10. International tournament of young physicists 1997

at Eger (Zcechia) from June 1 to June 7

11. International tournament of young physicists 1998

from May 31 to June 6, at Donaueschingen (Germany)

12. International tournament of young physicists 1998

from May 23 to May 29, at Vienna (Austria)

In early summer 1997 fifteen student teams from 11 nations came together for a physics competition at Eger (Czech Republic) . For one week they were living proof that this is not only a physics competition but also a highly effective forum for international understanding.

Germany has taken part in the tournament for three consecutive years. The participating students were for the most part students from "Gymnasien" (high school for medium to high achievers, grammar schools) from the state of Baden-Wuerttemberg.

The rules in the better known Physics Olympics lay down that individual students solve the problems set in an exam contest, which implies that a lot of the thinking has already been done beforehand. In this scientific contest, which is a very lively affair, the students compete in teams. The teams present and defend their possible solutions to 17 complex scientific projects, which they have spent months researching both through conducting experiments and theoretically. The presentation takes place before the critical eyes of an international jury.

All sources of information are permitted: intensive literature research in university libraries, interviews with experts at colleges, universities and business. It is the stated objective of the organising body, to make the students think for themselves thus leading them to work and research independently.

German student team with Professor B?rger, Professor von Klitzing and Professor Herwig Schopper at the 10th International Tournament of Young Physicists in Zcechia.

Курс доллара США на торгах ММВБ на 12.03.96 г. 1$ = 4827 руб. 12.03.96 8:58

Наименование	Цена, $	КОЛИЧЕСТВО, ШТ. Вс	В.	Л.	И.	Зк	ДЕНЬГИ ИДУТ Вс	1	2	3	ВСЕГО НА СКЛ. Вс	В.	Л.	И.	ВЫПИСАНО Вс	1	2	3
РУЧНЫЕ ГИДРАВЛИЧЕСКИЕ ТЕЛЕЖКИ																		
Ручная гидравл.тележка 2 т.	350.0	38		14	24						48		24	24	24	5	12	7
КТ 25Н 2,5 т 1995 г.	370.0	10			10						12			12				
ЭЛЕКТРИЧЕСКИЕ ТЕЛЕЖКИ																		
ЕП 001.3 1т 1996 г.	5000.0	0				2												
ЕП 006.2 2 т. 1995 г.	7200.0	2		2							2		2		5	2		3
ЕП 006.2 2т (без А/Б) 91 г.	3700.0	2		2			1		1		2		2					
ЕП 011.2 3 т. 1995 г.	7300.0	9	8	1							9	8	1		5			5
ЕП 011.2 3т 1996 г.	7600.0	0				3												
ЕП 011.2 3т (без А/Б) 91 г.	3900.0	4		4							4		4					
Электротягач ЕТ512 95г.	7900.0	1		1							1		1					
ЭЛЕКТРОПОГРУЗЧИКИ																		
Э/п ЕВ687.22 1т 1996г.	7600.0	20			2	5					3			3	3	2	1	
Э/п ЕВ 687.28 1т 1996г.	7800.0	3	2		1	1					3	2		1				
Э/п ЕВ 687.33.11 1т 1994г.	7400.0	1		1							1		1					
Э/п ЕВ 687.33 1т 1995г.	7700.0	1		1			1	1			1		1		1	1		
Э/п ЕВ 687.33 1т 1996г.	7800.0	2			2	1					2			2	3	3		
Э/п ЕВ 687.45 1т 1996г.	7800.0	1	1				1	1			1	1						
Э/п ЕВ 717.33 2т 1995г.	9600.0	2	2								2	2			2		2	

In the final round ("Physics Fights" = P.F.) 3 teams of 5 students respectively compete against each other. The language of communication is English. The rules say that the team of the opponents challenge the team of the "reporters" by demanding a report about issue nr 5 "Blue Blood", for example. The reporters may deny the challenge only twice without losing points. After the report is finished it is up to the opposing team to expose failures and weak points in the solution, suggested by the reporters. At this point the opponents should not disclose their own investigation results. Finally a third team, the "reviewers" are to judge how well the opponents and the reporters have presented themselves and their solutions. In a P.F. each of the three teams takes over the roles of opponents, reporters or reviewers once. This type of competition calls for a degree of creativity, commitment, communication skills hardly to be found in similar competitions. In the debates which are conducted in an exciting and passionate atmosphere the teams meet each other with a notable degree of openness and fairness. Up to now German students have taken part in this competition three times. Once a German team were the overall winners, and once they were runners-up. Germany will play host to the 11th tournament of young physicists. Students interested in physics are invited to particate in this tournament which is sponsored by German Physcal Society (Deutsche Physikalische Gesellschaft).

Here are some tasks which had to be solved at the 10th tournament of physics.

Blue Blood
Human blood is known to be red, but the veins appear to be blue. Explain this phenomenon and illustrate it by a model.

Water Jet
A water jet streaming vertically downwards from a tube is divided into drops at some distance frome the tube. Choose the conditions under which the length of the unseparated jet is largest. What maximum length did you obtain?

Floatation A piece of chocolate, which is dropped into a glass of soda water, periodically sinks and goes back to the surface. Investigate the dependence of the period of these oscillations on various parameters.

Candle Generator
Construct a device for charging an electric capacitor ($1000\E{\mu F}$/100\,V) using the energy of a candle which burns for a period of one minute.

Tea Cup
If one fills a cup with hot tea (60\,C\G - 80\,\G), a thin layer of steam emerges above the surface. One can see that some parts of the steam layer disappear suddenly and reappear after a few seconds. Investigate and explain this phenomenon.

Rain
On a long-time exposure photograph of night rain taken in the light of a projector, the tracks of drops appear interrupted. Explain this phenomenon.

Наименование	Цена, $	КОЛИЧЕСТВО, ШТ. Вс	В.	Л.	И.	Зк	ДЕНЬГИ ИДУТ Вс	1	2	3	ВСЕГО НА СКЛ. Вс	В.	Л.	И.	ВЫПИСАНО Вс	1	2	3
Э/п ЕВ 717.33 2т 1996г.	9800.0	5	2	2	1						5	2	2	1	2		2	
Э/п ЕВ735.33.10 3,2т 1992г.	10700.0	1		1							1		1					
Э/п ЕВ735.33.11 3,2т 1995г.	13300.0	2	1	1							2	1	1					
ДИЗЕЛЬНЫЕ ПОГРУЗЧИКИ																		
Д/пДВ1621.28.11 1,2т 1995г.	12600.0	3	1	2							3	1	2		1		1	
Д/п ДВ1621.33 1,2т 1996г.	12600.0	0				1												
Д/п ДВ1621.33.10 1,2т 95г.	12500.0	1	1								1	1						
Д/п ДВ1661.28 1,6т 1996г.	13600.0	0				2												
Д/п ДВ 1661.33 1,6т 1996г.	13200.0	1		1		4	1	1			1		1		4			④ ✓
Д/п ДВ1784.28 2т. 1996г.	13600.0	0				~~1~~					1		1		1		~~1~~	
Д/п ДВ1784.33.20 2т. 1996г.	13500.0	0				1												
Д/п ДВ1788.33.20 3т. 1995г.	13800.0	2		2							4		4		2			2
Д/п ДВ1788.33 3т 1996г.	13950.0	2		2		4					2		2					
Бета.33 3т. 1995г.	15500.0	-1													1	①		
Д/п ДВ1792.33.20 3,5т 1995г	13850.0	6		6							6		6		1			1
Д/п ДВ1792.33.20 3,5т 96г.	14200.0	3		3		2					3		3					
Д/п ДВ1792.45.20 3,5т 96г.	14200.0	1		1							1		1					
Д/п ДВ1792.33 с мин.дв. 95г	13600.0	1		1							1		1					
Д/п ДВ1794.33 4т 1996г.	14900.0	1		1							1		1					

1661.33-1
1784-1
1786-1
717-1

Док-

Team Captain Hendrik Hoeth and his team demonstrating the test box.

The scientific projects appeal to a variety of different talents: Students with a theoretical drift as well as students who enjoy conducting experiments, students who have a general knowledge and students who are specialists in their fields. Often the participants do not come up with a solution but with an alternative which corresponds to their academic standard and their possibilities.

They select theoretical models, plan and conduct experiments, form algorhythms that lead to the solution, find and explain approximate solutions and simplifications.

At each stage of the tournament there is a clear analogy between the present activities and later creative, scientific or technical investigative work:

Intensive library research, interviews with experts from colleges, universities and industry, scientific debates as conducted in seminars. Research departments are looking for this kind of "problem solvers".

The former president of German Physical Society , Prof. Herwig Schopper, attended the whole tournament as a critical observer and as a member of the jury. In his talk to the assmembly he emphasized the outstanding importance of the tournament of young physicists:

To become a successful physicist:

- Become a generalist, not a specialist, be flexible
- Learn methods to approach and solve complex problems
- Adapt to international environment (different mentalities, language)
- Learn and apply the rules of economics and management (cost efficiency, time schedules)
- Become a leader (learn to communicate, present yourself, human interaction, push your case but accept compromises)

He arrived at the notable conclusion:

"Tournament is an excellent enterprise to learn these qualities".

Наименование	Цена, $	КОЛИЧЕСТВО, ШТ. Вс	В.	Л.	И.	Зк	ДЕНЬГИ ИДУТ Вс	1	2	3	ВСЕГО НА СКЛ. Вс	В.	Л.	И.	ВЫПИСАНО Вс	1	2	3
Д/п ДВ1992.33 6,3т 1993г.	29000.0	1		1							1		1					
АККУМУЛЯТОРНЫЕ БАТАРЕИ																		
24 А/Б-Н(тел)2х40В/160а-ч-96г.	1550.0	11	7	4							11	7	4		11	4	6	1
А/Б-Н-Бл. 2х40В/200а-ч-94г.	1700.0	1		1							1		1					
А/Б-Н-Бл. 2х40В/200а-ч-95г.	1700.0	1		1			1	1			1		1		2	1	1	
10 А/Б-Н-Бл. 2х40В/200а-ч-96г.	1750.0	20	20								20	20			7		4	3
Элемент тяг.АБ 200 а-ч	55.0	5		5							5		5					
А/Б-П-Бл. 2х40В/210а-ч-96г.	2100.0	31	4		27		2	2			31	4		27	6	1	1	4
Элемент тяг.АБ 210 а-ч	66.0	5		5							5		5					
2 А/Б-П-И 2х40В/216а-ч-94г.	1600.0	5		5							5		5		1	1		
Элемент тяг.АБ 250 а-ч	90.0	4		4							4		4					
А/Б-Н(пог)2х40В/250а-ч-95г.	1850.0	3	3								3	3						
6 А/Б-Н(пог)2х40В/250а-ч-96г	2000.0	16	6	10							16	6	10					
А/Б-Н(т)2х40В/250а-ч-дек95г	1850.0	11	11				2	2			12	12			3		3	
А/Б-Н(тел)2х40В/250а-ч-96г.	2050.0	26		26							26		26		7	2	3	2
А/Б-П(пог)2х40В/280а-ч-91г.	1000.0	1		1							1		1		1	1		
А/Б-П(пог)2х40В/280а-ч-92г.	1200.0	1		1							1		1		1	1		
А/Б-П(пог)2х40В/280а-ч-94г.	2200.0	1		1							1		1		1	1		
А/Б-П(пог)2х40В/280а-ч-95г.	2500.0	2	1	1							2	1	1					