Introduction

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From the itinerant lecturers of the 18th century to popularizing physics in the 21st century –
exploring the relationship between learning and entertainment
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Introduction

The following articles and abstracts describe lectures given at the international conference "From the itinerant lecturers of the 18th century to popularizing physics for the 21st century – exploring the relationship between learning and entertainment", held in Pognana, Lake Como, Italy, from June 1 – 6, 2003. This conference was organized by the Deutsches Museum, München, the University of Oldenburg (Physics Department) and the Università di Pavia (Istituto e Museo di Storia della Scienza), Firenze. It was sponsored by the Volkswagen Foundation. The abstracts refer to articles that will be published in a special issue of the international journal Science & Education (No. 7/8, Vol. 14, 2005), edited by Jürgen Teichmann (Deutsches Museum), Arthur Stinner (University of Manitoba) and Falk Riess (University of Oldenburg).

One generally sees the experiential aspects of learning connected to cognitive and hands-on factors only. We must, however, recognize the educative power of emotional component that can be enhanced by personal participation when presenting scientific ideas. We believe that the embedding of science in contexts of history and entertainment can achieve this.

As a mark of the exact sciences, especially physics, the rational approach to understanding the world is seen as valid, often aided by experiments. In contrast to this, modern media as well as the public institutions that disseminate scientific information such as science centres and museums and amusement parks, suggest that the question of educating the public by entertainment is becoming more and more important, especially in a society where much leisure time is available.

The notion of entertainment has been an important component in the dissemination of the concepts of physics since the early 1700 s. There seem to be characteristic differences between the 18th century goal of enlightenment, the 19th century positivistic approach, and the various media-centered presentations of science information in the 20th century. Until now, however, there has been little concerted effort on the international level to discuss this development. We would like to make, what may be a first attempt for a historical judgment and to reflect on the relations among the practices in history, the present and suggest developments for the future.

There are, to be sure, a small number of publications about the popularization of physics in the history of science. But directly planned popularization is only a part of the wider concept of entertainment in the history of physics. Thus, the itinerant natural philosophers of the 18th century, such as Giacomo Bianchi of Pognana, were, at the same time, instrument makers, entertained their benefactors, were responsible for the demonstration of experiments at universities and highly regarded as popularizers of science. Spectacular water fountain exhibits, designed for the eyes of the nobility, were essentially displays to entertain and illustrate our power over nature. Electric experiments and demonstrations were symbolic for controlling and conquering new forces of nature by infusing fun, making emotional contacts and creating rational/technical interest. Many physicists of the 18th century devised compelling electrical performances that blended dramatic display with instructive education, and tried to supplement their profits by publishing chatty books.

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Some aspects of entertainment, partly shifted toward biology in the 19th century, as exemplified by the popular hobby of butterfly and insect collection from exotic countries. On the other hand, the marvels technology of the industrial revolution, epitomized by the steam engine, railroads, the building of bridges and the new communication technology were experienced as glorious events, exciting adventures and were conducive to experiencing fun. The planned popularization of science in general and physics in particular, as one important basis of technology, began to play an increasingly important role. University education already contained significant components of entertainment by the end of the 18th century , for example, the famous lectures of the physicist G. Ch. Lichtenberg.. Entertainment was commonly incorporated into the lectures on experiments in Universities throughout the second half of the 19th century and also in the 20th century. In the 20th century there were special attempts made to place the history of physics into the school curriculum, with the goal of humanizing the teaching of physics, e.g. by 'telling stories' about great scientists or about the 'adventure' of science in general.

The historical conference in Pognana followed a program built around the following goals and themes:

1. Popularizing physics in the media, using lectures, books, and pictorial representations.

2. Showing the relationship among physics, instruments, and technology , aiming for private and public enjoyment.

3. The teaching of physics from early school years to University, using elements of play and entertainment.

4. The teaching of the history of physics in today-institutions, presenting the achievement of scientific knowledge also as an "adventure" in action and thought.

Pognana is the birthplace of Giacomo Bianchi, one of the most famous "itinerant lecturers" of science of the 18th century. He was active in Austria, Germany and France, not only as a lecturer but also as a noted maker of scientific instruments. He seems to be the only one of this class of physicists of that time about whom we have substantial material, especially at Pognana, Vienna, and Paris. This material clearly shows that he established a – possibly – very typical "hybrid career", a combination of experimental physicist and teacher, of instrument maker and itinerant lecturer, which may throw new light on the efficient public dissemination of scientific knowledge in the 18th century. In Pognana today, the family name of Bianchi is still widely recognized and highly regarded. There are still vestiges of this significant family, including the house in which Bianchi was born. Pognana itself is conserved in its state of the 18th and 19th centuries. It can be regarded as a typical example of a small town where opportunities for mobility were available that the "nuova scienza", starting in the 17th century, afforded to many who were outside the recognized centers of culture. Here was to be found – maybe sometimes to a greater extent than in the big centers – not only practical interest and craftsmanship, but also unconventional thinking (that sometimes bordered on charlatanism). It is fitting that two brothers of Giacomo Bianchi became instrument makers, too. Otherwise, Pognana, an Italian place, can be seen as a symbol of the beginning of the new experimental physics of the second half of the 17th century. This is especially so in reference to the Accademia del Cimento in Florenz. It can be seen also as a symbol for the combination of science (mostly as playful technology) and

entertainment within the Baroque period, from Latium to the Dukedom of Milan. However, it is also a symbol of the decline of this importance. The career of Bianchi found its high point, not in Italy but in Vienna and Paris (and for his two brothers in the Netherlands).