GIREP newsletter

Groupe international de recherche sur l'enseignement de la physique
International Research Group on Physics Teaching
Internationaler Arbeitskreis zur Förderung des Physikunterrichtes

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George Marx and International Physics Education

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The Danube Seminars

I well remember standing with George Marx in Visegrad, where the Danube makes its huge bend to the south, looking across to what was then Czechoslovakia. George had chosen this historic place for the second Danube Seminar, the first of many Danube Seminars on Physics Education held in Hungary. Why the title, "Danube Seminars"? George Marx wanted the countries of Eastern Europe, then frozen in the Soviet bloc, to come together to invent for themselves new ways of thinking about teaching physics in the school. And he wanted to ignite that fire with flames taken from the best and most recent work and thinking in other countries. I was there as one of the matchsticks in his matchbox.

At that time, in 1975, it was not at all trivial to arrange such a meeting. Colleagues from Eastern Germany, Poland, Czechoslovakia, Yugoslavia could travel to Hungary fairly freely, but had almost no money. Visitors from England needed not only a visa, but also a "pre-visa" which requested permission to issue a visa. With determined effort, George overcame all these problems. Only one problem he did not solve: Hungarian forints once bought could not be changed back into English pounds. So we had to spend them all in Hungary. But such was George's generosity that we never managed to spend any at all! So we went back home with unusable currency. Perhaps this too was part of his plan: it made it more likely that we would return!

The first Danube Seminar held in Vienna in 1974 with the help of Roman Sexl, was about the teaching of wave mechanics in schools. The second, at Visegrad in 1975 was about teaching statistical mechanics. Together, the report on the two seminars, titled "Atoms in the School" showed ways of teaching about the structure and nature of atoms, and about the statistical consequences of the atomic/molecular hypothesis. Already it showed George Marx's deep vision: to reform physics education, tackle first the essentials of modern physics. Get the big and difficult things right, and maybe the smaller ones will follow.

There followed many further Danube Seminars. The third Seminar was on the teaching of Newtonian mechanics, "Momentum in the School". From that Seminar I remember the taste of a breakfast of milk and salty bread bought at a rail station, and learning the Hungarian word for the number 3. George had arranged for me to see his colleague Eszter Toth teaching some statistical mechanics at her school in Budapest. Leaving Visegrad in the dark at 5.00 am, Eszter and I travelled by train and bus to Budapest to arrive just in time for the first lesson of the day, breakfasting on delicious bread and milk on the way. Eszter and her class, using some ideas we had developed in the UK, studied the distribution of molecules in two halves of an empty box. Throwing a die, they chose one of six "molecules" (numbered bits of plastic) to move from one half to the other. The students soon saw that 3 in one half and 3 in the other is the most probable distribution. "Harum - harum" they said. Slowly the meaning dawned on me. I could at last count beyond 2 in Hungarian!

By the time of the fourth Seminar, "Structure of Matter in the School", in 1979, participation was truly international, with contributions from Australia, Austria, Bulgaria, Czechoslovakia, Denmark, East Germany, Finland, Holland, Italy, Poland, Japan, and the UK, USA, and USSR. This may have been the seminar at which, during an evening dinner at a Czarda, the Russians present demanded that everyone sing a national song. Nervously, I realised that I was the only person from the UK. "Do I have to?", I asked George. "When a Superpower says 'sing', you sing!" was his answer. I sang, badly.

Events had been moving fast in Hungarian physics education. By 1977, the Hungarian Academy of Sciences, led by George Marx, had developed a proposal for curriculum reform in the sciences, in the General and in the Grammar School. Drawing on George's vision, the proposal started from the broad scientific world picture, and showed how to develop its essentials in a co-ordinated way across the sciences. At one International Conference I showed a slide picturing the "leaders" in science education, USA and UK, as runners looking behind them at another nations, waving them on. "Come, follow us". So, looking backwards, they did not see a small country, Hungary, running ahead of them with its own excellent programme. George was very very proud of this compliment.

It was at these Danube Seminars and later meetings in Hungary that I learned from George the essential gaiety and vivacity of Hungarian life. The Seminars were at a high intellectual level, but were always serious without ever being solemn. George's own lectures were masterpieces of wit as well as of clarity. In the evenings we danced and sang, George foremost amongst us. And anyone whose birthday it was found themselves being serenaded by gypsy violinists. We all wondered how George knew these birthdays so well. Simple: his conference registration forms always had a mysterious official looking section in which one had to write one's date of birth!

IUPAP, ICPE and GIREP Meetings

By the early 1980's George Marx had built up strong links with the International Union of Pure and Applied Physics (IUPAP) and its International Commission on Physics Education ICPE. They began supporting the Danube Seminars, which went from strength to strength. In 1981 a Seminar, on Nuclear Physics and Nuclear power, was held in the lake-side town of Balatonfüred. The collection of essays "Quantum Mechanics in the School" in the same year drew together much of the previous work, now bringing in contributions from such as Sir Nevill Mott and Victor Wiesskopf.

Similarly the Danube Seminar teasingly entitled "Disorder in the School" (1983) built on earlier seminars about statistical mechanics, but began to go beyond them. George Marx, with his wide and eclectic circle of friends and colleagues all round the world, was one of the first to see that the emerging ideas of self-organisation in complex systems, might well be important for school education. For myself, I first heard and first failed to understand the word "autopoiesis" (self-creation) beside the Lake Balaton at this meeting.

Future seminars revealed yet more of the breadth and generosity of George Marx's thinking about science education. He was among the first to grasp the importance of the microcomputer revolution for Science Education. In 1985, as Vice President of GIREP, he organised an international meeting on Microcomputers in Education, again by the Lake Balaton where he also had a small family country home. Welcomed there for barbecues in the evening, we spent the days looking uncertainly into the future. But for George, the importance of computers had long been clear. At one of the earlier Danube Seminars, he had introduced me to a school student who had, at George's suggestion, programmed for a small home-built computer the "quantum shuffling" game. This was a game we had previously developed in the UK to simulate the Boltzmann distribution of energy quanta amongst atoms in an Einstein solid. However, this student, as well as building the computer, had programmed the whole thing himself in hexadecimal code. To tell the truth, I didn't believe it. But I noticed a small error in the way the averaging of numbers was done (a trap we had ourselves fallen into). The student returned two hours later with the game re-programmed and correct! I learned that George Marx was far from being alone in his Hungarian qualities of determination, self-belief and brilliance.

George's thoughts about the use of microcomputers always turned around the idea of making models with the computer, to get insights into how Nature might behave. These thoughts were reflected in his charming and wide-ranging collection of examples entitled "Games Nature Plays".

A word here about GIREP and ICPE, and George Marx's involvement in them. Founded in 1966 by Prof. W Knecht, GIREP (Groupe Internationale pour la Recherche sur l'Enseignement de la Physique) is and was a quite small European "club" of people interested in changing Physics Education. Its subscription was small, its membership conditions very open, and its meetings informal. It was a place where school teachers and university educators could talk on terms of considerable equality. As President of GIREP in 1992-95 George Marx helped to make sure that this friendly atmosphere continued. And Paul Black, President before him, recalls how it was George who, when plans for a GIREP meeting failed, stepped in and organised one himself - and made it an excellent one too.

The involvement with ICPE was over an even longer period. Between 1978 and 1981 George Marx served as a member of the Commission, returning in 1987 to 1993 as Vice-Chair. He was also a vice-president of IUPAP between 1993 and 1996. It was George who had originally proposed that ICPE award a medal for outstanding services to the teaching of physics, with an international dimension. In 1997 the Commission awarded George Marx himself the medal whose existence he had initiated. The citation read:
Throughout his long career Professor Marx has devoted himself to advancing the cause of science and of physics education. Both in his research work in physics, and in his work as a teacher, an author and an editor he has made seminal contributions to the literature. He has catalysed the organisation of numerous international conferences and projects in physics education. Always, and in all ways, George Marx has been a trusted advisor and a highly valued friend of physics teachers the world around, and through his continuing and tireless efforts on their behalf has earned their deepest respect, affection and gratitude.

In 1987, George Marx organised another meeting at the Balaton, now supported by ICPE and GIREP, on non-linear phenomena. Once again, his depth of vision had taken him beyond the then current concerns of Physics Educators. He saw, long before most, that non-linearity and chaos, with their connections to self-organisation and perhaps to the nature of life, pose huge but fascinating problems for Science Education. Again, the conference had one of his teasing titles, "Chaos in Hungary". There is a story about this. Some months later, he was telephoned by a high security official to say that East Germans, possibly subversives, had been seen in Berlin carrying bags labelled "Chaos in Hungary". It was understood that Professor Marx might be responsible. George laughed down the telephone. After a pause, the security man laughed too. George told me that this was one of the clearest concrete signs he had that the old political regime was changing.

In 1989 another conference, supported by GIREP, IUPAP, ICPE, UNESCO and the International Atomic Energy Agency, and introduced by the President of Hungary and the Director General of UNESCO, turned to a different topic, now central to George Marx's concerns. This was Energy and Risk Education. After the 1986 Chernobyl accident, public opinion had turned sharply against nuclear energy. George was deeply concerned that this reaction, while understandable, was not based on a real understanding of the issues. He had been impressed how, in Hungary, the public - educated with a school programme including aspects of nuclear energy - had been much less panic-stricken that that in neighbouring countries. He saw that it was essential to support education both about nuclear energy, and about the assessment and understanding of risk. That concern continued: his last paper for the UK journal Physics Education on the occasion of the award to him of the Institute of Physics Bragg Medal for outstanding services to Physics Education, was entitled "Life in the Nuclear Valley". It showed how fundamental to all of life, including its very genesis and survival, have been nuclear processes. The "Nuclear Valley" of the title is the "potential well" formed amongst nuclei of every possible combination of neutrons and protons, due to their binding energy. George had introduced us all to the idea at an earlier Danube Seminar. He was now delighted that we in the UK had taken it up in our recent work, and he was thrilled to be taken by us on a computer generated flight over "his" valley, plotted in three dimensions.

Later, in 1992, he found the Hungarian village of Matraderecske, where natural radon levels in houses were very high. Here was a place for very practical nuclear education, touching people's lives. George and his colleague Eszter Toth, together with her high school students, set about a programme of measurement, and practical education. The students learned by teaching the villagers. The last Danube Seminar "Planet in our Hand; Atoms in our Hand" at Eger in 1995 drew on this important experience.

Being Hungarian

You cannot understand George Marx's vital contributions to Physics Education internationally without first understanding that he was, above all else, intensely and passionately a Hungarian. This feeling shone through everything he said and did. It is at its most striking in his book, "The Voice of the Martians", which takes its title from a line by Isaac Asimov":

"A saying circulated among us that two intelligent species live on Earth: Humans and Hungarians."

and from Leo Szilard's reply to Fermi's question whether extra-terrestrial beings were already on Earth:

"They are among us, but they call themselves Hungarians"

His book records and celebrates the multitude of examples in science of "Martian-Hungarians", speaking a language nobody else understood, invading and in many cases taking over whole areas of science and technology, besides seeding many new ones too. George was deeply proud of the achievements of Hungarian writers, poets, musicians and artists. He was even prouder of the many Nobel prizes won by Hungarian scientists, and of their profound contributions to science. He felt in his heart that all these people were very special, sharing what was for him a special Hungarian quality of excellence. He believed it his duty and privilege as a Hungarian to do everything possible to continue this flowering of talents into the future. People from his small nation had in the past changed the world many times over; George wanted to help that to go on happening in the future.

Your next mistake would be to imagine that this passionate belief in Hungary and Hungarians, which led him to stay and work there when many others had left, was in any way a narrow kind of nationalism. As a distinguished physicist of the first rank, George Marx was a strong internationalist. He had connections with physicists and educators all over the world, and sought always to learn from them and to enjoy what they had to offer. Visits to Hungary at his invitation by Richard Feynman, Eugene Wigner, Victor Weisskopf, Nicholas Kurti and many others gave him deep pleasure. He perhaps reserved his greatest admiration for two fellow Hungarians: John von Neumann and Leo Szilard. It was very clear to him, as it had been to Lorand Eotvos when he founded the Hungarian Physical Society, that Hungarians could only do work of world rank if they knew and understood deeply what the best people of every other country had to offer. Obvious in physics (though still not always observed everywhere), this view of things extended for George to other cultures, religions and ways of life. For him, there was something to be learned from everybody. His open mind and broad sympathies worked on every scale, from a love of Japanese green tea to an appreciation of the genius of Chinese culture. He hated the Soviet domination, but he knew, respected and learned from their great physicists, particularly Yakov Zel'dovich. It was a thought from Zel'dovich that led George Marx and Sandor Szalay to propose that a small neutrino mass could explain the "missing matter" in the Universe. If only neutrinos had turned out to be a bit more massive than they actually seem to be, a Nobel Prize might well have been his. If it had, he would have planted his own tree with pride in the garden he established with trees planted by every Nobel prize winner he could tempt to visit Hungary.

One thing George Marx never believed: that the path to creativity and excellence lies in a quiet life. He felt sure that the turbulent times that Hungarians have had to survive stimulated many of them to originality and brilliance. For this reason he was always himself looking eagerly for the next new thing; for the coming idea or challenge. That was what kept him alive.

George Marx in Japan, China and Africa

George Marx's fascination with and respect for all cultures gave him a wonderful and wide view of the development of knowledge throughout the world, and through history. In a chapter "Shortcut to the Future", written in 1994 for a volume to honour the memory of one of his heroes in physics education, Eric Rogers, he memorably evoked the whole history and geography of knowledge. Paying tribute to the gifts to our heritage of the cultures of China, India, Islam, Israel, Japan and the USA, he asked the question how to keep knowledge alive and on the move in post-industrial society.

With this large vision and tolerant understanding of others, George Marx was able to help and encourage scientists and teachers in India, Japan, China, and Africa to see and invent for themselves new paths into the future for their science education.

In the 1980s and 1990s George made many visits to China, Japan and Africa. He also went to India in 1984. A long visit to China in 1983 was followed by a series of further visits, as he was invited back again and

again. This in itself is testimony to the value Chinese people put upon his ideas and experience. A similar long series of visits to Japan started in 1986. In all these visits, George expounded his vision of a science education based on the deepest and most general elements of the scientific world picture, and designed to develop the creativity and talent of all students.

I can recall George, in London with us after his first visit to China, speaking with awe of the huge scale of educational problems in a country of more than a billion people. In Hungary, with 10 million people, you could get all the high school teachers of physics in the country into one big hall or maybe stadium, and speak with them of a new vision. But in China, to organise any change at all means influencing millions of teachers, not thousands. Even so, George established a close rapport with his Chinese friends, and between them they found close and sometimes surprising bonds between China and Hungary.

Some of the most fruitful outcomes of George Marx's work in Asia came in 1992 when he brought about seventy Japanese physics teachers to Jaszbereny in Hungary, where they exchanged ideas about teaching physics with Hungarian teachers, and again in 1997 when he organised a conference "Creativity in Physics Education" in Sopron, jointly with the Chinese Physical Society and the Japanese Association for Science Education. In many respects, George opened the borders of their countries for Asian teachers, as he had done before for teachers in Eastern Europe.

Starting in 1987, with the support of the International Centre for Theoretical Physics headed by his friend Abdus Salam, George Marx began a long series of workshops on the use of microcomputers in science and mathematics education. Between 1987 and 1993 he took his ideas, and his personal charm and warmth to Egypt, Ethiopia, Kenya, Ghana, Zimbabwe and Uganda. George was never there merely to teach. Above all, he tried to leave behind a sense of possibility, of personal creativity in every participant.

I was with him on the first of these visits, which was to the Sudan. He had been asked to lead a team introducing uses of microcomputers in education. Not without difficulty, we carried our electronic equipment through the Sudanese Customs. We gave, and often improvised, talks. But what I remember best is a drive out into the Sahara desert. Of course the truck got stuck in soft sand and we had to dig it out. There was emptiness as far as you could see, or even imagine seeing. Truth to tell, I was scared. But nothing new and strange ever scared George. With his permanent sense of adventure, he loved every moment of this, as of any new experience.

Paths made by walking

I hope that I have shown how the many contributions George Marx made to science education internationally sprang from deep within him. He lived for the adventure of new thoughts. So I can best end with the short poem by Antonio Machado which George himself chose to end his chapter in honour of Eric Rogers:

Traveller! Here there is no path.
Paths are made by walking.
When you look over your shoulder,
You see a path you'll never walk again.

All Nations Need To Require Science Literacy Courses for All University Students

Art Hobson, University of Arkansas, USA, ahobson@uark.edu

During 1994-2000, I attended six international or national physics education conferences in Europe and in China, sponsored by GIREP, ICPE, and others. The meetings, and especially the "hallway conversations" with attendees, were delightful and interesting. I was pleased to have the opportunity to present invited and contributed talks at these meetings.

My reason for attending these meetings, and the focus of my talks, was the teaching of general "physics literacy" courses to non-scientists, especially at the university level. It is an important goal for many reasons, most importantly because, as the American Association for the Advancement of Science puts it in its *Science for All Americans* project: "The life-enhancing potential of science and technology cannot be realized unless the *public in general* comes to understand science, mathematics, and technology and to acquire scientific habits of mind; without a scientifically literate population, the outlook for a better world is not promising" (my italics). I believe that this statement is especially relevant to the *university-educated* portion of the "public in general."

My talks have always received a friendly hearing and general agreement at international meetings, but I have come to realize that these talks go out into an almost-perfect vacuum. With the important exception of China, no nations take any action to improve science literacy education: No new courses are developed, no new programs are started. Indeed, such possibilities are not even considered. I have discovered that the reason for this is quite simple: Very few nations require students to take any courses in science literacy or in any other area outside of their major professional interest. University students of say music or history are not required to take physics literacy courses--courses that stress the conceptual (non-technical) understanding of the ideas of classical and modern physics, along with their social and philosophical implications.

Thus, the universities of most nations train professionals but they do not educate citizens. Evidence shows that this narrowly-focused university education pattern is a mistake.

The work of Jon D. Miller of Northwestern University (see references below) provides evidence that science literacy courses for non-science university students make a surprising difference in a nation's overall level of scientific literacy. Using carefully developed instruments, Miller builds on two decades of national surveys in the United States and two Eurobarometer studies to measure civic scientific literacy in several nations. In Miller's work, "scientific literacy" means: (1) an understanding of basic scientific concepts such as the molecule, DNA, the structure of the solar system; and (2) an understanding of the nature and process of scientific inquiry, including the ability to separate scientific sense from pseudoscientific nonsense. In practical terms, scientific literacy reflects the level of skill required to read the science section of a major newspaper.

Miller found that the percentage of American adults who were scientifically literate increased from 10% to 17% during 1990 to 1999. Although these levels are low, surely too low for the requirements of a democratic society in today's world, they are higher than the level for European adults in 1992 (5%), for Canadian adults in 1989 (4%), and for Japanese adults in 1991 (3%) (Ref. 7, p. 2; Ref. 5, p. 98).

In view of the weak showing of U.S. secondary school students on such comparative exams as the Third International Math and Science Study, it is surprising that U.S. adults are measurably more scientifically literate than European, Canadian, or Japanese adults. At some point between secondary school and full adulthood, the average science literacy level of Americans seems to increase relative to other nations. Why?

Miller has studied the factors associated with scientific literacy in the U.S., evaluating the relative significance of the individual's age, gender, highest level of education, college science courses, minor children in the household, and use of informal science education resources. He found that the strongest predictor of adult science literacy is college science courses, followed at a much lower significance level by informal science education, and then by highest level of education.

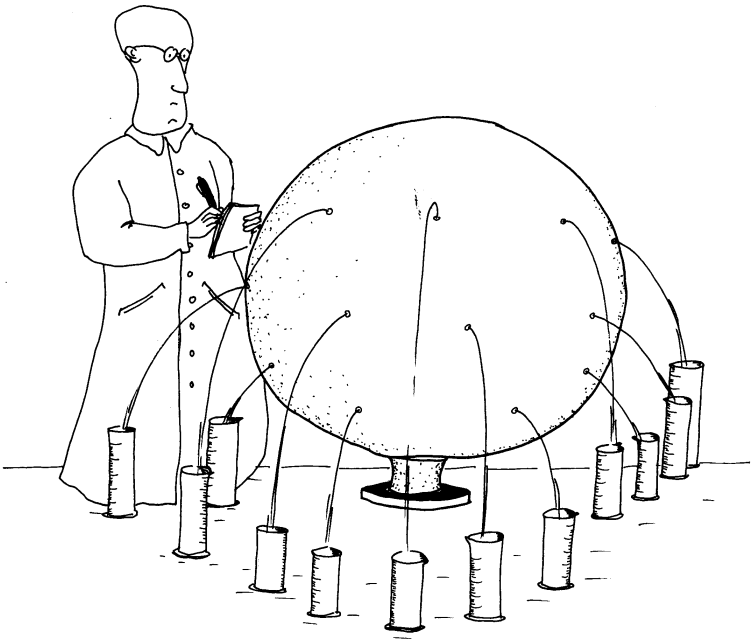
In his college science course indicator, Miller divided the number of courses into three levels: (1) no college-level science courses, (2) one to three courses, and (3) four or more courses. Those individuals falling into level 2 took college science courses as a part of a general education requirement rather than as part of a major degree program. Thus, this indicator gives significant weight to science literacy courses, and the high significance of this indicator in predicting an individual's science literacy level is evidence for the importance of these courses in educating scientifically literate adults (Ref 7).

Miller comments that "it is not well known in the scientific community that the United States is the only major nation in the world that requires general education courses for its university graduates. University graduates in Europe or Japan can earn a degree in the humanities or social sciences without taking any science course at the university level. ...Analysis of the data shows that this exposure to college-level science courses accounts for U.S. performance." (Ref 7, p. 3)

All nations need to begin requiring science literacy courses for all university students.

Publications by Jon D. Miller:

1. *Public Perceptions of Science and Technology: A Comparative Study of the European Union, the United States, Japan, and Canada,* (Madrid: BBV Foundation, 1997), with Raphael Pardo and Fujio Niwa.
2. *The Public Understanding of Science and Technology in the United States,* A Report to the National Science Foundation (Chicago: Chicago Academy of Sciences, 1995).
3. "Civic Scientific Literacy in the United States: A Developmental Analysis from Middle-school through Adulthood," in Gräber, Wolfgang and Claus Bolte (Eds.), *Scientific Literacy* (Kiel: Germany: Institute for Science Education, University of Kiel, 1997) pp 121-142.
4. "La Nécessité d'une Éducation Scientifique Citoyenne?" in Schiele, Bernard and Emyln H. Koster (Eds.), *La Révolution de la Muséologie des Sciences* (Lyon, France: Presses Universitaires de Lyon. 1999) pp 293-328.
5. "Civic Scientific Literacy and Attitude to Science and Technology," in Dierkes, Meinolf and Claudia von Grote (Eds.), *Between Understanding and Trust: The Public, Science, and Technology* (Amsterdam: Harwood Academic Publishers, 1999), pp 81-129, with Rafael Pardo.
6. "The Measurement of Civic Scientific Literacy," *Public Understanding of Science*, July 1998, pp 1-21.
7. "Civic Scientific Literacy: A Necessity in the 21st Century," *Federation of American Scientists Public Interest Report*, January 2002, pp. 1-4.



Experimental verification of Gauss' law

Report of the treasurer

GIREP Balance, Jan. 2000 to Dec. 2001

approved by the auditors S. Pugliese-Jona and B. Laiz Castro

Postbank Munich (DEM)

	CREDIT	DEBIT
carried forward from previous balance	6904.27	
support for Barcelona conference		3920.54
support for newsletter and GIREP server		1550.00
expenses (account, mailing, cheques etc)		211.68
fees	6950.68	
totals	13854.95	5682.22
carried forward		**8172.73**

GIREP Balance, Jan. 2001 to Dec. 2001

approved by the auditors S. Pugliese-Jona and B. Laiz Castro

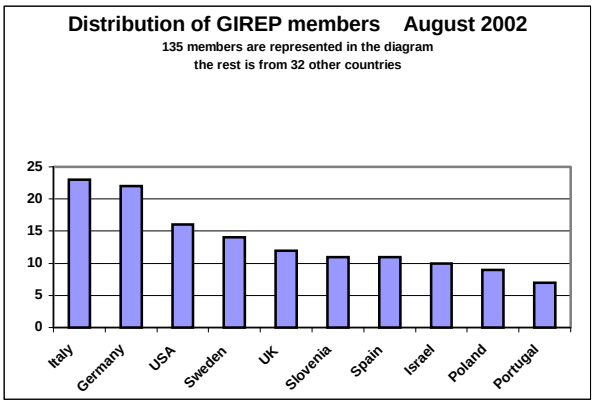
Postbank Munich (DEM)

	CREDIT	DEBIT
carried forward from previous balance	8172.73	
support for Udine (1st GIREP seminar)		1001.11
proceedings (Barcelona)		762.77
expenses for newsletter no 44		500.00
expenses (account, mailing etc)		139.80
fees	4090.79	
totals	12263.52	2403.68
carried forward		**9859.84**
		= € 5041.26

I will make only some small remarks: Since years there is no big change in the income and the expenses. GIREP can support the biannual regular conferences with about € 4000 and also the newly introduced GIREP seminars with some money. This is not very much money but it is a very nice money, because the organizers of the conferences can pay with this money expenses which they often cannot pay from other supports. With e-mail it is now much easier to remember our members to pay their fees. It is also much easier now to handle the payment with credit cards. This is a real progress for the treasurer.

GIREP has actually 204 members (from 42 countries)

According to our statutes are all persons members who have paid their fee until 2000 and later. Some members have paid their fee in advance even until the year 2006!
In the diagram are represented 135 persons.
The other 69 members are from 29 different countries:



Argentina, Austria, Belgium, Chile, Colombia, Cyprus, Czech Republik, Denmark, Finland, France, Greece, Honduras, Hungary, India, Indonesia, Ireland, Japan, Korea, Latvia, Malta, Mexico, Netherlands, New Zealand, Norway, Philippines, Romania, South Africa, Thailand, Turkey.

Christian Ucke (*Treasurer to GIREP until 2003*)

Dear Colleagues!

As you may know, new GIREP committee has been elected last August in Lund. Here follows a short self-introduction of the new committee.

Editor of GIREP newsletter, Gorazd Planinsic

N E W G I R E P C O M M I T T E E

MANFRED EULER, president

Manfred Euler is Director of the Physics Education Department at IPN, the Leibniz-Institute for Science Education in Kiel. He is also a professor of physics education at the Christian-Albrechts- University of Kiel. In his research at IPN he is involved in several national and international projects to improve the quality of teaching and learning in science.

Research interests:
Research on teaching and learning modern physics, especially complex systems, nonlinear dynamics, biophysics.Participation in various research and development projects in quality development in science education and in computer-based science teaching and learning

TON ELLERMEIJER, first vice-president

For many years I am a Physics Educator, involved in teacher training, Physics Education research and initiator of many projects. At present I am director of AMSTEL (Amsterdam Mathematics Science and Technology Education Laboratory) Institute of the Faculty of Science, Universiteit van Amsterdam. We have a longtime experience in introducing ICT in Science and Math education, and act as expert centre for Dutch Government. Probably I am best known internationally from many presentations on our Coach learning environment. I have attended GIREP meetings since 1984 and I hope in the coming years to be able to contribute to the GIREP community as well to the position of Physics Education in general.

MICHELE D'ANNA, second vice-president

I was born in the Italian part of Switzerland on 7th August 1953; after finishing school, I graduated at the Swiss Federal Polytechnic in 1977 with a thesis on theoretical physics. After a short period as a researcher in the field of elementary particle physics, since 1979 I have been working as a high school teacher in Locarno. During the last two decades I have been involved in several groups working on school reform; at the present I'm interested in the modernization of the basic course in physics at high school level and in the development of a modeling-based course linking physics and mathematics.

ROSA MARIA SPERANDEO-MINEO, treasurer

Professor of Physics Education at the Department of Physical and Astronomical Sciences of Palermo University

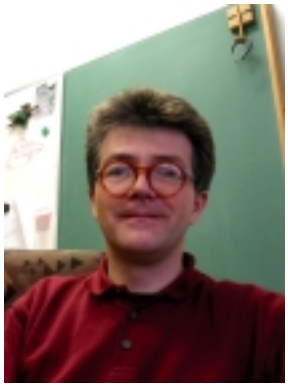
Courses:

Physics and Physics Education to students who are attending a University degree Course for elementary School teacher preparation. Physics Education at the two years post-graduate Specialisation School for Secondary School Teacher Preparation.

Research interest

Physics and Science Education at primary and secondary levels with special focus on ICT contributions to redesign of approaches and didactic materials. My present research work concerns the impact of modelling procedure approaches to Science and Physics teaching. Teachers Education, with focus on Net-Courses and Net-Seminars.

GORAZD PLANINSIC, secretary



Docent at *Faculty for Mathematics and Physics, Department of Physics, University of Ljubljana*. Since year 2000 I am leading a Physics Education course for undergraduate and postgraduate students at the Dept. of Physics in Ljubljana, and Continuing education program for in-service secondary school physics teachers in Slovenia. I collaborate with Slovenian hands-on science centre *The House of Experiments.* I am also involved in national and international physics curriculum developements.

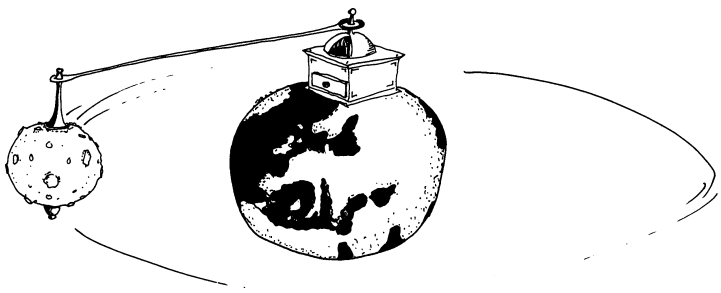
Courses:

Didactics of Physics, Project Laboratory, Physics Seminar (for undergraduate students). Didactics of Physics with projects (for Physics Education postgraduates)

Research interest

Physics Education at secondary and university level with special focus on the development and didactical use of the hands-on experiments and computer-based laboratory. Magnetic resonance imaging; Physics of granular material

&: Black-ink humorous illustrations of physical thematic (as seen in this newsletter)



VLCG - Very Large Coffee Grinder

I M P O R T A N T N O T E S

Paying the GIREP membership

The preferred method to pay is by credit card (**VISA** or **EURO-/MASTERCARD**; no others). **Add 5% expenses to the fee; this means then totally 21 Euro for one year!** Please write or fax (**no e-mail!**) to the Treasurer your full card number, expiration date and the total amount

Fax Number: +390916162461 or +390916234281.

The fee can be paid also into the following account:

Rosa Maria Mineo-Sperandeo MEDIOLANUM BANK-Account N 478971,
Swift Code: MEDB-IT-MM, [ABI: 3062, CAB: 34210].

At the same time, please send a note (by letter, fax or e-mail) to the Treasurer, confirming how much money you sent and when and for what years. **The members should pay all bank charges and mailing costs. Please ask your bank for these costs before transferring money!**
If you prefer to reduce bank or cheque expenses, you may pay several years fees in advance.

Please do not send cheques (high expenses!)

In cases of real difficulty to arrange payment, please contact the Secretary or the Treasurer who are ready to advise whether special arrangements can be made.

GIREP home pages

www.girep.org
http://www.pef.uni-lj.si/girep

User name: girep, **password**: duis98

E V E N T S

GIREP 2004 - International Conference

on

Physics for sustainable growth

19 - 23 July 2004, University of Ostrava, Czech Republic

This topic concludes physics and physics learning/teaching process as concern nature, biology, biophysics, chemistry, medicine, industry, economy and all processes that can improve or debase our environment from the point of view physics. Organisers of conference are GIREP, the University of Ostrava, the Technical University of Ostrava and the Czech Society of Mathematicians and Physicists.

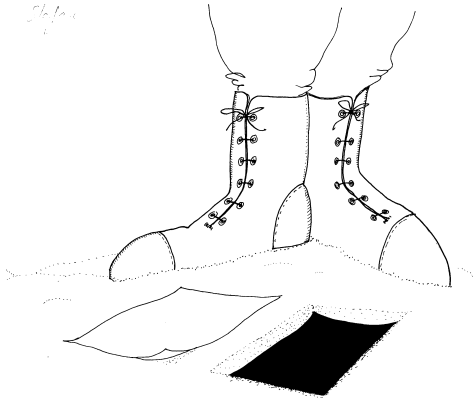
Conference guarantee prof. RNDr. Erika Mechlová, CSc. from the University of Ostrava, the Faculty of Science, Department of Physics. E-mail: erika.mechlova@osu.cz

Contact person: Jana Janoscova, e-mail: jana.janoscova@osu.cz , phone: +420-596 160 244, fax: +420-596 120 478

Addresses:

- University of Ostrava, 30. dubna 22, 701 03 Ostrava, Czech Republic
- Web site of university http://www.osu.cz/conf/girep2004
- E-mail of conference: girep@osu.cz
- Town Ostrava http://www.mmo.cz/ostrava/mesto.html

Organisers invite you to attend the international conference GIREP 2004 in Ostrava.



Young Jozef Stefan on a sunny winter day

University of Udine
Interdepartmental Centre for Research in Education (CIRD)
Physics Department

Second INTERNATIONAL GIREP Seminar
on

Quality development in teacher education and training

1-6 September 2003
University of Udine, Italy

Organized by:
Groupe International de Recherche sur l'Enseignement de la Physique (GIREP)
European Physical Society (EPS)– Division of Education
International Commission on Physics Education of IUPAP (ICPE)
European Physics Education Network (EUPEN)
University of Udine, Italy

with the cooperation of the
Austrian and Slovenian Sections of GIREP
International Centre For Mechanical Sciences (CISM)
National Italian Conference of the University Centres for Research in Education (Concured)

And with the patronage of the
Italian Physical Society (SIF)
Italian Association for Physics Teaching (AIF)
Regione Friuli Venezia Giulia

Information: **www.uniud.it/cird/girepseminar2003/**

Reference address: Prof. Marisa Michelini - CIRD & Physics Department, via delle Scienze 208, 33100 UDINE, Italy
Tel. ++39 0432 558210, 558211; ++39 338 7882745 Fax ++39 0432 558222; e-mail: michelini@fisica.uniud.it

SCIENTIFIC PROGRAMME

The aims of the Seminar

(1) The Seminar aims to bring together those who are involved with the training of teachers to teach physics throughout the school age range in order that participants will be able to share ideas concerned with 'how to teach student teachers to teach physics in schools'.

(1) It will focus on what teacher trainers can do with their students in preparing them for work in school, but it will also consider the means, practices, resources and support that encourage and enable physics teachers to achieve, maintain and enhance good quality teaching throughout their professional lives.

- The Seminar hopes to bring together teacher trainers, scientists from universities and industry, researchers in education and school teachers united in a common aim to improve the quality of physics education.

Why is the seminar necessary at this time?

The many factors that make the seminar timely include:

- A new emphasis on the professionalism of teachers that requires a complex interaction of subject knowledge with technical, pedagogical, social, administrative and organisational skills.
- The challenge, in many countries, to recruit and retain in the profession enough high quality physics teachers, at a time when physics graduates have a wide choice of careers available to them.
- The educational demands of a scientific and technologically based society where few citizens understand science well enough to take part in scientific debate on issues of direct concern, and many public figures are proud of the fact that they are not scientifically literate.
- The need for teachers to improve their approach to teaching physics so that recent and relevant scientific knowledge is taught to students in a highly motivating way. Abstract physics must give way to physics in context for most, whilst at the same time preparing others for higher education in physics which may be of an abstract aproach. Tools and methods must be offered to students rather than answers to questions which have not been asked.
- The need for physics/science education -o begin at kindergarten and continue throughout schooling. Young students have an enthusiasm for scientific investigation and this needs to be nurtured early and encouraged for all students. Good physics/science education is essential for those who teach our youngest children as it is known that many future scientists have already decided to study science before they leave primary school.
- The likelihood that the mission, organisation and cooperation of Institutions (Universities - Physics and Education Departments - and Teacher Training Colleges) may need to change. There is more to teacher training, and training for other professions too, than subject knowledge!
- There exists of a vast amount of research on teaching and learning that should be properly utilised in meeting the needs of the trainee teacher.
- The interation of teacher training institutions and schools in the training of teachers

THE STRUCTURE OF THE SEMINAR

In these Seminars there is more time for discussion and less for presentations. The Seminars, however, are organised in such a way that all the participants have the chance to present their thoughts and research and make their work known. The first GIREP Seminar was held in Udine in September 2001 on the topic "Developing Formal Thinking in Physics". At the end of the 2001 Seminar the participants recommended its organisational structure as a model for future GIREP Seminars - in particular for planning a Seminar on the training of physics teachers, as a follow-up of the Barcelona 2000 Conference.

The Seminar will host Plenary Lectures, Round Tables, Panel Sessions and Workshops.

- The Plenary Lectures and Round Tables will offer overviews of the topics that will be discussed in detail in the Workshops. A final document will be written and approved (see Outcomes).

- The Panel Sessions are amongst the earliest of the Seminar's activities. Their function is to survey all the accepted contributions, in parallel sessions according to topic,.They will provide selected materials for the Workshop activities that follow.
- The Workshops are the core of the Seminar and they determine its outcomes. .They will benefit from the Plenary Lectures and from the contributions of the participants. The leader of each Workshop will choosefrom the contributions presented to the Seminar the ones whichs/he considers most relevant to the Workshop s/he leads.

In each Workshop the discussion will be in five parts:

1. a general overview of the topic;
2. a preliminary discussion of the most important problems;
3. a more thorough discussion into specific aspects and possible solutions of the problem;
4. a general summary;
5. and, finally, a discussion on the contribution of the Workshop to the outcomes of the Seminar

Workshop themes

The Workshop activities will be inspired by the following themes.

Teacher Education and new technologies
Initial Teacher Education
In-service Teacher Training and Teacher Training at a distance
Contribution of research into Teacher Training
The Universities and the:

We ask for three kinds of contributions:

1) results of research projects and in-school experimentation centred on any of the issues;
2) analysis of papers from GIREP proceedings, on any of the issues, that are useful for teachers;
3) thoughts on the Seminar issues in the framework of the themes of the GIREP Working Groups.

TIMETABLE

Time	Monday 1st Sept	Tuesday 2nd Sept	Wednesday 3rd Sept	Thursday 4th Sept	Friday 5th Sept	Saturday 6th Sept
9.00		Opening Ceremony	Plenary lectures	Workshops in parallel sessions	Workshops in parallel sessions	Reports from Workshops
11.00						
11.30		Plenary lectures Round Table	Plenary lectures	Workshops in parallel sessions	Workshops in parallel sessions	Final Documents Conclusions
13.00						
	Lunch					
14.30		Panel Sessions In parallel	Plenary lectures and Round Table on outcomes	Workshops in parallel sessions	Plenary lectures and Round Table on outcomes	A trip to the heart of Friuli
16.30						
17.00	Registration Welcome	Panel Session (PS) In parallel	Report from PS Workshop presentation	Plenary lectures	Visit to the city	A trip to the heart of Friuli
19.00						
	Social events					

OUTCOMES

The following outcomes are expected:
1) A collection of papers on issues connected to quality development in teacher education and training, for all grades in school from kindergarten to pre-university level
2) A collection of papers on innovation in physics teaching;
3) At the end of the Seminar a final document will be written with indications and recommendations on how:

- to promote co-operation between schools and universities;
- to produce papers useful for teachers and to help teachers to produce papers themselves;
- to write criteria for supporting teachers in documenting their own work;
- to enhance the contributions of institutions to the improvement of teacher training.

APPLICATION AND CONTRIBUTIONS

Please send your Application Form to Marisa Michelini michelini@fisica.uniud.it as soon as possible and not later than **1st April 2003,** sending the abstract in English, using the format given (see www.uniud.it/cird/girepseminar2003/). If possible, please send your Abstract as a WORD file via the Internet.
The participants who wish to make their contributions available beforehand to the workshopleaders may send the full text (no more than five pages, set out in the same way as the Abtract) to the same address not later than **1st June 2003**.

Second INTERNATIONAL GIREP Seminar on
QUALITY DEVELOPMENT
IN TEACHER EDUCATION AND TRAINING
1-6 September 2003, University of Udine, Italy

APPLICATION FORM
Please send not later than
April, 1st, 2003 to
fax ++39 0432 558222 or
michelini@fisica.uniud.it

Title **SURNAME** **NAME**			
Complete address			
E_mail			
PHONE		**FAX**	
Main topics of interest			
Suggested topics and/or aspects for workshop discussions			
Contribution offered for	❒**oral presentation in Panel Session**	❒**workshop discussion**	❒**poster**
Title of the offered Contribution			
Authors and Institutions			
Instruments needed for oral presentation	❒**overhead projector** ❒**videorecorder** ❒**videoprojector and computer** **other (specify)**		
comments			

Abstract in separate sheet

Student Dormitory reservation. Please reserve for me:

from (date of arrival) _____ to (date of departure) _____
n. of nights _____ n. of persons _____in (single, double) room _____

Signature_____