SJWP Hungary 2013

About the Stockholm Junior Water Prize

The Stockholm Junior Water Prize (SJWP) was established in 1997 and is an annual competition open to young people between the age of 15 and 20, who have conducted water-related projects focusing on local, regional, national or global topics of environmental, scientific, social or technological importance.

The Stockholm Junior Water Prize consists of two parts: the National Competition and the International Final. All participating countries start off arranging their own National Competition. The winner proceeds to the International Final in Stockholm. As a result of the competitions, thousands of young people around the world develop personal interests, undertake academic study, and often pursue careers in the water or environmental fields.

The International Final is held at the World Water Week in Stockholm. It is an event where people from all over the world meet. This generates many opportunities for networking and exposure. The efforts of the participating countries are highlighted globally. The winner receives an award of USD 5,000 and a handmade blue crystal sculpture. But just taking part is what really matters.

The Stockholm Junior Water Prize enjoys Royal Patronage by H.R.H. Crown Princess Victoria of Sweden.

Stockholm International Water Institute administers all the Stockholm Junior Water Prize and awards and serves as its secretariat. See: www.siwi.org/prizes/stockholmjuniorwaterprize/

Hungary and the SJWP

Hungary joined the SJWP in 2013. This was the first year when National Competition was held to select the Hungarian champion representing the country at the International Final. The first SJWP-Hungary competition was organised during the UN International Year of Water Cooperation thanks to the sponsors and other partners supporting the idea. The patron of the competition was Péter Kovács state secretary for water, Ministry of Rural Development.

The national organiser of the SJWP is GWP Hungary Foundation in agreement with the Stockholm International Water Institute. Details of the competition are available at www.ifivizdij.hu.

CONTENTS

You are what you drink

Bettina Biró, Lívia Kovács and Hajnalka Zámbó

Eötvös József Grammar School, Tata

In the centre of our project, the water consuming habit of Tata's inhabitants and the examination of the town's drinking water stand. We frequently experience in our surroundings that teenagers and adult people as well mostly drink soft drinks and juices. Many of them drink mineral water too but almost none of them drink tap water. According to our hypothesis, people living in Tata do not consume enough liquid and especially not enough drinking water.

We made a questionnaire to explore the habits of the consumers. The questions are in thematic order. First we focused on the customs concerning liquid consumption. There were questions about the consumption of different types of liquid and about the drinking of mineral water as well. Finally questions in connection with tap water consumption and domestic water cleaning followed.

The other examination of our work refers to the quality of water. Therefore we tested tap water with the help of an independent laboratory. We compared the results that referred to tap water with those of mineral water. We collected data about the quality of the "Tatabánya XIV/A" well, which provides the tap water in Tata. We collected the data into a table and finally concluded that the quality of the tap water in Tata is excellent. This is confirmed by the fact that it was classified as mineral water in 2009.

We think that our task in the future is to disseminate this information on the basis of our results of the questionnaire and the chemical analysis. We worked out a plan to campaign for the consumption of tap water in our school and in the primary schools of Tata in the form of presentations. We believe that the changing of the people's view would result in a healthier and a more economical and environmentally friendly life style for them.

Thermal water in Hungary and its utilization

András Melles

Eötvös József Grammar School, Budapest

It is a well known fact that Hungary is one of the countries of favourable geothermal conditions; however there are a lot of erroneous ideas in this context. The possibilities originating from the geothermal conditions of the country are very often overestimated by the public and the professionals as well. It is not taken into consideration that the use of geothermal energy is not equal to the exploitation of thermal water. When discussing the geothermal potential of the country the environmental constraints of thermal water exploitation are not mentioned in the majority of cases. With a view to the quantitative protection of ground waters, overexploitation of thermal waters can reduce the amount of the water resources as constituents of a uniform hydraulic system to the extent which results in undesirable processes. Simultaneously the used thermal waters of high temperature and organic matter content conducted upon the ground surface into rivers or lakes increase the heat and pollution load of surface waters and that of the geological formations. They endanger the utilisability of the recipient; furthermore they damage the natural ecosystem through increasing the pollution and temperature of the recipient. These environmental constraints, the significance of which has been highlighted by the adverse trends of the past decades, do not mean that the utilisation of geothermal energy has no further perspectives. The quantitative limits of the production of thermal waters are determined by the affordable decrease of pressures and water levels caused by the production in the geothermal reservoirs, from the aquifers of drinking water supply and from the shallow groundwater reservoirs. On the other hand, qualitative limits are indicated by the impacts of disposal of used thermal waters on the elements of the environment [geological formations (soil), surface and ground waters] and by the affordable loads connected to limit values. Taking all the above into consideration the best solution seems to be the reinjection of the thermal water used in closed loops into the geothermal aquifers if it is demonstrated that the water is not polluted. However, this is possible only in the case of energetic utilisation. Therefore the utilisation of geothermal energy based on thermal water abstractions can develop in the future only after solving the technological problems of reinjection and if as a result there is no obstacle in the way of its everyday application. In this case the environmental problems are not significant and only the management of geothermal energy is concerned. Another precondition of the development of the utilisation of geothermal energy combined with reinjection is economy, since such projects are costly. Covering the costs in a realistic time interval is an economic precondition even if the state makes these preconditions easier upon environmental considerations. The purpose of this work is to give a realistic picture on the possibilities and obligations.

An examination of the therapeutic effect of the medicinal thermal waters at Berekfürdő, and its energy conscious utilization in a health hotel, as a presentation of the many uses of thermal waters

Bence Cs. Szabó* and Emese Huszár**

* *Great Cumanian Reformed Secondary School, Karcag*
** *Bethlen Gábor Reformed Secondary School, Hódmezővásárhely*

Hungary possesses the fifth greatest wealth of medicinal thermal waters in the world. Our nation only partially utilizes the possibilities that lie in thermal waters. Between 2010 and 2012 we followed the process of a thermal well as it was drilled, and yielded mineral water and later its medicinal utilisation. Since the hot water of the deep aquifers contains large quantities of dissolved methane gas, we possess a grand opportunity to exploit it for energetic purposes. Our paper discusses the many uses of medicinal thermal springs through personal experience, for example its uses in balneotherapy, and in energetics through the drilling of a well for a thermal spa.

In the first section we discussed the environmentally friendly usage of the heat of the water and the dissolved methane gas. Our well brings water of 46°C to the surface, with which the heating of the hotel can be ensured using a heat exchanger. This is possible because only water between 33–38°C can be used for therapeutic purposes. The first task is to clean the water coming from a 650 m depth from its dissolved gases. 1 m^3 of thermal water contains 0.755m^3 of dissolved methane gas. We burn most of the gas in a 30kW gas engine, with which we can produce 720 kWh of electrical energy, and 1440 kWh of heat energy daily. This is sufficient for the entire energy and gas demand of the 2500m^2 hotel. It is possible to use the separated methane as fuel (CNG), which is more environmentally friendly and cost efficient than gasoline.

In the second section of our paper we discuss the therapeutic value of our thermal water according to a protocol certified by The University of Szeged. The water of Berekfürdő contains bromine, iodine and sodium bicarbonate. This type of water is most suitable for treating musculoskeletal diseases. The patients participating in our study suffered from large joint arthrosis and lumbal spondylosis, verified by x-ray in each case. Through the study 80 patients participated in bath therapy for 15 times in water of 35°C. The physical condition of the patients was recorded directly before and three months after the treatment. On the bases of these results the water was classified as medicinal thermal water in 2012.

At the end of our paper we discuss the further uses of the hot water as it leaves the pools. From the hotel the water flows into two cooling ponds, in which we placed 100 Nile Tilapias because of the high algae growth and warm temperatures, The diet of this fish is mainly green algae. In the future we are planning to breed some African catfish in the other cooling pond, and to use the remaining heat of the water to warm up a greenhouse in order to produce fresh vegetables for the hotel kitchen. We thought it constructive to present the opportunity hidden within thermal waters, for it does not only affect Berekfürdő, but the whole country and others with thermal waters as well.

TWEC Thermal Water Energy Conversion

Máté Bodor and Roland Marton

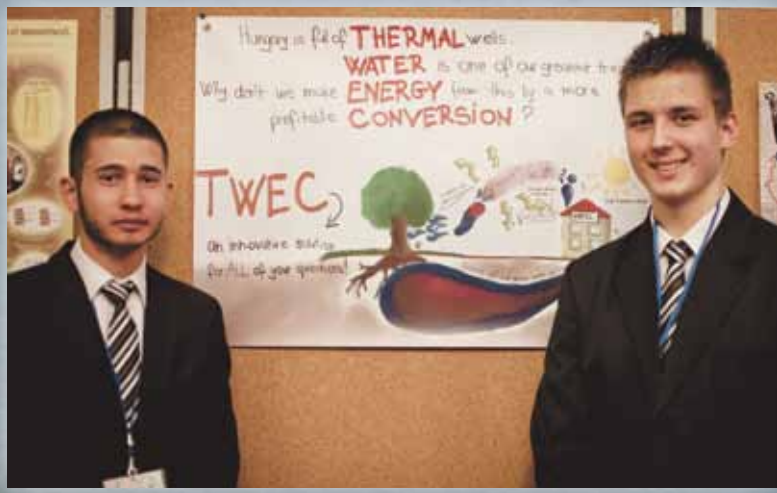
Péter András Grammar School, Szeghalom

Renewable energy utilization faces some significant problems nowadays such as the reinjection of thermal water. Discharging this water on the surface can cause serious problems if we do not handle it carefully. Water contains a big amount of salt and because of this the salination of soil is a possible result. We created a system which can prevent it and at the same time more energy is produced. The idea can be a great help for more economical usage of our waters in the ground.

In Hungary the usage of thermal water has got a great future due to its huge amount stored under the surface. But it faces some serious problems too such as the reinjection of water, which is a really expensive procedure under the present circumstances. We tried to find a more economical solution for this issue. After reading about this problem and discussing it with other people we found the system called OTEC (Ocean Thermal Water Conversion), which is based on the interaction of ocean water and sun. In our opinion it was a really promising starting point and with some changes we could create our own system for taking the salt and other pollutants out of the used water.

Basically distillation happens to the water and the rising steam produces energy through a turbine. Then we can use the warm steam for heating tap water and at the end of the chain we can discharge the water to nature and use it for irrigation, for example.

Our idea is just the starting point of the existing system. We consulted experts on this topic and our conclusion is that this idea is viable under Hungarian circumstances and it can mean the most advantageous solution for the most relevant problem of thermal water usage until a perfect method of reinjection is created.



Vulnerable Wonders of the Bükk Karst Water System

Eszter Kozár, Balázs Petrovich and Adrienn Tóth

Herman Ottó High School, Miskolc

Besides the fact that the Bükk Mountains are one of Hungary's most versatile areas with their several natural, geological, hydrogeological and cultural curiosities at its national park, the karst water system of this mountain plays an extremely important role in providing water for more than 180,000 residents living around.

Unfortunately some seriously threatening events in the past like floods and drinking water pollutions resulting in illnesses reminded us of how vulnerable these karst water sources are. For the better understanding of the main problem the explanation of the geological background is provided. As the Bükk Mountains consist of several types of rocks, which make this area capable of the formation of great karst systems, the examination of the reasons of their appearance is relevant. The structural changes that characterized the various geological time periods are all in unquestionable connection with today's image of the Bükk with its three big divisional units (Northern, Median, Southern) and hydrogeological characteristics. We can find so many springs, thermal springs, sinkholes, ponors, ponor lines, caves and caverns in the Bükk Mountains, owing to its petrology and geology, that, for example, underground cave systems are still under research due to their high complexity rate. In contrast, lakes and streams are relatively rare due to similar scientific reasons.

The amount of water stored in these karst systems shows enormous dependence on the amount of precipitation fallen and the intensity of the rainfall is also an important factor. Our main aim was to investigate whether the more and more extreme weather conditions in the Carpathian Basin, possibly caused by the climate change and the global warming, have any effects on the water supplies of the karst system, considering the fact that these water systems are surprisingly sensitive for any quantitative and qualitative alterations. The data series provided by the great number of modern karst water quality and quantity monitoring devices led us to the conclusion that these changes do not seem to be negligible when planning the future water supply strategies based on the karst water system.

The importance of the Szinva-stream Biological and Chemical-Physical Examinations

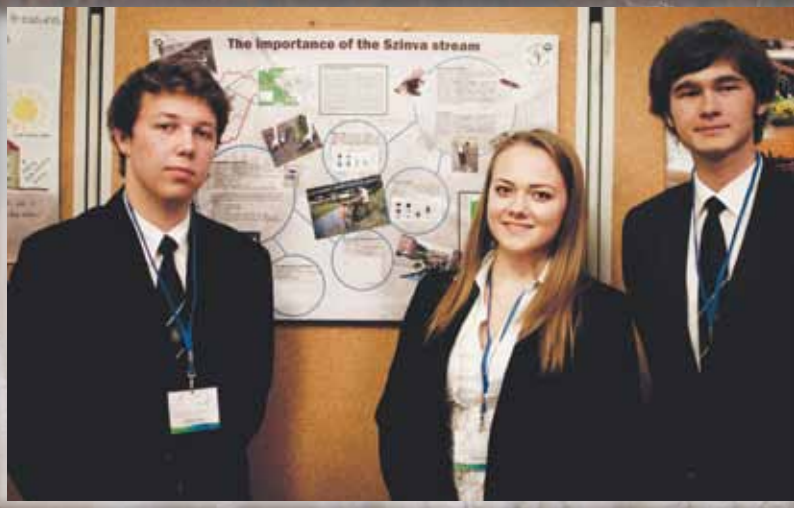
Dézi Kakas, János Béri and Péter Polák

Fényi Gyula Jesuit Secondary Grammar School, Miskolc

In our project we examined the chemical, physical and biological quality of the local stream, the Szinva, which flows through our town and provides drinking water for our area. In the frames of the biology workshop of our school we used a MultiLine 3430 (WTW) device, with which we were able to measure the temperature, the pH-rate and the oxygen concentration of the water. We also used a VISOCOLOR ECO PF-12 photometric environmental case (MN). With its help we could analyse our samples and measure the concentration of ammonite-, nitrite-, nitrate- and phosphate-ions. From the physical aspect we measured electric conductivity, the saturation of oxygen and the concentration of oxygen in water. We started to measure the Szinva in 2010, but in this project we used the results of 2012. The biological part of the work was the so-called biomonitoring examination. We drew conclusions about the quality of the water by using indicator genera, which shows us given changes in the environment. We observed the macroscopic invertebrates, the well visible animals that hang on to different materials during winter. We examined them in two different periods of the year, starting from May and then from October.

With regard to the sudden lack of rainfalls since 2010 and the lowering of the runoff as a consequence, we obtained the following results:

- the upper-Szinva's water is still of excellent quality and is almost unspoilt
- the two main joining tributaries carry a lot of organic and inorganic pollutions which considerably degrade the quality of the stream



- this pollution is likely to be the production of man coming from sewage, detergents and garbage
- the self-purification of the Szinva is not as good as it was earlier due to the low runoff since the results on the lower parts are still bad
- with the help of the local people and the local government we have to deal with this situation to preserve one of Miskolc's most valuable resources.

The national final

In 2013 students submitted nine entries in English to the competition from different parts of the country focusing on surface and drinking water, thermal water use, water in karst areas with local and global perspectives.

The jury selected six entries for the national final held on 1 June at the Museum of Hungarian Agriculture in Vajdahunyad Castle in Budapest. Finalists had to prepare A1 posters displaying results of their projects..

Finalists of the SJWP Hungary 2013 competition

The jury selected three teams based on their projects and presentations using the same criteria as for the international final in Stockholm. All finalists received diplomas and recognition on stage.

The winner is a team of three students of the Fényi Gyula Jesuit Secondary Grammar School in Miskolc: Dézi Kakas, János Béri and Péter Polák Jr. Their project – led by their teacher Péter Polák Sr. – "The Importance of the Szinva Stream: Biological and Chemical-Physical Examinations", presented results of a local project started in 2010. The students investigated the water-quality of the Szinva Stream of Miskolc City in north-eastern Hungary, which is a drinking-water source and supplies water to local industry.

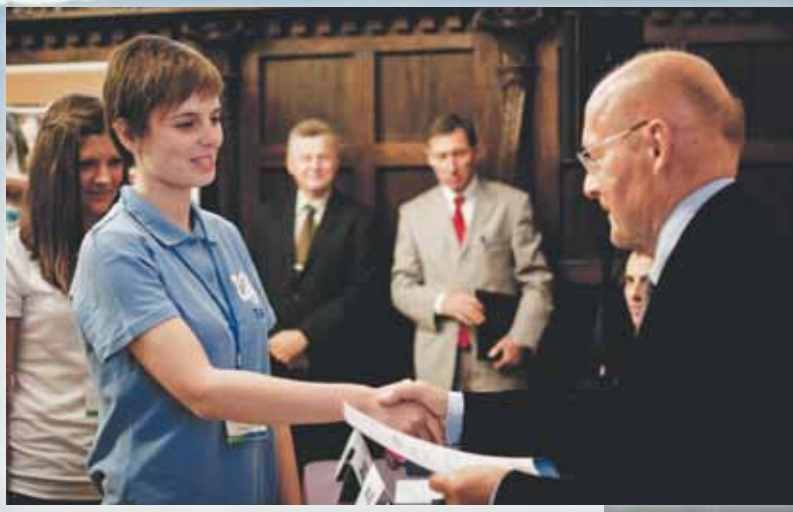
Observations of the students provided reliable information on the status of the water. In addition, they suggested that the local authorities should take some measures in order to improve the water quality of the Szinva. Péter Kovács State Secretary for Water and the Patron of the Hungarian SJWP competition handed over the first prize to the winners.

The "You are what you drink" project by Bettina Bíró, Lívia Kovács and Hajnalka Zámbó of Eötvös József Grammar School (their teacher is Zsuzsanna Lukácsné Zubor) in Tata a town in north-western Hungary became the second. The authors made a review of tap water sources in the town of Tata. Their methodology comprised a questionnaire evaluation focusing on social and partly economic issues related to water consumption.

The project resulted in a solid and transparent graphical description and proposed healthier, more environmentally friendly and more efficient use of water. In addition, the students received a special grant of HUF 1 million (app. 3 350 EUR) to support the follow up of their interesting and useful project.

The third place was attained by Bence Cs. Szabó and Emese Huszár of Karcag (their teacher is Dr. Zsolt Cs. Szabó), a town in central Hungary. Their project "An examination of the therapeutic effect of the medicinal thermal waters at Berekfürdő and its energy conscious utilization in a wellness hotel" presented various ways of thermal water use.

The members of the first three teams were awarded a six month subscription to National Geographic and invitations to visit the facilities of the Budapest Water Works and Coca-Cola HBC Hungary. All finalists were invited to the Budapest Zoo as well.



The chair of the jury congratulates the second team

The jury of the SJWP – Hungary 2013

CHAIR:

László Somlyódy member of the Hungarian Academy of Sciences

MEMBERS:

Edit Nagy Secretary General at the Hungarian Water Utility Association
Marcell Marschall R&D leader of GE Power & Water /Water & Process Technologies
Judit Rákosi Senior consultant of ÖKO Plc.
Tamás Krámer Associate Professor at BME
Adrienne Clement Associate Professor at BME
Judit Jakab PR coordinator of Coca-Cola HBC Hungary
Csaba Haranghy Director General of the Budapest Water Works
Károly Kovács President of the Hungarian Wastewater Association

SECRETARY:

József Gayer Chair of GWP Hungarian Foundation

Péter Kovács, State Secretary for Water handing over the first prize

The international final

The international final of the SJWP was held during the World Water Week in Stockholm.

This year the winners of national competitions from 29 countries were competing for the SJWP:

Argentina, Australia, Belarus, Belgium, Canada, Chile, China, Cyprus, Finland, France, Germany, Hungary, Israel, Japan, Latvia, Mexico, The Netherlands, Norway, the Republic of Korea, the Russian Federation, Singapore, South Africa, Sri Lanka, Sweden, Thailand, Turkey, Ukraine, the United Kingdom and the United States.

Hungary was represented by the three member team of János Béri, Dézi Kakas and Péter Polák Jnr of the Fényi Gyula Jesuit Grammar School of Miskolc, the winners of the national competition.

The jury included experts within the field of water, who appointed the winner of the international final by committee consensus. The decision was based on the finalists' written report, a short presentation of their display material and a round of interviews.

Contestants and organisers with H.R.H. Crown Princess Victoria of Sweden

The students Naomi Estay and Omayra Toro from Chile received the 2013 Stockholm Junior Water Prize for their work on how living organisms can help clean oil spills at extremely low temperatures. H.R.H. Crown Princess Victoria of Sweden presented the prize at the award ceremony of the World Water Week on 4 September. The winners also received an award of USD 5,000 and a sculpture of blue crystal.

The Chilean team travelled to the Antarctica and managed to identify a whole dozen of bacterial strains with the potential to clean up oil spills by metabolising it at extremely low temperatures.

A Diploma of Excellence and USD 500 was awarded to Yeari Vigder and Noam Arye Nassi from Israel, for a project that proposes a cheap and easy way to use remote sensing systems for farmers in developing countries.

Poster preparation is fun

The winners Naomi Estay and Omayra Toro from Chile with H.R.H. Crown Princess Victoria

The jury interviewing the Hungarian team

Diploma of Excellence was awarded to the team of Israel

H.R.H. Crown Princess Victoria is greeting the students

Entering the stage

Finalists on stage during the award ceremony

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