Among other elements, the fact that it is difficult to study science seems an obvious one. We probably could live with that and just keep in the loop those who are doing well and are interested. However, the evolution of society and the place of science and technology in our daily lives evolve in such a way that we need a deeper look. No society can afford to miss the train of scientific innovation of because of the fierce competition with others, but also because of the increasing needs of citizens in many domains such as health and communications. That is why ensuring new generations of science teachers and scientific researchers is vital, and no one can plan new policy issues who does not take into account the potential gap in scientific personal. With that in mind, the explanation: “science is too difficult” is a bit short. Putting responsibility on the learner is easy but will not help anyone and will certainly not open many hopeful perspectives.

It is to the credit of to the European Union that it had the courage to say loudly what many people knew but did not want to say: “the education system itself creates the barriers that stop new vocations”. A very simple fact expresses best what it is all about: when we compare the time young people spend in front of a written text with the time they spend in front of a screen, television or computer, teachers and schoolchildren clearly live on separate planets. These are not yet totally in conflict, but there is a huge gap between them across which no communication seems possible. It is even not totally clear to me if the formal education system is at all aware of the way children learn today. There are many good reasons for that. The education system all over the planet has a lack of financial and human resources to be innovative. Teachers are exhausted because of many tasks other than teaching, and so on. That is all true. But what if the answer was: we don't want to know because there is no way current to adapt our system to this new situation?

And there are good reasons to think that is the case. What further EU research has shown is that the learning process of young people is much closer to the way informal education environments create knowledge. In other words, the way a science centre shows scientific phenomena is closer to the real world of youngsters than the schoolteacher is. My presentation will list all the elements of informal learning mechanisms that have proven to be successful. That includes hands-on approaches, inquiry method learning, and interdisciplinary presentations and so on.... However, far and foremost, what is the key to new enthusiasm for science learning is to stop considering the curriculum as an untouchable given. Countries that have taken the risk of shaking around the curriculum seem to have better results than others do. In addition, there may

be differences worldwide in the way young people look at science, as the ROSE research from Prof Sjöberg shows. The main trend remains the same when it comes to learning.

Starting from these findings, I will present the “PENCIL” project that I have set up in Europe to take up that challenge and create new evidence on what the elements are that make informal learning a better way to approach science teaching. In other words what are the common elements we can learn from specific case studies that enable successful transfer of teaching techniques? I will show the evaluation scheme of that effort as it has been established in cooperation with King’s College in London and the Federico II University in Naples. We will consider the different applications and the crucial role of new communication technology both from their technical and social point of view.

To end, I will present some more specific application as they appear to illustrate very well the above, and can even be enlarged to applications for the general public and life long learning experiences. I will show how the IGLO project on Global Warming will use the experience of PENCIL, but also the results of the work of the Yale School of Forestry and Environment which has tried to answer the question of “how to bridge the gap between the science and the action”.

Finally, I will be happy if everyone understands that this is not a tentative suggestion to replace schools by science centers, but to find new and innovative ways of cooperation for the benefit of all.

<参 考>

ティーンエイジャーと科学博物館

Walter STAVELOZ

*Director, International Relations, Association of Science-Technology Centers,
Washington DC, 20005-6310, USA*

若い人たちがなぜ、学びだけでなく就職の面からも、科学に対する興味を失いつつあるのか - その理由を見つけようとさまざまな研究が行われている。それらのいろいろな理由の中で、興味をなくす明らかな理由のひとつが、科学を学ぶのは難しい、という意識である。もちろん、科学はそれを得意とする人たちが勝手にやっていけばいいと、そう片付けておくこともできるだろう。しかし、社会や日常生活における科学技術の変革について、私たちはその成り行きをよく見極める必要がある。どこの国の社会も、科学の革新という潮流を見逃すわけには行かない - なぜなら、ほかの社会（国）との競争や、健康や通信など多くの分野に対する市民からの要求があるからである。したがって次世代に、科学を教える教師や科学にかかわる研究者を確保することは極めて重要であり、科学者との理解の隔たりを考慮しつつ政策を立てなければならない。そう考えれば、単純に「科学は難しい」と片付けることはできない。学ぶほうに責任を被せるのは簡単なことだが、これでは誰も救われないし、今後の展望も望めないであろう。

「新しい科学者育成を阻んでいるのは、教育システムそのものである」——この、多くの人を知りつつも、自分では言いたくなかったセリフを叫ぶ勇気がヨーロッパ連合にあったことは評価に値する。このセリフの表すところは、単純な事実を見れば明らかである。すなわち、若い人たちがどこで毎日を過ごしているか — 教科書の前かそれとも映画やテレビ、コンピューターの前なのか — を見れば、教師と生徒がまるで違う惑星に住んでいるのがわかる、ということである。この二者が完全に相反するとは言わないが、その間のコミュニケーションはほとんど望めない。それどころか、学校の教育システムが今の子供たちの学び方をきちんと把握しているのかどうかさえ、私には疑問に思える。こうした事態に至るには多くの理由がある。教師（教育）の世界ではどこでも、教育改善に必要なお金も人も足りない。教えること以外の多くの仕事に、教師たちは疲れきっている。これは全くの否定できない事実である。しかし一方で、その理由のひとつが、“実は私たち自身が、今の教育システムでは新しい状況に対応できないことを知りたくないこと” だとしたら、どうだろう？

そして、これが現実であると考えるに足る根拠がある。EUでの調査で明らかになったのは、若い人たちの学ぶプロセスの方が、学校での教育よりもより知識を増やすやり方に合致しているということである。つまり、例えば科学館などが科学現象を見せるやりの方が、学校のやり方より、若い人たちのそれに近いということである。私はこの講演で、学校以外での教育方法が成功した事例や秘訣について紹介したいと思う。そこには、ハンズオンとか、問かけ式学習とか、多角的な方法に関するものが含まれている。ただし、何より重要なのは、今までの学習カリキュラムを変えていく勇気が（我々に）あるかどうかであり、そこに科学を学ぶ意欲を引き立てる鍵がある。今までの学習カリキュラムを揺るがすリスクを払った国（社会）は、ほかに比べていい結果を得ているようである。Sj_berg 教授による ROSE 調査が示すように、世界を見渡せば若い人たちの科学に対するまなざしに差も見られるだろうが、学習ということになるとその主流は変わらない。

これらの知見を元に、とくに私がヨーロッパで立ち上げた PENCIL プロジェクトについてお話したい。これは、学校以外の学習が科学教育によりよい形で役立つには、どんな要素が必要なのかを明らかにしようとするプロジェクトである。言い換えれば、教育テクニックを上手に変えることに成功したケースを調べることで、そこには、どのような共通要因があるかを探ろうというものである。この試みの評価の概要を紹介したい。なおこれらの方法は、ロンドンのキングズカレッジおよびナポリのフェデリコ2世大学との共同研究によって開発されたものである。これを基に、新しいコミュニケーション技術の様々な応用やその技術の担う重要な役割を、その技術的および社会的観点から考えたいと思う。

最後に、一般の人々の生涯教育にまで応用を広げることができた具体的な応用例も紹介する予定である。ここでは、PENCIL での経験を生かした、地球温暖化に関する IGLO プロジェクトの例のほか、「科学と行動の間にある溝に、いかにして橋を築くか」という問いに答えようとした、イェール大学森林・環境スクールの成果を紹介したい。

なお最後に申し上げておきたいのは、これは科学館が学校に置き換わろうという試みではなく、どこにとっても有益な、新しく、よりよい協力体制を見つけようとする試みだということを理解しておいて頂きたい。

Forum Abstracts (1)

Museums and Young People: The National Perspective

Activities of the Nagoya University Museum for Younger Generations: A Summing-up for the Future

Teruaki NISHIKAWA

Director of the Nagoya University Museum (NUM)

It is my great pleasure to hold the Second International Forum of our museum entitled “Youth and science: museums for the younger generation” after four years have elapsed since the first forum “Search for a new concept in education and research through cooperation with the sister university museums” in June 2002. I would like to express my heart-felt gratitude to the invited guests and participants. Their lectures and discussions will surely give us a new idea on what museums can do to encourage younger generations to grow up to be good citizens with appropriate knowledge and understanding of nature and culture on the basis of their own vivid experiences.

The most important role of the Nagoya University Museum (NUM) is to create a broad interface between the university and the public, based on excellent scholarship. Since its establishment in April 2000, NUM has carried out this function in various ways such as: General and Special Exhibitions, Special Lectures, “NUMCo” (concerts of various kinds held among displayed specimens for relaxation or “muse therapy”), “Nature Watch” and other field studies for younger generations, the NUM Botanical Garden (as a keystone of our “campus museum” project) open to the public. Furthermore, NUM has continued to make good collections of various kinds of specimens, which is the basic function of museums and also the stable basis for such “interface” activities.

In terms of the present topic, “museums for the younger generation”, our “interface” activities will be summarized as follows:

- (1) In exhibitions and displays, visitor-friendly displays are being developed to show scientific results from both completed work and on-going researches in Nagoya University, such as those of its Prof. Ryoji Noyori, Nobel Prize Winner in Chemistry 2001. The “Noyori corner” keeps attraction for visitors, judging from their answers to our questionnaires. Explanation panels are prepared to be understandable even for junior high-school students. Furthermore, pamphlets for pupils of elementary schools are specially made for some exhibitions. The Gibeon iron meteorite, Australian Archean rocks, and some other specimens are hands-on items to give visitors an opportunity to feel real objects.
- (2) High-school students as group visitors are always welcomed by the research staff’s friendly explanations about the items on display.
- (3) We have contributed to the “SSH (Super Science High School)” project of the Nagoya University-affiliated high school, as well as “general learning” and “internship” courses of some other junior high schools, by giving some lectures and/or supporting some specialized courses.

- (4) “Chikyu Kyoshitsu (Earth School)” is a big program for younger generations, which will be described in detail by Dr. Kazuhiro Tsukada later.
- (5) “Nature Watch” and “Field Seminar” are our routine projects on seashores, forests, and so on, for junior and senior high-school students (and sometimes even for pupils of elementary schools accompanied by their parents) in order to foster a better understanding of natural environments and human life. In these years, “Nature Watch” events have been held in spring, in which about 30 to 45 students participate every year; “Field Seminar” has been composed of several programs throughout the year, entitled “Let’s look at stars using a telescope” (in June), “Natural and human history of acorns”(in November), “Biology and evolution of the lancelets”(in December), and “Bird-watching on campus” (in February 2007).

Such activities have been increasing year by year and, judging by their answers to questionnaires, most participants felt impressed with the programs, which has pleased us very much. On the basis of such “success”, it seems necessary now to consider the future of such activities (even somewhat critically) in relation to the “raison d'être” of our museum in Nagoya University. I do hope that the present forum will successfully discuss the museums’ future activities for younger generations in general, and also, as a case study, about what the Nagoya University Museum should (and should not) do in this field as a university museum.

**The “Chikyu-Kyoshitsu (Earth School)” Designed to
Attract the Next Generation of Scientists
— A Cooperative Work between NUM and NCSM —**

**Kazuhiro TSUKADA*, Masao KAMETAKA*, Yusuke KATSURADA*,
Hidekazu YOSHIDA*, Mamoru ADACHI*, Shoji NISHIMOTO**,
Katsuhiko MOURI**, Masayuki SHIBATA** and Toshio NAKAMURA****

**The Nagoya University Museum (NUM), **The Nagoya City Science Museum (NCSM)*

There are two fundamentally different approaches that a science public lecture or a field workshop can take with regard to its relationship with its participants.

In the first approach, the lecturer (or leader) decides what to ‘teach’ them as a scientist. When the participants hear the lecture, they may discover what the science is and that it is a stimulating experience for them. Or they, especially children, may find that it is puzzling, confusing or dull. Most of former type of science lectures and field workshops are like this where ‘teaching’ is often the purpose of this kind of event. In the second approach, the lecturer (or leader) decides first to communicate a little information on the theme of the lecture or the workshop and then subsequently to stir up participants’ interests through interactive communication. In this case, the concept is not “heading”, but enjoying science all together.

The crucial difference is the attitude to the participants. In the first model participants are not central to the events, but only passive audiences or students. In the second, they are in the centre of the events and can be active coworkers. It seems to me that the second is the preferable way to encourage their interest in science and, when done well, interactive communication can be a real tool for effective education.

It is said, at the moment, that there has been a worrying drop in the numbers of children who are interested in scientific subjects. One of the problems seems to be that parents and teachers who are not fully aware of what a scientific life is like, can’t impart of science’s interest to them. Events following the second model should be effective not only for children but also for adults, and this would mean deliberately targeting children along with their parents and teachers.

We hold ‘non-teaching’, interactive, multi-targeting, field workshops, like the “Chikyu-Kyoshitsu (Earth School)” discussed below, every month to promote children’s interest in natural science.

The 6th Chikyu-Kyoshitsu *Stone hunting in Unuma* — Let’s make a stone knife! We will make a knife with stones collected ourselves. How many kinds of stones can you collect? Which type of rock is the best for stone knife making? And then, let’s cook Japanese-styled curry using the knives! Join us!

Date: 3rd and 4th November 2006

Place: Unuma, Gifu Pref. (3rd Nov.) and The Nagoya University Museum (4th Nov.)

Capacity: about 30 persons for public

Participants: 3rd year students of element. school to 3rd year students of junior high school with their parent

Fee: 500 JPY/person

We will show this through the presentation and in field on 3rd and 4th November.

第6回 地球教室

主催：名古屋大学博物館・名古屋市科学館・発明発見創造クラブ
岐阜県各務原市鷺沼の木曾川の河原で石を採集し、その石で石包丁をつくってカレーを料理します。

とき：11月3日（祝）・4日（土）
※両日とも日曜りで二日間がセットになっています。

ところ：岐阜県各務原市鷺沼の木曾川の河原
名古屋大学博物館

定員：30名
対象：小学3年生～中学3年生とその保護者
※中学生以上は個人参加もできます。

参加費：ひとり 500円

申込方法：往復はがきに

①イベント名（第6回地球教室）②郵便番号 ③住所 ④参加者全員の氏名（ふりがな）⑤電話番号 ⑥学校名と学年 ⑦返信用の宛名を記入して、下記の宛先までお申し込みください。

〒464-8601

名古屋市千種区不老町 名古屋大学博物館 地球教室事務局

申込締切：平成18年10月23日（月）必着
※応募多数の場合は抽選となります。ご了承下さい。

お問合せ：
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この事業は、独立行政法人科学技術振興機構 研究者情報発信活動推進モデル事業「モデル開発」により行われます。
なお、このイベントは第2回名古屋大学博物館国際フォーラムと連動して行われます。

河原の石でつくる石包丁

いしぼうちよう

Collaborations with Outside Organizations to Maintain and Develop Programs at The Nagoya City Science Museum

Shoji NISHIMOTO, Katsuhiko MOURI and Heiji SAEKI

The Nagoya City Science Museum, 2-17-1, Nakaku, Sakae, Nagoya, Japan

Because of continued reductions in the budget, The Nagoya City Science Museum (NCSM) has started collaborative projects with private enterprise, universities and other museums. Since most of the museums and science centers in Japan are managed by the government, it is difficult to receive outside funds or donations directly. Therefore, NCSM has organized project committees, with collaborators, so that independent budgets can be established. For example, a special exhibition is managed by a newspaper company and a TV company based on a plan that is developed by the museum staff members.

We have also organized the Hatsumei-Hakken-Sozo Club (Invention-Discovery-Creation) with private enterprise to run educational programs that provide workshops involving hands-on craft making, robotics, and earth science. The club works with other organizations, such as universities, in a way that makes processing easier and allows us to develop more educational programs.

As for our planetarium division (Astronomy), we have worked with Nagoya University for ten years to develop computer graphics that are currently featured in the planetarium. In a recent evaluation, more than 40% of 6th graders in the city enjoyed the computer graphics. Moreover, 230,000 visitors, which include 95% of 4th graders in Nagoya City, have visited the facility. Recently, we started telescope classes for the members of the Astronomy Club. The members can also rent a telescope set to take home after the class.

The Educational Support for Youth in NSM

Seiji IWASAKI

*The National Science Museum (NSM), Exhibition & Education Department,
Education Division, Tokyo, Japan*

The National Science Museum has a mission to collect, preserve and pass on to the next generation a wide range of specimens and materials concerned with natural science and its applications. In addition, the museum promotes the advancement of natural sciences through a series of study and research activities and makes the results of these efforts available to the public, providing opportunities for lifelong learning.

1~1.4 million visitors visit our Museum per year. With a current annual increase in members, however, the member of young visitors is decreasing. We feel a responsibility to educate future visitors, so we would like to share our experiences of educational activities for Youth in NSM as follows:

- Certification of Master of the Museum and the Noyori Science Award
- The Exploring Club, The Ueno Museum Club
- The National Science Museum strives to raise the scientific literacy of university students
- Science Communicator Practical Training Course
- The Natural Science Course for University Students “Natural Science of Japanese archipelago”
- Practical training in Museum
- School Partnership Program
- Course for high school students to experience research first hand

Natural History Museum Invited to Children

Keiji MATSUOKA

Toyohashi Museum of Natural History, Toyohashi, Aichi, Japan

The Toyohashi Museum of Natural History was founded in 1988 with a mission to educate children and adults about evolution and natural history, and was unified into the Toyohashi Zoo & Botanical Garden in 1992. Each year some 400,000 people visit the Museum, which is the largest of educational institution of the Toyohashi Zoo & Botanical Garden. Under its main theme of “evolution of life”, the Toyohashi Museum of Natural History provides various educational activities.

Museum curators are involved in many teaching activities including lectures, field observations, museum guides, and loan specimens. Lectures by the Museum curator are available on request for schools and educational institutions.

Education of pupils in the Museum offers some programs serving approximately 32,000 children and teachers: permanent exhibition, “Dynavision Theater”, and backyard tour of the Museum, and Special Exhibition. Special Exhibition and “Dynavision Theater” account for more than 10 percent of visitors to the Museum annually.

The exhibitions consist of Paleozoic Hall, Mesozoic Hall, Cenozoic Hall, Galapagos Islands Hall, and Toyohashi Nature Hall. The Paleozoic Hall is being renewed in such way that the public is able to touch many exhibits. We hope that this will increase our visitor number by up to 50,000 annually.

Area study for the next generation

Shigeto INOKUMA

Nemuro City Museum History and Nature, Nemuro, Hokkaido, Japan

We hold many events for the younger generation. Because students spend the greater part of the day at school, few of them have the opportunity to study the local history and nature of their own city. So we make some programs to allow them to opportunity of studying.

Our programs are roughly divided into two kinds. Historical programs include touring historic spots in our city and making ancient tools (accessories, pots and stone tools). Natural programs include wild plant watching (spring and fall), star watching (every season) and bat watching.

Through these programs, children can study the history and nature in their city and this rediscover the value of their city and improve their love for the district.

Forum Abstracts (2)

Museums and Young People: International Experience

Teenagers, Science and Museums

Giles CLARKE

Special Exhibition Advisor to The Natural History Museum, London, UK

Recent reports have shown that there has been a reduction in the numbers of teenagers choosing to take science subjects at an advanced level at school and at University. This is clearly a serious situation for the future economy and national prosperity. Museums and science centres can play a part in reversing this trend.

There is a general truth that successful design for communication has to take account of the enthusiasms and level of background knowledge of the intended audience. The traditional reputation that museums have gained over the years is such that many teenagers think they may be dull and uninviting places where they are not welcome and will not feel at home. At a time of their lives when young people are keen to show their independence and break away from their parents' influence, the prospect of a visit to a museum may take a low priority.

For museums to be successful advocates of science and science education one important action is to take the subject out to the students in schools and elsewhere, rather than expecting them to come to the museum. Outreach programmes which encourage school students to make a museum visit are critical in this respect.

Another significant action is to make the museum more user-friendly. Despite the fact that museums are collection-based organizations, science needs to be presented as a dynamic process pursued by enthusiastic and creative people — as a human activity rather than a body of known truths. The successful message to the potential scientists of the next generation is that science is an exciting and vital search for new knowledge, which makes a useful and rewarding career for those who are prepared to take up the challenge. This has a profound effect on the way exhibitions are planned. It is not so much a question of demonstrating what has already been discovered, as of showing what we are currently working on and why extending our knowledge is significant — and worth joining in.

Change Management for Museums in a University Environment A University of Sydney Example

David ELLIS

Director, University Museums, University of Sydney, Australia

The museums at the University of Sydney are undergoing change and invigoration as we realign ourselves with the University's new strategic goals and our role within our constituent communities.

In 2003 the University created a new position of Director of University Museums, following the retirement of the Director of the Macleay Museum, to bring the University's Nicholson Museum, Macleay Museum and University Art Gallery together into one department. They had previously operated independently of one another. The establishment of this position and its appointment from outside university circles signaled a change in approach to the way the University viewed its museums and collections.

This paper will discuss some of the issues surrounding these changes and the strategies put in place to bring the museums together, increase access to them, share resources and change perceptions.

Change management was a key strategy in moving towards a more outwardly focused role for the museums and collections as the University sought to increase its role and profile within the community. These changes created tensions as some tough decisions had to be made about where we allocated our energies and resources as we re-evaluated what we did and how we did it. It meant some staff left and new positions were created. The challenge was to ensure the museums not only maintained but extended its role in the teaching, learning and research of the University and built external audiences. This has not been easy with a small staff and limited budget.

An outcome of our review was to broaden the Schools Education Program, that was previously focused on the Nicholson Museum and its antiquities collections, to include the collections of the Macleay Museum and the Art Gallery as well. An important part of this strategy was to ensure all current and future programs were linked to the schools curricula.

Another strategy was to change the perception of the museums as dull spaces that do not change. We undertook basic renovations to create a new look for our museums and re-designed our publications. We increased the number of exhibitions and related programs, and extended museum opening hours by 30% to provide greater access to communities beyond the University. As we did our visitor numbers have increased from 25,000 in 2003 to over 45,000 this year and our profile around the University has increased substantially to the point where we were able to argue (successfully) for more resources to make these programs sustainable.

This increased profile has also set the scene for support from the University for the future development of the museums, and has resulted in a proposal for a new cultural complex on campus being supported by senior University staff. The proposed complex will house the museums

and collections together in state of the art facilities, providing secure access for research, teaching and learning and provide a series of temporary exhibition spaces, research spaces and teaching areas.

Our challenge now is to ensure we maintain the staffing expertise and resources necessary to sustain this new activity and outlook whilst maintaining the core responsibility of caring for the collections and making them accessible.

Educational Work and Concepts of the Senckenberg Natural History Museum in Frankfurt/Main, Germany

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Introduction

The Senckenberg Museum, situated in the geographical centre of Germany, is the result of a unique fusion of local history with international scientific developments. As early as 1826 — just 5 years after the opening of the “Museum Senckenbergianum” for the public — the city of Frankfurt provided an annual grant. The grant was exclusively used for training courses for young people (Klausewitz 1979).

As time passes, it became slowly apparent that science and the representation of science to the public are two rather different subjects, and the educational concepts had to be altered accordingly. In 1907, the space for public exhibitions was separated from the research area. It was realised that public exhibitions should be managed by experienced educators and that knowing about the scientific background is not enough. Finally, in 1981 the Education Department of Senckenberg Natural History Museum was instituted and a permanent post established. Likewise, new concepts were tested, rejected or applied and adapted for the specific situation of the Senckenberg Museum.

The Context of Displayed Objects

Any object that becomes exhibited in a museum has been taken from its original place in culture or nature (primary context) and staged in the secondary context of the museum, contemporary society, and the regional community that supports the museum. In exhibitions, we may focus either on the primary context, or on the secondary context. Both have been considered as a suitable way to attract young people to museums.

a) The Primary Context of displayed objects or organisms

In a modern approach in the educational work of museums, it is often desirable to display the objects as a more or less exact reconstruction of their occurrence in the present or bygone biosphere, or culture. Accordingly, museums sometimes rebuild ancient or modern landscapes to present them as a diorama. In a diorama, the objects are arranged as they occur in nature or history, allowing the visitors, and especially children, to explore, and to immerse themselves in the setting. Aside from dioramas, the Senckenberg Museum features, for example, life size replicas of dinosaurs and fossil plants.

The display of living organisms in museums further advances the concept of reconstructing environments. The Senckenberg Museum does not keep live animals any more. As an example,

the “Museum fuer Natur und Mensch” in Oldenburg, Northern Germany, specialises in the history of regional nature and culture. In 2002, an aquarium was opened showing exclusively fishes from the River Hunte which runs through the city of Oldenburg. Fish tanks representing the various environments of the river keep children, especially the very young, happy and occupied. From 2002–2004, 40% of all visitors to the aquarium are from kindergarten, and 21% come from elementary school (Preuss 2005). This may show that every visitor and every age group has different ideas about what is attractive in a museum.

b) The Secondary Context

Considering the secondary context of the displayed objects inspires (young) visitors to become actively involved. Exploration becomes linked with educational interactive activities and thus the visitor’s feedback. We distinguish three levels of communication with our visitors:

First Level

The presentation and/or reconstruction of the object (the primary context). This is still a one-way road of communication.

Second Level

Individual communications and gallery talks. As an example, we illustrate some arrangements for children from a family day in Senckenberg on August 13, 2006. Visitors learned about the regional fauna how it was between 10,000 and 100,000 years ago, during the last Ice Age, when animals such as mammoths roamed the Frankfurt region. Children and their parents were given several possibilities to utilise the space of the museum, talk with staff members (some of them dressed like stone age people) and spend time at play.

Third Level

The third level is the distribution of printed matter and other types of media dedicated to “themes”. Apart from reference books and magazines, a growing range of online learning resources adds a further dimension to the museum as a learning environment.

Conclusion

Educational work has many facets. The most important is the ability to influence the conception of a new exhibition from the beginning with experience made during daily contact with our visitors. The display of themes and topics will reflect the results of visitor feedback, including that of children. This is the biggest gain any museum can draw from the work of an Education department.

The importance of young visitors may be illustrated by the numbers involved: in 2005, the educational department of Senckenberg Museum organised 2212 guided tours for schools and 244 for adults. Of the 38,045 persons joining such programs (= 12,88 % of the 295,274 visitors in total), 29,372 were children, schoolboys, and schoolgirls.

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Some Activities for Young Generation in Korean Museum

Sung-rak CHOI

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I would like to introduce some of the activities we organize for the younger generation in Korean museums. Today, many museums make some programs for the young generation and the National museum in Korea lead these activities.

The National Museum of Korea has opened a new building on 28th Sep., 2005. The museum now has a children's room for the first time, and children can touch and the ancient artifacts and learn about ancient culture. Gwangju National Museum also has children's program every year.

Other organizations also make programs for the younger generation. For example, Honam Cultural Property Research Center, which is located in Gwangju city had one program for elementary students. They drew any artifacts, made pottery, and experienced ancient culture.

Dongbuka Dolmen Research Center, which is located Jeonnam province, also had similar programs. Children saw dolmen and made ancient artifacts.

Lastly, my University Museum has a small program for the younger generation. Visiting students, my museum were told and shown about the ancient culture of Yeongsan River basin, a subject about which they know little. Having learned history through the text books, they did not know much about the history of their home town.

I think museum has an important role in educating children about their own history. If they do not know the their own culture, they do not have any idea of their culture and history in the future. Next year, I will make some programs for young generation at my University museum.

Earth Science Museum for Students and Society

Zhang QINGLONG

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The Earth Science Museum of Nanjing University was established for university students as well as the lay public. The display concept focuses on different comparative knowledge such as Sedimentary Rocks vs Igneous Rocks, Stable Process vs Active Process and Gradual Evolution vs Rapid Evolution. Within that, about 1000 remarkable specimens found in China have been exhibited in the four major exhibition rooms in our museum.

First of all, at the entrance hall, you can see the famous Chinese dinosaur, 2.5 meters in height which lived about 220 million years ago.

Next to the main hall, in the first exhibition room, various kind of sedimentary rocks and igneous rocks from China are shown. In particular, more than 30 different types of granitic rocks is one of our noteworthy displays. Also, many kind of ore minerals such as Tungsten (W), Tin (Sn), Molybdenum (Mo), Beryllium (Be), Iron (Fe), Copper (Cu), Lead (Pb), Zinc (Zn) and Oil with host rocks are displayed.

The second room has mainly tectonic rock specimens that are folded and sheared and so on. The third room displays the history of the earth by means of distinct Vertebrate, Reptile and Birds in China. The fourth room shows many kinds of gemstones used for jewels in China. In the presentation, I will briefly introduce our museum and activity in Nanjing University.

The Museum of Geology and Mineral Resources of Mongolia

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More than 5,000 mineral deposits have been discovered in Mongolia and mining is the key industry of this country. Moreover, Mongolia has large number of visitors from abroad as a country of fossil dinosaurs, and tourism is one of the best foreign currency earners of this country today. As a result, the significance of geology and mineral resources in Mongolia's economy are increasing greatly, and one of the objectives of the Museum is to promote visitors' good-understanding of the geology and mineral resources of Mongolia.

The Museum has four sections as follows.

The **Geological Section** concerning whole geological structure and tectonics of Mongolia displays many kinds of rocks from Mongolia including the Pre-Cambrian grey gneiss (oldest rock in Mongolia), the granite the new minerals were discovered from, serpentinite, basalts, other igneous rocks and fossiliferous sedimentary rocks such as limestone and shale.

In the **Mineral Wealth Section**, many specimens on natural resources for fuel power, engineering and industries are on display.

Notably, fluorites in various-colored, copper-molybdenum ore, colored semi-precious stones and beautiful specimens of quartz, feldspar, elpidite, halite and garnet are the representatives of the Museum. In addition, staple nonmetallic minerals in Mongolia, such as phosphorites, fluorspar, gypsum, graphite and mica are on view in the Section.

All types of ores in Mongolia, i.e. gold, silver, platinum, iron, copper-molybdenum, tungsten, tin stone and rare earth elements, and gemstones like as transparent aquamarine, blue and pink topaz crystals, bright red garnets, multicolored agates, jaspers, chalcedonies, turquoise, fancy flint, nephrite are going on exhibit as well.

The **Mineralogical Section** shows about 3,000 specimens of nuggets, sulfides, oxides, silicates, carbonates, phosphates, tungstates, sulfates, fluorides and chlorides. The new minerals and rocks discovered in Mongolia such as Armstrongite, Mongolite and Ongonite are put on display at the special corner.

The **Palaeontological Section**, just opened in 2006, shows many well-preserved fossils from Mongolia.

This section is subdivided into the following four corners;

1. Vertebrates: bones, tooth, and eggs of Mesozoic dinosaurs and Cenozoic mammals.
2. Invertebrates: Palaeozoic to Mesozoic corals, mollusks, bryozoans, brachiopods, ammonites, crinoids, graptolites, trilobites.
3. Plant fossils: petrified wood, external molds of plants, and fossils of flowering plants.
4. Trace fossils

This Museum has academic relationships with a number of scientific institutions, and annually published "The Transactions of the Mineralogical Museum" since 1971. The museum is open to public from Monday to Friday.