

Antal Joó dr. – Gábor Joó:

Possibility and Situation of Velomobile Riding in Hungary

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Who is Who?

Antal Joó dr. (1957.) is a chemical engineer – economist. At present, he is the director of finances and investments at a chemical company. Bicycles, cycling, amateur bike building are his hobbies. For several years now, just for pleasure, he has been carrying out experiments, developing and using two- and three-wheeled recumbent bikes equipped with electric actuation. In 2008, his 20-year dream came true when he could take into daily use the first velomobile by which he has covered 4000 km-s up to now. During the Széchenyi Race¹, which is a race of alternatively driven vehicles, in the hobby category he took 1st and 2nd position with the ANTIBRINGA H2 and ANTIBRINGA V vehicles in 2008 and 2009.



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Gábor Joó (1986.) is an undergraduate in economics. He rather uses than builds bikes. If needed, he assists in building bikes and provides logistic support in case not every test is successful. He is a member of the ANTIBRINGA team and a winning competitor in the Széchenyi Race in the year 2009. He considerably contributed to the compilation and preparation of the presentation.



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1. Introduction

Originally I had in mind to write a presentation on the properties of the optimal velomobiles. However, the organisers motivated me to deliver a lecture on the situation and possibilities of velomobile riding in Hungary instead. I express my thanks for it. However, it should be mentioned, as you will soon be convinced of that, velomobile riding is still at an early stage in Hungary.

That is the reason why so much is said of cycling. Velomobile riding has little chances till the cycling in Hungary reaches a critical mass. I think the highly developed condition of the bike transportation is closely connected with the

¹ <http://szechenyifutam.hu>, 2009-06-14

velomobile use. It is no mere chance that most velomobiles are manufactured and used in the Netherlands. It is the country where there are most bikes per capita and the proportion of cycling is the largest in the transportation.

In this presentation, you will find several critical remarks on the situation in Hungary. I would like to underline that the criticism is for the sake of cycling and not against something or some people. I am optimistic that cycling and velomobile riding will some day be so considerable in the transportation of Hungary as is now the case in Denmark, Netherlands or Germany. The changes in the world will force us to do so if our discretion and wisdom should prove to be insufficient.

2. The First Hungarian Velomobile

When having a quick look in the materials of the previous conference, I saw that most of the presenters had already been using velomobiles when I, about 20 years ago, saw the rough sketches of a recumbent and velomobile in a book on bicycles. It was love at first sight, and I hoped that some day I would get into some of them or maybe I would possess such a machine. Well, about three years ago, I took possession of my first home-made recumbent (ANTIBRINGA K serial), then a factory-made AZUB-5 and afterwards there followed a new home-made trike (ANTIBRINGA H serial). However, the top is the velomobile which I have been using since August 2008. This is not only my first velomobile but this is also the first factory-made velomobile in Hungary. After the joyful three weeks' assembling (BION X, disc brake, forced ventilation, windscreen etc.) I took the machine into everyday use. Since then, rain or shine, I have been going to work by it. Up to now, there have not been such extreme weather conditions which could have prevented me from using it.



1st picture ANTIBRINGA K7



2nd picture AZUB 5



3rd picture ANTIBRINGA H2



4th picture ANTIBRINGA V

Source: www.antibringa.hu ; www.szechenyifutam.hu Photo: Földi D. Attila

3. Nothing or the Lion's Share

Many of you may know the story when a shoe factory sends two market researchers to Afrika. In the market research study it reads: According to the pessimist: „everybody goes barefoot, therefore not even a pair of shoes can be sold”. According to the optimist: „everybody is barefooted, therefore lots of shoes can be sold here”.

In Hungary, the situation of velomobile riding is just the same. To the best of my knowledge, in Hungary, the territory of which has 93.000 square kilometres and there are 10 million inhabitants, there can be found altogether two velomobiles (a home-made one² and a factory-made one³). The imaginary pessimist sales clerk would write in his report that in Hungary everybody goes by car so not a single velomobile can be sold. I may as well finish my presentation at this point, but I am an optimist so I am continuing it. It can be clearly seen that even if the number of velomobiles is increased only by one, then it is a fifty percent growth. What dynamics! ☺

² http://ambringa.hu/kepek/galleries/Velomobil3_020_.JPG , 2009-06-14

³ <http://www.antibringa.hu/?aerorider-leiba,25> , 2009-06-14



5th picture VELOMOBILES of HUNGARY

Source: Google map, www.ambringa.hu, www.antibringa.hu, KSH

4. Consciously and yet by Chance

I spent much time to select the best and ideal velomobile. For several months I corresponded with manufacturers. I had strict demands, from the size of the rear-wheel through to the springing to the colour and other parameters. At last I made my choice, ordered, paid a sum in advance and impatiently waited for the D-day. In the meantime, the type and delivery date were changed. Roughly about ten days before the deadline it turned out that the machine had not been manufactured with the ordered parameters. After some hesitation I cancelled the order but I took it very much to my heart. A year passed and I was forced to start from the beginning again. I said to myself: now I pick up the phone and make calls to manufacturers till I find someone who tells me that he has a velomobile to be sold and it can be promptly delivered. It was perhaps my third call when I spoke to a manufacturer who was willing to sell a test machine. We agreed. Within a week, the first factory-made velomobile was already travelling on the hood of my car to Hungary. The date was August 7, 2008. It is a most memorable day for me. I was consciously preparing for it, however, it was by blind chance that decided the velomobile type.

5. Velomobiles in the World

While purchasing my own velomobile, I made a lot of acquaintances. On my homepage, I was keeping informed those interested in Hungary about the recumbent bikes and velomobiles. I was deeply involved in the question what is the ideal velomobile like. I was curious to know how many types of velomobiles there are and how many people use velomobiles in the world. I was reading the homepages of manufacturers, where I could collect information about the abundance of the types as well as their technical data. However, I could hardly find any data about the number of velomobiles. While I was already collecting material for this presentation, I hit upon the idea of asking the manufacturers. Nothing ventured, nothing gained. On the Internet I was searching for all velomobile manufacturers (I succeeded in this up to perhaps 90 percent), and international organizations for bicycles, who could provide me with data. I turned to them in e-mails and I have met some of them.

It was a great pleasure to me that almost everybody responded to me. There were several people who gave me estimated data, but in any case, they were very helpful in sharing their data with me, without any limitation to publish. I sent out 49 questionnaires, and I received back 45 with any kind of feedback. The contents and quality of the replies were ranging from „unfortunately I have no time” through to the detailed and substantial information. I am happy to tell you that the latter ones were in decisive majority.

I am greatly indebted to the following persons, by the help of the information, advice and homepages of whom I could prepare this chapter: *Andreas Fuchs, Andreas Pooch, Bart de Wert, Bob Stuart, Brian Sauer, Brecht Vandeputte, Carl Georg Rasmussen, Craig Johnsen, Christian Wagner, David M. Eggleston, Dana Lieberman, Dietrich Lohmeyer, Elmar Maier, Gavin Keats, German Eslava, Jack Dekker, Harry Lieben, Johan Vrielink, John Olson, Jürg Birkenstock, Mary Arneson, Marcus von der Wehl, Matthias Erz, Michael Beyss, Mick Sims, Neil Sellwood, Peter Eland, Peter Zoomers, Ray Mickevicius, Rod Miner, Steve Schleicher, Thomas Breedlove, Thomas Seide, Vasili Gess, Ymte Sijbrandij, Yvan Dutil.*

For any mistake, only the authors of this presentation are to blame. Your corrections and proposals are welcome.

6. Before you Resume Reading...

Before you resume reading this chapter, I request you to answer the questions below and give some estimates, resp. That is requested because in this way you will be in the position to compare your ideas with the estimates of others as well as the facts.

- 1.) How many velomobiles are there in use in the world currently, and how many of them can be found in Europe, in the USA and Australia?
- 2.) How many velomobiles altogether have been manufactured in the world up to now, and how many of them were manufactured in Europe, in the USA and Australia?
- 3.) How many velomobiles were manufactured in the world, in Europe, in the USA and in Australia in the year 2008?

Now, if you have the estimates ready, let us see the estimated data and the facts.

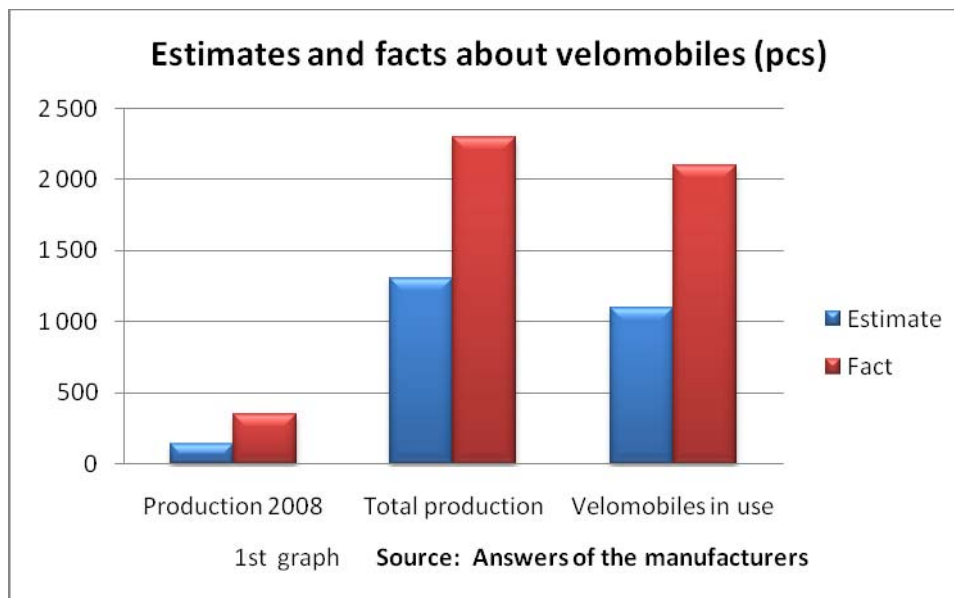
7. Estimates on the Number of Velomobiles

Several people tried to estimate the number of velomobiles. Of them, the data of Mr Peter Eland (Velo Vision) should be emphasized. Among the respondents, he is remarkable for trying to give estimates for nearly all types, and in several cases they are very close to the facts. Let us see now the estimates of the respondents concerning the above mentioned questions:

- 1.) In their opinion, in the world there are now roughly 1000-1200 velomobiles in use. Of them, there are 900-1000 in Europe, 50-100 in the USA and 10 in Australia.
- 2.) They estimate that altogether about 1200-1400 velomobiles have been manufactured in the world up to now. Of these quantities, 1000-1200 are thought to have been manufactured in Europe, 30-100 in the USA and 10-100 in Australia.
- 3.) They estimate the velomobile manufacture of the world was in the range of 120-160 pcs in the year 2008, of which 100-150 were made in Europe, 5-10 in the USA and 2-10 in Australia.

8. Facts on the Number of Velomobiles

Comparing the facts of the manufacturers with the estimates, we can say that even the most optimistic estimates place the number of the currently used velomobiles and the velomobiles manufactured altogether and manufactured last year scarcely at the half.



Let me note however, that there are estimates in some cases among the facts as well because the manufacturers of some types could not be found, or, some people did not give any data or they gave only some details. This is marked in the appendices separately in every case. My estimates are intentionally underestimated. The so-called „other velomobiles” category contains the velomobile manufacturings which are unpublished. However, it is evident that there are several individual attempts in the world. These I estimated from the beginnings (from 1983 on) to be altogether 60,

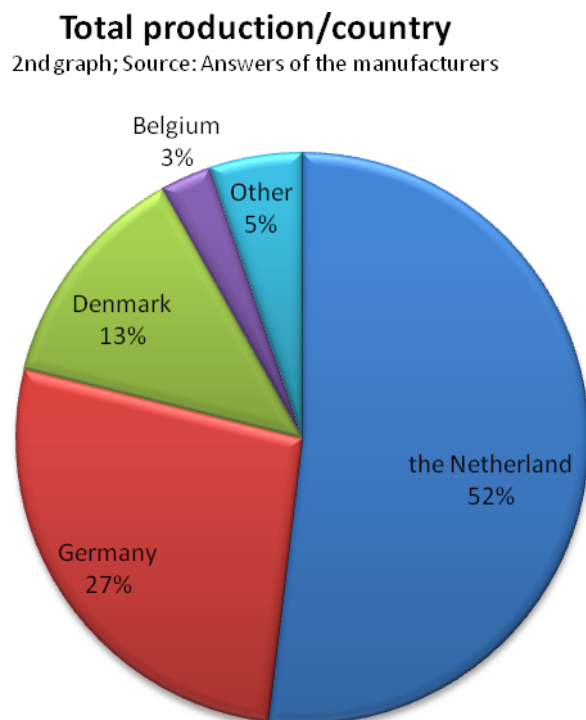
and 19 in the 2008 year's manufacture. To be sure, unique velomobiles were manufactured more than that. For example, one was made in Hungary too. Detailed information were received from European, American and Canadian manufacturers and users. Some data are also available from Australia.

Velomobiles are not manufactured to be on stock therefore we can say what had been manufactured it was put into operation somewhere. That is why there is no significant difference between the data of manufacture, sale and putting into use. Several manufacturers are of the opinion that of the total manufacturings, there can be maximum 200 velomobiles (in the range of 5-10 percent) which are out of use today.

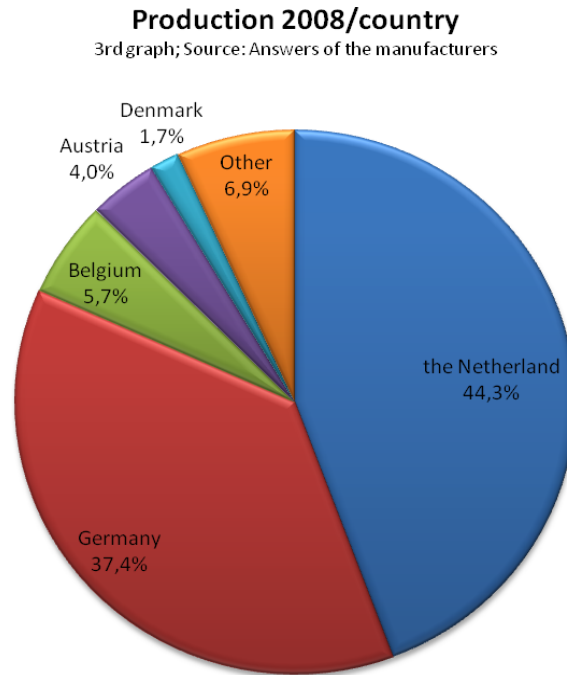
After these preliminary remarks, it can be said that till March 31, 2009 (the closing date of the data collection) the total number of the manufactured velomobiles in the world amounted to 2300, of which 350 were manufactured in 2008.

The number of the velomobiles being in use is by approximately 200 pcs less than that. It means there can be about 2100 pcs in the world. The decisive majority of the indicated quantities are manufactured and used in Europe. The manufacture in the USA, Canada and in Australia does not exceed 30 pcs, on the other hand, the number of the velomobiles used in these countries can be in the range of 90-100 pcs.

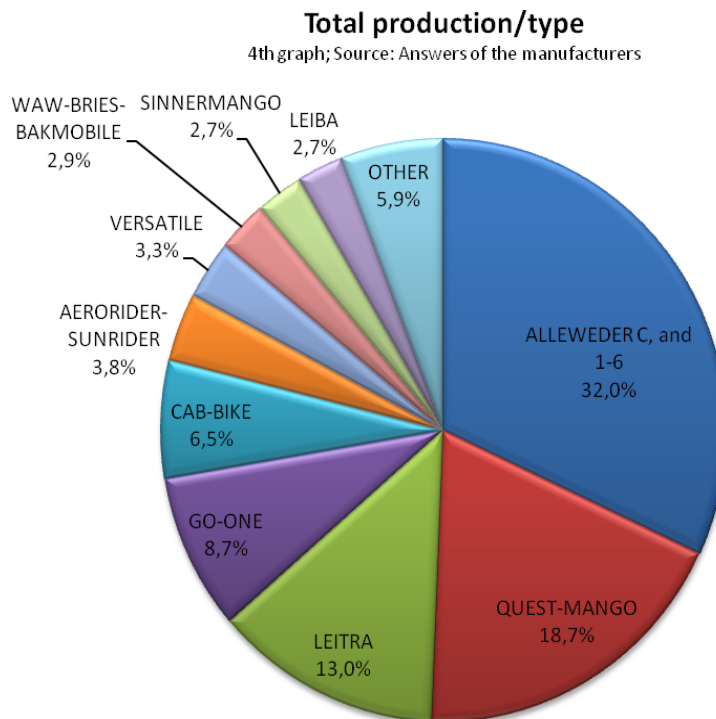
Regarding all manufacturings up to now, the order of the manufacturing countries is as follows:



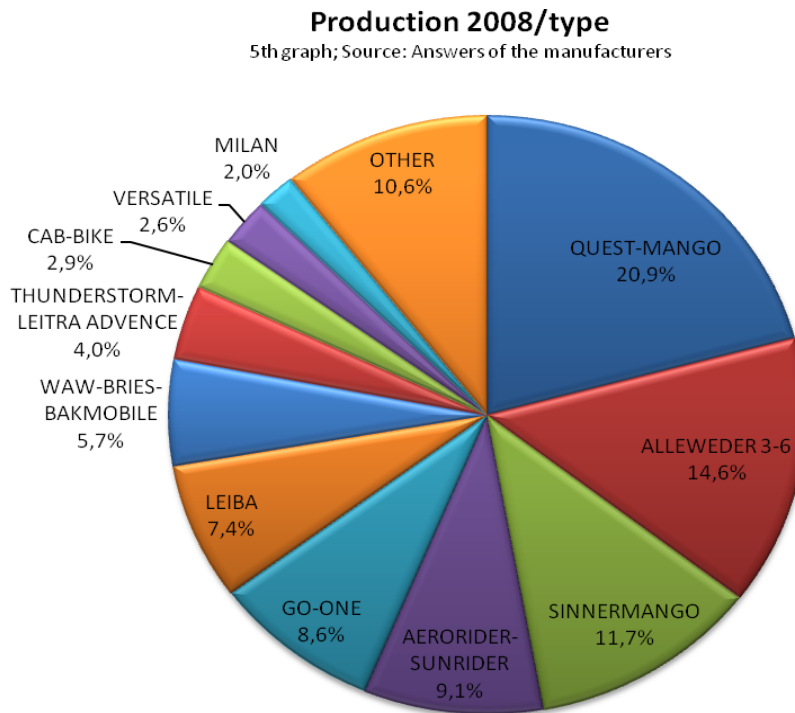
However, if we examine the manufacture in the year 2008, then the proportions will change as follows:



Regarding velomobiles manufactured up to now, the order of the various velomobile types (the same types and manufacturers collected into one group) is the following:



If we examine the manufacture in the year 2008, then the order will be as follows:

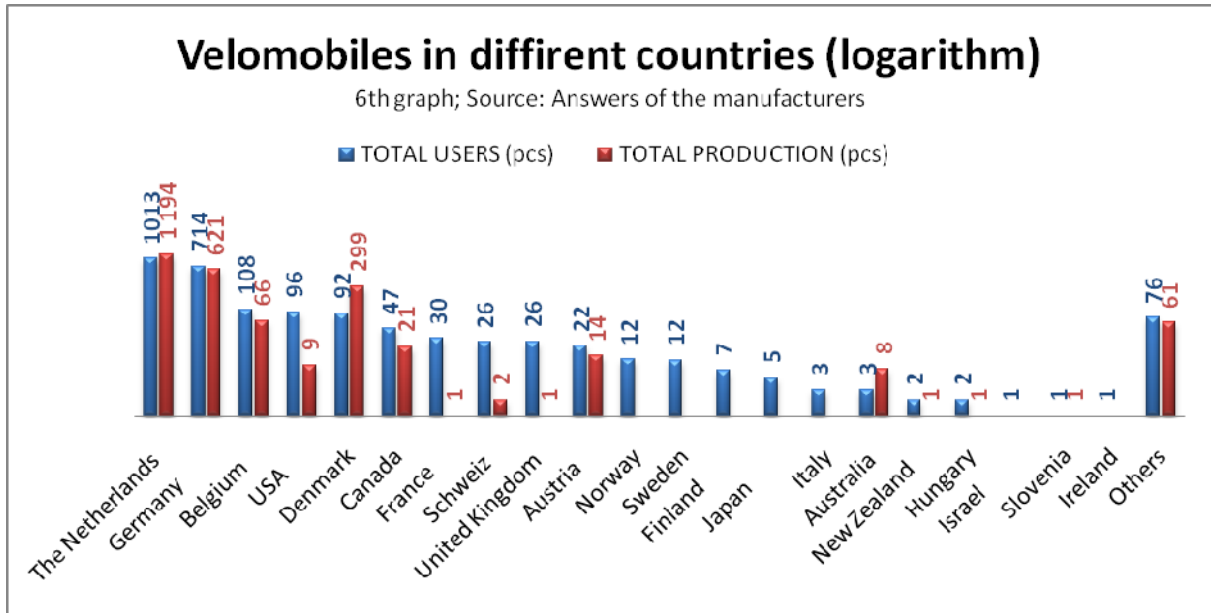


There are no detailed data to demonstrate the annual growth of the manufacture. However, the starting point can be the analysis of Yvan Dutil⁴ prepared in 2006. According to the author, the number of sold velomobiles amounted to 59 in 2000, and to 166 in 2006, which is an annual 16 percent growth. If we accept these figures, it can be seen that between the years 2006 and 2008, the sales (manufactures) increased to more than twofold (350 pcs).

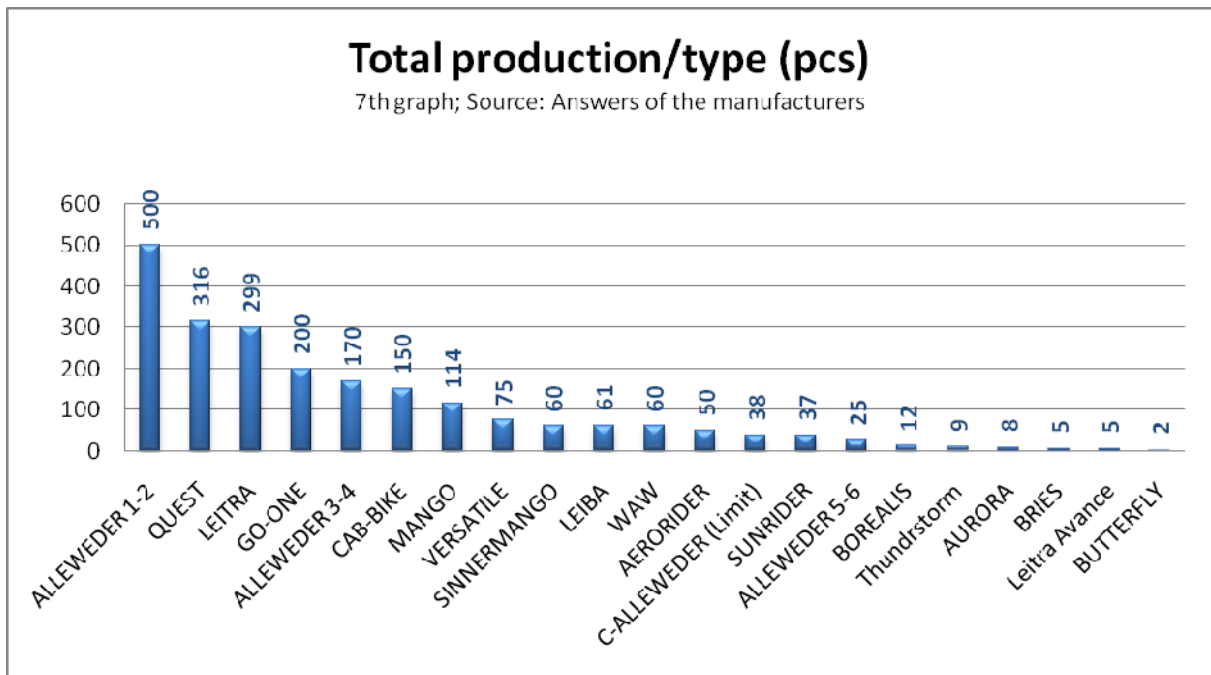
It is interesting to note that, although Alleweder 1-2 type was very successful as KIT (500 pcs were made, and the price was most reasonable), no manufacturer offers such a solution nowadays.

The split-up order of countries using velomobiles is very similar to the order of manufacturing countries. It means that most velomobiles are manufactured and used in the Netherlands and Germany. It can be seen in the following graph that the total manufacture exceeded the total use only in the Netherlands and Denmark. At the same time, in the year 2008, Holland was the sole net velomobile exporting country. Eighty percent of velomobile manufacture and use concentrate in three countries (Holland, Germany and Belgium).

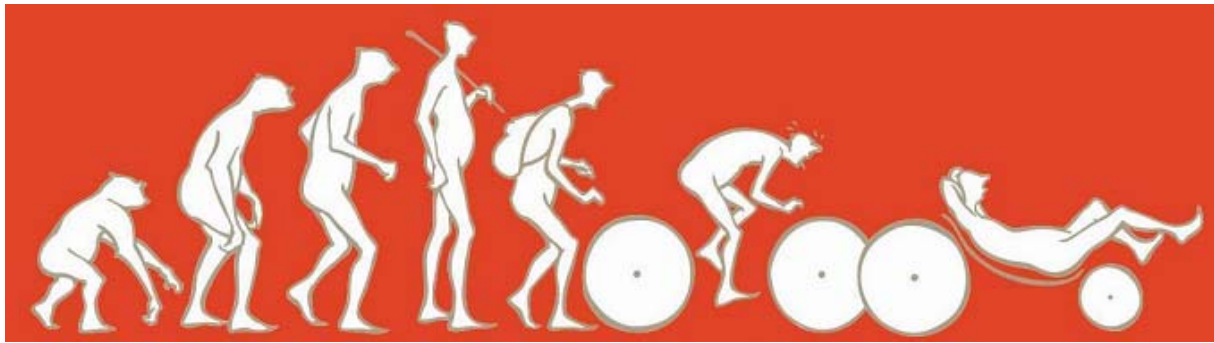
⁴ Yvan Dutil, [2006]: pp. 1



Among the manufactured velomobile types, Alleweder 1-2 is still leading (500 pcs), though it has not been manufactured for ten years. Quest, being in the second place, continues to be very popular (316 pcs). It was from that type that the most was produced in 2008. Regarding the total manufactured quantity, Leitra is in the third place (299 pcs). Manufacture in Denmark is in decline, it is now manufactured in Austria under the tradenames Leitra Avance and Thunderstorm. It is noteworthy that the youngest Leitra owner is 13 years old, while the oldest one is 94 years old. Nine types make out 80 percent of the total velomobile manufactures. Manufactures of Quest, Sinnermango, Alleweder, Leiba and Aerorider-Sunrider are increasing.



9. A Bit of History

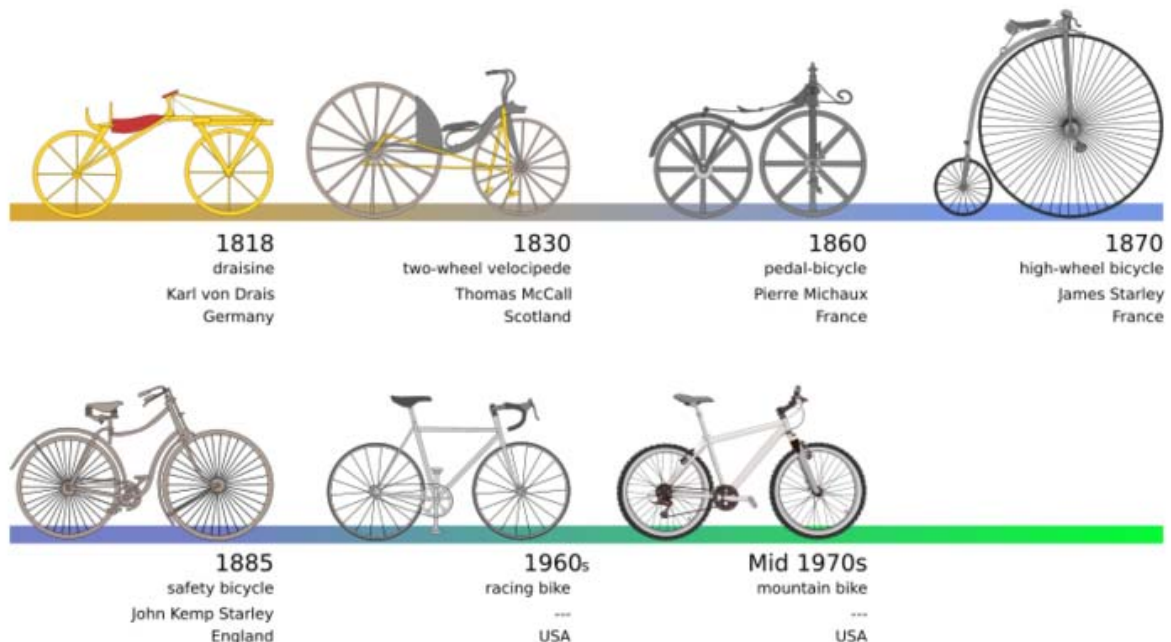


6th picture Bicycle evolution 1.

Source: www.ambringa.hu

According to a study made in 2006, in Holland ⁵ the bicycle went through the following epochs:

1. luxury article (till 1900)
2. from luxury article, an everyday vehicle (1900-1920)
3. the bicycle as a necessary commodity (1920-1950)
4. being a subordinated vehicle, driven in the background (1950-1970)
5. an everyday vehicle (1970-
6. The above epochs can be complemented by the appearance of recumbent bikes and velomobiles. They are missing from the following picture:



7th picture Bicycle evolution 2

Source: http://wapedia.mobi/commons/File:Bicycle_evolution-en.svg

⁵ <http://www.khem.gov.hu/data/cms1168940/kerparoskozlekedes.pdf>, 2009-06-17

The first golden age of velomobiles starts from the 1920', and the second one from the 1980' years. ⁶ Main dates and types, complemented with some man-powered aquatic and air vehicle records:

1924 VELOCAR (Charles and Georges Mochet, France, four-wheeled, in about 15-18 years, more than one thousand pcs were manufactured (according to other sources, 6000 pcs were manufactured)

1930? PILOT MCB 101 (Ulf Cronberg, The Swedish velomobile "Pilot" was sold as drawings and do-it-yourself guide. Not very many were actually built.)

1940 FANTOM, (Hobbex, Sweden, three-wheeled, in 40 years 30 000 pcs were manufactured (according to other sources, 100 000 pcs)⁷

1948 FEND FLITZER (Fritz Fend, Germany, three-wheeled, which later transforms into a vehicle without pedal)

1949 AMPHIBIKE (Reino Karpio & Matti Naranen, an amphibian velomobile, which crossed the open sea between Helsinki and Stockholm)

1979 CYCLODYNE (Alan Carpenter, USA, Colorado, up to 1982, 14 pcs were manufactured)⁸

1979 LEITRA (Carl George Rasmussen, Denmark, three-wheeled, up to now 299 pcs were manufactured, the sale began in 1985)

1980 WINDCHEETAH (Mike Burrows, Great-Britain, a few pieces were made)

1983 SINCLAIR C5 (Sinclair Vehicles Ltd, England, three-wheeled, with pedal and 250 W electric motor)

1983 Velerique (Belgium, it was a fashionable and nice but a dangerous two-wheeled model, and the manufacturer went bankrupt in a few years)

1985 ALLEWEDER (Bart Werhees, Holland, a three-wheeled velomobile, aluminium framework and cover, it was sold as a KIT for assembling between 1993-99, 500 pcs were manufactured)

1988 DECAVITATOR (Prof. Mark Drela, a man-powered boat, it reached a 34,3 km/h average speed record in a 100-meter race)

1989 DESIRA (two-, three- and four-wheeled, there were six kinds of models, the last one was manufactured in 1999)⁹

1991 GO-ONE (Michael Goretzky, Michael and Andreas Beyss, Germany, a streamlined, three-wheeled velomobile with plastic cover, to this day 200 pcs were manufactured)

1993 FIRST VELOMOBIL SEMINAR (Copenhagen)

1995 AEOLOS (two-wheeled, closed velomobile, which covered more than 80 000 kilometres between 1995-2004)

1996 CAB-BIKE (German Eslava - Reinhold Schwemmer, Germany, a three-wheeled velomobile, up to now 150 pcs were manufactured)¹⁰

1997 C-ALLEWEDER (LIMIT) (Gerrit Tempelman, Aller Jacobs, Ymte Sijbrandij, Holland, 3-wheeled, the first one-bodied composite velomobile, between 1997-2002, 40 pcs were manufactured)

1998 DAEDALUS 88 (Kanellos Kannelopoulos, Greece, man-powered aeroplane, which flew across the 130-km distance between Crete and Santorini in 3 hours 54 minutes)

⁶ Carl-George Rasmussen-Jürgen Eick: Survival of the fittest, 5th European Velomobile Seminar, Germersheim, 2004.

⁷ Frederick Van De Walle: The Velomobile as a Vehicle for More Sustainable Transportation

⁸ Ingo Kollibay: Cyclodyne –the forgotten velomobile, 5th European Velomobile Seminar, Germersheim, 2004.

⁹ Stefan Gloger: Desira-Story, 5th European Velomobile Seminar, Germersheim, 2004.

¹⁰ German Eslava-Reinhold Schwemmer: Cab-Bike Velomobile on a based Modular Concept, 5th European Velomobile Seminar, Germersheim, 2004.

2000 QUEST (Ymte Sijbrandij, Holland, 3-wheeled velomobile, glass fibre reinforced plastic cover, from 2005 on with a 26"-wheel in the back, up to now 316 pcs were made)

2002 MANGO (Gerrit Tempelman, Holland, 3-wheeled, 14 pcs were made up to 2007, now it is manufactured under the name SINNERMANGO, of which 62 pcs were manufactured till now)

2002 VARNA DIABLO (Sam Whittingham, Canada, in the Battle Mountain, USA Nevada, the top speed at 200-m flying start was 130,33 km/h)

2002 WHITEHAWK (Lars Teutenberg, in the testing centre of Opel, Germany, Dudenhofen, from standing start the 1-hour average speed top was 82.601 km/h)

2002 WAW (Brecht Vandeputte, Holland, a 3-wheeled velomobile with module system, 60 pcs have been manufactured)

2003 VERSATILE (Johan Vrielink, Holland, 3-wheeled velomobile, computer-aided design, environmentally-friendly, thermoplastic PP was used in the cover, 75 pcs have been manufactured)

2004? AERORIDER (Bart de Wert, Holland, a 3-wheeled velomobile with electric actuation, the windscreen is made of glass, an especially nice design, from 2008 the AERORIDER SPORT type has been manufactured which is a SUNRIDER equipped with electric actuation. Up to now 53 (50+3) pcs were manufactured.

2004? SUNRIDER (Bart de Wert, Holland, a three-wheeled, streamlined velomobile of high demands, up to now 34 pcs were manufactured)

2006 LEIBA (Vasili Gess, Germany, a 3-wheeled velomobile, its types are: Classic, Brise, X-stream, 61 pcs have been manufactured)

2008 VELAYO (Marcus von der Wehl, Germany, a 3-wheeled velomobile, three pcs have been manufactured)

2008 GLYDE (Ian Sims, Australia, a three-wheeled velomobile)

2009 GO-ONE Evolution (Michael and Andreas Beyss, Germany, a 3-wheeled velomobile, in contrast to the previous model, the rear wheel was also put under the cover)

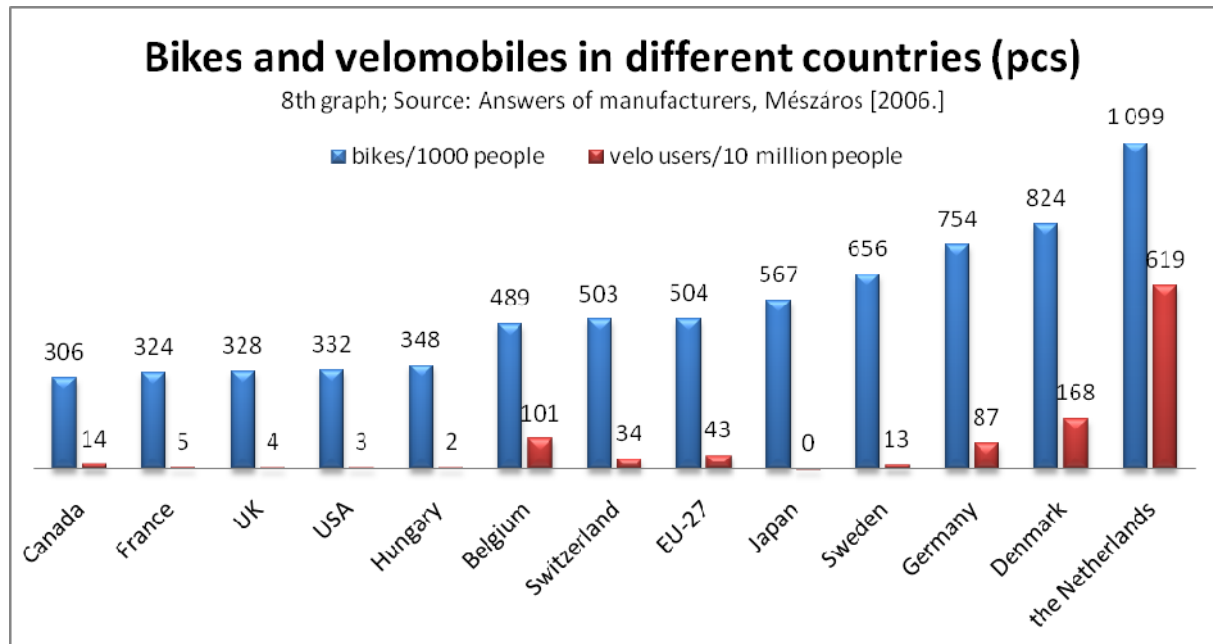
Based on all these, it can be stated that the flourishing velomobile manufacture in the first half of the past century (with its order of several ten thousands) considerably surpassed the hoped-for second golden age which began in the '80-ies of the past century (2300 pcs).

10. How is it Going on in the World?

Generally it can be said that in the developed world, bicycle riding is more and more spreading. On the other hand, unfortunately, in the developing countries opposite tendencies can be observed. To demonstrate this, I compiled some data from various parts of the world.

Approximately 1.6 billion bicycles can be found in the world today. The split is: there are 500 million in China, 250 million in Europe and 150 million in the US. The largest bicycle manufacturers of the world are China and India. In 2005, 80 million of bicycles were manufactured in China, which amounts to about 60 percent of the world production. The share of India was 11 percent.

The number of bicycles per 1000 inhabitants and that of velomobiles per 10 million inhabitants in various countries are demonstrated in the following graph. As far as the first three countries are concerned (Holland, Denmark and Germany), we can say that the number of bicycles correlate with the number of velomobiles.



In Europe, the proportion of those using regularly bicycles for transportation, amounts to 20-25 percent.¹¹

Holland is the country where everybody cycles. There is no other country in the world where there are more bicycles than inhabitants. The population of Holland is 16.5 million, while 18 million of bicycles are registered. On a yearly basis, 1.4 million of new bikes are sold, and, if we presume that they not only buy the bicycles but also use them, in this case they pedal 900 km-s per capita yearly.¹²

In the Western towns of Germany, bike riding rose by 50 percent between 1972 and 1995. This results from the authority measures which also considered public interest. These measures included the building of cycle lane networks and bike tracks, making the traffic more favourable, teaching school-children the traffic rules, frequent inspections by the police so as to prevent thefts, establishing bicycle storing and renting facilities etc. Munster is an outstanding city from this point of view where 32 percent of the roads are covered by bikes in spite of the fact that, on an average, on 238 days of the year it is raining. It is true that as early as 1995, there existed a 252-km long cycle lane network and further 300 km-s public road could be used by bikers. In Germany, the cycle lanes are longer than 40 000 km-s.

In Europe, the proportion of town roads is the smallest in France and Italy (5 percent), and the highest in Holland (30 percent). In the cities of the US, this amounts to only 1 percent.¹³

¹¹ <http://bikemag.hu/kiemelt/varosban-biciklive/>, 2009-06-13

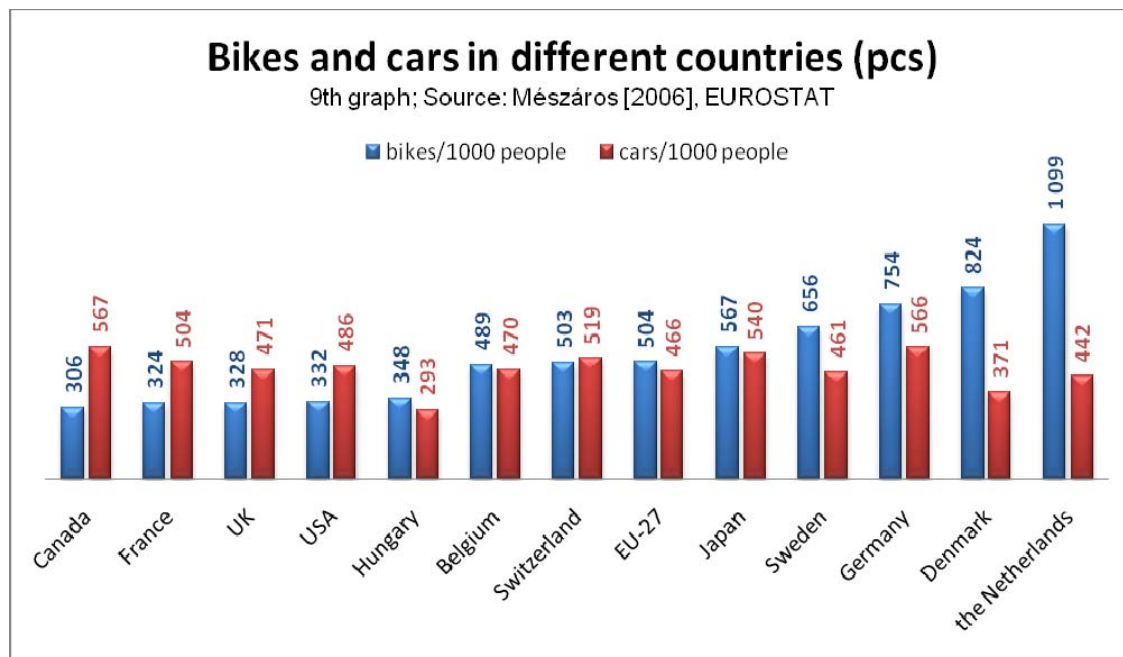
¹² <http://criticalmass.hu/blogbejegyzes/20081029/valsag-kerekpar>, 2009-06-13

¹³ <http://www.harmonet.hu/cikk.php?rovat=258&alrovat=266&cikkid=278>, 2009-06-13

In Copenhagen, 3000 bikes are provided free-of-charge to cover short distances. No wonder that one-third of those going to work go by bikes. High parking fees and usable cycle lanes account for the fact that, e.g. in Amsterdam, 35 percent of local traffic is made by bikes. In Great Britain, a plan was made on how the bike use can be increased fourfold by the year 2012.¹⁴

In Brussels, you can cycle in each one-way street in both directions. There is a moved-forward bike stand at every traffic light. The level of every road junction is raised so as to reduce speed, and there is cycle lane, recommended lane or bike track on every road of large transportation. All that have been established in the city in the past 3-5 years, which had formerly been designed exclusively for traffic by cars. However, they were determined to make the city „cycleable” again.¹⁵

In the following graph, the number of bikes and cars per one thousand inhabitants can be seen. The same countries are leading which are prominent in the bike riding and velomobile riding as well.



In China, about 450 million (with an accuracy of ± 50 million) of bikes are registered. The number of electric bikes is dynamically increasing. In 2006, 16-18 million pcs were sold, while the sales in the US and in Europe amounted to only 100-100 thousand pcs. In several cities of China the motorbikes and scooters were banned. That facilitates the use of electric bikes and scooters, though it is true that the lead batteries and the current made of fossil power also result in environmental problems.¹⁶

¹⁴ <http://www.fenntarthatofejloves.net/2007/03/25/kerekparutak-itthon/> , 2009-06-13

¹⁵ <http://www.kerekparosklub.org/meghivo-a-velo-city-konferencia-beszamolojara> ,2009-06-20

¹⁶ <http://www.zoldtech.hu/cikkek/20070709elektromoskerekpar> , 2009-06-13

Unfortunately, opposite trends have also started. In China and India, virtue might have been made of necessity, if, parallel with the economic growth, the transportation by railways and bikes would have been preferred instead of cars. The use of bikes is decreasing in China and India. Sixty percent of those going to work used bikes in Beijing in 1998. Today, this proportion is only beneath 20 percent. Several cycle lanes in Beijing were transformed for use by cars. In India, the travels by bikes make out about 15-30 percent. Bike riding is popular mainly in the agricultural regions. However, it is a disadvantage that there is shortage of safe cycle lanes and parking facilities.¹⁷ If the Chinese motorization approaches the level of developed countries, then it is feared that considerable regions and arable lands will be sacrificed (road building, parking), which can even result in food shortage.

11. And How is it Made in Hungary?

The present situation of bike and velomobile riding is not bright in Hungary, however, the outlooks are promising. We still have to fight the struggle that had been successfully won by Denmark, Holland or Germany several decades before. I am greatly impressed and, in the good sense of the word, I envy these countries, where the various transportation means could be integrated in an efficient way. The various transportation means get on well side by side. There are excellent motorways in these countries, air transport and railways are organized well, but there are cycle lanes everywhere as well. There are parking lots at the railway stations and covered cycle storing facilities, smoothly accessible ramps leading to the railway carriages etc.

Referring back to the epochs of the bicycle in the previous chapter, Hungary may now enter the era reminiscent of Holland in the 1970's, when step by step, the bike becomes an everyday means of transport. That holds good by all means for Budapest, the capital, but the bike use is again increasing in the country as well.

Let us see some data on the Hungarian situation. In Hungary, about 3.5 million of bikes are registered, the number of cars amount to 3 million. At present, the length of the Hungarian public road network is: 30.000¹⁸⁻¹⁹ km-s public road, and 1.113²⁰ km-s motorways and freeways.²¹ The length of the cycle lanes is about 2000 km-s (according to other sources, 2367²² km-s). A considerable part thereof does not meet the demands of bikers, thus, the real length of the cycle lanes does not reach even 1.500²³ km-s. The contradiction of the data gets some message across to us,

¹⁷ <http://www.fenntarthatofejloves.net/2007/03/25/kerekparutak-itthon/>, 2009-06-13

¹⁸ <http://www.kkk.gov.hu>, 2009-06-14

¹⁹ According to the Magyar Közút Nonprofit Zrt. (Hungarian Road Nonprofit Co.): „The length of roads is 31 240 km-s. About 75 percent of the country's total road traffic runs on this road network. Of that, 7 958 km-s are motorways, including 2 204 km-s "E" road, i.e. part of the European road network. 28 percent of that cross settlements, it means they play an important role in the local traffic of settlements. This road network is managed by Magyar Közút Zrt. Length of the roads managed by the municipalities amount to 140 000 km-s.”

http://internet.kozut.hu/szakmai/orszagos_kozutak_adatai/kozutakfojellemezoi/Lapok/default.aspx, 2009-06-14

²⁰ http://hu.wikipedia.org/wiki/Magyarorsz%C3%A1g_a%C3%B3p%C3%A1ly%C3%A1i, 2009-06-14

²¹ According to Magyar Közút Nonprofit Zrt.: „Length of the freeways network (motorways, public roads) is 1055 km-s, the motorways with intersections are 373 km-s.”

²² <http://www.antibringa.hu/?bringa-szamtan.18>, 7. article, Bodor Ádám, 2009-06-14

²³ Real length of the cycle lanes cannot be defined exactly. Various sources provide with contradictory data. According to the table downloaded from the website of Magyar Közút Nonprofit Zrt. on Febr 8, 2009, length of the cycle lanes is 1637.3 km-s. This table is not accessible on the website at present.

because it is expected from the competent authorities that they should know and let us know what is what and how many. If we compare the data with those of Germany, it can be seen that in Germany the cycle lanes (40 000 km-s) are longer than the whole public roads in Hungary (30 000 km-s).

Sorry to say, the modest quantitative index is associated with several quality defects. The small number of cycle lanes are often built in bad quality. When building them, presumably the regulations were not observed which are taken into consideration stricter when building public roads (taking off the top soil, observing the layers order, compression, quality and thickness of wearing layer etc.). When the vehicle traffic starts on a public road, these defects will soon become evident. In case of cycle lanes, they will appear only years after. It can be clearly seen that, in contrast to the public road, people using the cycle lanes cannot damage them. The condition of cycle lanes depends primarily on the level of the building and maintenance.²⁴

Maintenance of the ready cycle lanes also leaves much to be desired. The road damages, cracks are not repaired in time, the roadsides are not mown, they are not tidied up etc. The owners (public road offices and municipalities) do not meet their obligations.

Most of the constructed cycle lanes are narrow (1.8 m). Regarding the width, they could be suitable even for velomobiles, but the real useful width is not more than 1.4-1.6 meters because the roads and roadsides are not maintained properly.

You can find bike storing facilities near the railway stations only now and then. Elimination of obstacles is almost unknown at the railways. The railway stations and the carriages are not constructed in such a way that bikes could be pushed in or on easily. Of course, it is also a problem that the railway network, the planning, speed of the trains and accuracy fall behind to that of you are accustomed to in the West.

Much should be done also for improving the level of traffic culture. Impatient car drivers and bikers, violating all regulations, cause a lot of nuisance and accidents. It is no mere chance that the number of cars per 1000 inhabitants in Hungary is only about the half of that of Germany (293 in Hungary and 566 in Germany), however, the death toll of traffic accidents is just the double (122, and 60 persons/year/million inhabitants, resp.), that is, the Hungarian index is four-fold worse.

It is considered to be forgivable sins to drive by cars, motorbikes and scooters on the cycle lanes, and so is parking on the pavement and cycle lanes. On the other hand, bikers are often signalled by the car drivers to keep off the public road, and it often happens that it is a policeman who drives away the bikers from the road to use the otherwise unusable, unpassable „cycle lane” instead.

Motor vehicles are preferred exaggeratedly to bikers. The pace of public road construction, motorway construction and renewal manifold surpasses the pace of

²⁴ <http://www.nol.hu/archivum/archiv-461960> „According to a survey made by the Balatoni Szövetség (Association of Lake Balaton), which organization coordinates the municipalities situated at the lake, the condition of roads is damaged by bumpy sections due to tree roots as well as by weeds growing from beneath the asphalt and potholes. It is stated in this survey that the premature wearing off of the cycle lanes is not caused by the heavy traffic but primarily by the undemanding building in quick campaigns and by negligence.”

cycle lane construction and renewal. Bikers are more and more driven out of the formerly small-traffic public roads due to the enormous heavy traffic. As a consequence, cycle traffic among the various settlements has drastically decreased in the past years.

Traffic by bicycles is a marginal element in the decisions and attitude of authorities who participate in the forming of the transportation infrastructure and traffic organization. There exists no ability to enforce the interests of bikers in merit. Authority people make decisions who are committed to motorization, and they do not use in work bicycles or do so only occasionally.

Motor vehicles are in a more favourable position not only for their strength but also regarding the traffic rules. Traffic organization is not unified even in the same situations, e.g. regarding the right-of-way at the junction of public roads and cycle lanes, which vary in every settlement.

To summarize, there are only a few cycle lanes in Hungary, and a part of them is in bad condition. Biking is not or not properly supported by either the traffic rules or by the competent decision-makers. The traffic culture also leaves much to be desired.

12. Something has Started

As late as the recent past, cycle lanes in Hungary were not connected into a contiguous network, and their technical level fell far behind the European norms. A cycle lane network development programme, which covers the whole country, is dedicated to remedy this problem. This programme will be realized within the framework of the New Hungary Development Plan. The official justification of the inviting of applications regarding bikers, reads: „Traffic jams, parking difficulties and air pollution are the most characteristic problems of cities. In the member countries of the European Union, and in Hungary as well, it is a governmental goal to popularize the biking because that means an evident solution to reduce the environmental impacts and to remedy the everyday traffic nuisances.”²⁵

According to the governmental plan entitled „Biker Hungary Programme 2007-2013”, from the budget more than HUF 60 billion (€ 214 million) will be allocated for this purpose till 2013. By rational and harmonized developments, by the year 2013 roughly 2000 km-s of new cycle lanes and tracks can be built, and, in addition to the proportional growth of the bicycle traffic, the number of deadly accidents of bikers can be reduced to half, and even 5 percent of the European bicycle tourism market can be obtained. The first main elements of the programme are the infrastructure building and maintenance. The second one is the cultural development of the bike traffic, e.g. by the help of training programmes, by modifying the Highway Code, by frequent inspections and the restructuring of the Hungarian Railways Co. into a bike-friendly company. The third element is the development of bike riding for tourism, sport and recreational purposes, primarily by joining EuroVelo, the European cycle lane network.²⁶

²⁵ <http://bikemag.hu/kiemelt/varosban-biciklive/> , 2009-06-13

²⁶ <http://www.fenntarthatofeiloves.net/2007/03/25/kerekparutak-itthon/> , 2009. június 13.

EuroVelo, the full name of which is **European Cycle Lane Network**, is a plan of the European Bikers' Association for establishing 12 cycle lanes crossing all Europe. The total length of these lanes is more than 60 000 km-s, of which more than 20 000 km-s have already been finished. The EuroVelo cycle lanes are designed for biker tours crossing the Continent, by connecting them with the existing ones. Of course, it will be possible to use the EuroVelo routes in the local bike traffic as well. Two EuroVelo routes will cross Hungary, the one being **EV6**, running from the Atlantic to the Black Sea („Rivers Route, between Nantes—Constanca 3653 km-s, the Hungarian section thereof will cover 440 km-s). The second one will be **EV11**, running from Norway to Greece („Eastern European route”, between the North Cap and Athens”, covering 5964 km-s.)²⁷ Placarding of the section of EV6 in Hungary is in progress.



8th picture EUROVELO

Source: <http://wapedia.mobi/hu/EuroVelo>

²⁷ <http://wapedia.mobi/hu/EuroVelo> , 2009-06-13

The size and growth of the mass basis of Hungarian bike riding can best be illustrated by the development of the Critical Mass movement which started in the US. The purpose of the demonstration, which is held twice yearly, on the Earth Day and the Car-Free Day, is only partially to popularize environmentally-friendly means of transportation. Another goal is, through the demonstration of a mass basis, and by the intervention of civil organizations, to put pressure on the decision-makers in matters concerning bikers. The first organized demonstration took place in Budapest in September 2004, with 6000 participants. There were most participants present on the Critical Mass demonstration with 50 000 people in the capital, which took place on the Earth Day in April 2006. In the meantime, similar events were organized throughout the country. By that, the Budapest CM deserved the title of the greatest similar event in the world and it was recognized by the foreign civil bikers. In the meantime, the number of bikers increased manifold in Budapest in four years. (In the country, however, an opposite process can be observed.) Of course, the long-term goal would be that the present 1-2 percent ratio of regular bikers in Hungary approach the 20-25 percent European average.²⁸

Positive signs can be seen in the traffic culture as well, especially in the circle where people not only drive cars but they often get on bikes as well.

An action called „Go by bike to work”, organized by the Hungarian Bikers’ Club, was finished this spring. That was the umpteenth successful action of this kind, calling the attention of more and more of people. Number of the teams, having 1-5 members, amounted to **5 896**, and the covered distances were altogether **4 248 242** km-s. The reduction of the carbondioxide emission was **790 173** kgs, and the fuel saving was HUF **89 213 078** (€ 318 618). The company I work for participated with 57 persons in the action, which means 35 percent of the staff.²⁹

However, some exceptions can be observed in the mentality among the senior managers and bikers as well, e.g. Ms Júlia KIRÁLY, vice president of the Hungarian National Bank. Quote from the interview made with her: **Is it good manners for the vice president of the issuing bank to go by bike?** Ms Ibolya GÖRÖG was the protocol chief of the prevailing government for decades. One of her basic principles is that the vice president of the issuing bank is not allowed to go by bike to a conference, discussion, and not even to work. My counter-argument is my favourite photo. That was published on the cover page of Financial Times three years ago. The photo shows Mme Lagarde, the financial minister of France, getting on the bicycle and starting to work, while wearing a beautiful custom and stilettos. If she is allowed to do so, I think so is allowed the vice president of the issuing bank as well. **What are the arguments of the protocol expert against bike riding?** In her opinion, and she is right, the Hungarian society has respect of authority. If somebody is in a high position, then he or she must behave accordingly, otherwise the people will be confused. In this society, a general on bike is a most unusual phenomenon.³⁰

As for the railways, you can deliver bicycles on an increasing number of trains, which facilitates the combined transportation means.

²⁸ <http://bikemag.hu/kiemelt/varosban-biciklive/> , 2009-06-13

²⁹ <http://www.kamba.hu> , 2009-06-14

³⁰ http://www.kamba.hu/index.php?option=com_content&view=category&layout=blog&id=34&Itemid=77 , 2009-06-20

According to the new standard, the new cycle lanes are being built wider (minimum 2.6 metres), and the builders have to consider several technical regulations.³¹ Thereby, it is to be hoped that the construction quality will be better.

To sum up, we can hope that in 4-5 years, the length of cycle lanes in Hungary will be doubled and reach 4 000 km-s. Perhaps the worn-out roads will also be renewed. Much depends on whether the government, the authorities and municipalities are willing to implement the excellent plans in the everyday practice.

13. VELOMOBIL and Bike Maths

Nowadays bicycles are used basically for two reasons: either because people are poor or because they are conscious. Most bicycles can be found in the very poor and very rich countries. „There are some people who can afford only bikes, and there are some people who can afford even bikes”.³² Let us see some bike maths.

Distance: The automobile, which is the main cause of traffic chaos, the stress in cities and towns and the air pollution, has been one of the symbols of the recent past. Now it fell victim to its own success story. It is just the use of bikes that can be an „antispasmodic” in the road transportation which is like a still in towns and cities day by day. The bike is very useful mainly when covering short distances (3-5 km-s). But it can also be used for longer travels as well, e.g. if the biking can be combined with travelling by train, as it is well demonstrated in the developed Western countries.³³

One-fifth of the travels made by cars of Budapest people inside the city are shorter than 2 km-s. More than half of the travels' distances are shorter than 3 km-s, and three-fourth does not reach 6 km-s. These distances could also be covered on foot, even a bike would not be needed.³⁴ However, this is just the same in the developed countries. In Holland, 40 percent of change of place are below 2.5 km-s, 70 percent of going on foot and travels are below 7.5 km-s, which still could be covered by bikes.³⁵ In Great Britain, two-third of the distances to be covered every day are not longer than 9 km-s, and they are fully passable by bikes.³⁶

Speed: As regards distances below 5 km-s, mainly in city transportation and traffic jams, there is no relevant difference between travelling by car or bike. And, what is more, if there is a traffic jam, you can move on by bike even on the pavement. This, however, cannot be said of a velomobile as the width in many cases does not make it possible to progress under such conditions.

Weather: You can use velomobile even in severe weather conditions. I can confirm that from my experience. I go to work by velomobile every blessed day! If often happens that it hails, the roads are icy, or snow-bound, it snows, or it is very cold (-11 centigrade) or very hot (+35 centigrade), gust of wind (30-50 km-s/h), it is foggy, or it is raining cats and dogs, to mention just a few characteristics of bad weather conditions.

³¹ <http://www.maut.hu/magyar/sajto/pdf/cikk34.pdf>, 2009-06-17

³² Murlasits Attila és Karlovitz Kristóf

³³ <http://www.lelegzet.hu/archivum/1996/12/1141.hpp>, 2009-06-13

³⁴ <http://www.antibringa.hu/?bringa-szamtan,18>, Szép régi adatok, 2009-06-13

³⁵ <http://www.khem.gov.hu/data/cms1168940/kerparoskozlekedes.pdf>, 2009-06-13

³⁶ <http://www.lelegzet.hu/archivum/1997/01/0765.hpp>, 2009-06-13

Power waste: A biker consumes 100 kJ power on the average, while a car uses about 5000 kJ. This is a fifty-fold power waste. This is all the more so if we consider the fact that in most cars there sits only one passenger (on the average, 1.4 person). Let us have a look at exact calculations: One km of riding a bicycle requires 92.09 kJ, going on foot: 261.63 kJ, and riding a car requires 4.83 MJ of power on the average. It means that going by bike is the most efficient means of individual transportation.³⁷ As regards power demand, a velomobile is more favourable compared even to the traditional bike. On plain areas, a traditional bike can cover about 15-21 km-s per hour with 100-watt power, while a velomobile can reach 28-34 km-s per hour. To take another approach, 271-441 watt power is required to reach a 30-km/h speed by a traditional bike, while in case of a velomobile 79-115 watt is sufficient.³⁸

Parking: The space taken up by a bicycle or even a velomobile is only a fragment to that of a car. If you park a car it requires 10 sq metres on the average, where ten bikes or at least four velomobiles can be parked.³⁹

Road building and maintenance: Investment and maintenance costs of cycle lanes are only a fragment in comparison to those of building public roads. The cycle lanes take up much less space and the environmental impact caused by their building is much more less as well. The investment costs of 1 km cycle lane in Hungary amounts to HUF 30 million (€ 107 000) on the average. Not much money is spent on their maintenance. Just a few data for comparisons:

| | |
|----------------------------------|---|
| building 1 km motorway | HUF 1.3-4.0 billion (€ 4.6-14.3 million) |
| building 1 km two-lane main road | HUF 0.3-0.5 billion (€ 1.07-1.79) |
| maintenance of a motorway | HUF 10.0-15.0 million (€ 36-54 000) |
| maintenance of a main road | HUF 3-5 million (€ 11-18 000) ⁴⁰ |

Depreciation of roads: Wear and tear of roads are caused by vehicles, especially by heavy vehicles. The road damage caused by a truck is much more than that caused by several hundred thousand of cars.⁴¹ Practically no damage is caused by bikes and velomobiles on the roads. A cycle lane gets damaged only if the construction is not satisfactory and the minimum maintenance jobs are not made. As the building and maintenance costs of cycle lanes are only a small proportion in comparison to those of building public roads, therefore all investors could be obliged to build or maintain at least so many cycle lanes as many roads are built or renewed by them.

Permeability of roads: If we consider the permeability of roads from point of view of road capacities, then a two-lane road (7 meters) can be passed by maximum 2000 cars in an hour, which means 4000 passengers if, in the ideal case, we can count with two passengers. In Holland, 6500 bikes can pass a 2.5 meter cycle lane in an hour.⁴²

Investment and operational costs: The price of a car is manifold than that of a bike, but even the price of a velomobile is more reasonable (€ 5-8000) than that of a

³⁷ <http://wapedia.mobi/hu/> , 2009-06-13

³⁸ Frederik Van De Walle: The Velomobile as a Vehicle for more Sustainable Transportation, page 59

³⁹ <http://www.khem.gov.hu/data/cms1168940/kerparoskozlekedes.pdf> , 2009-06-13

⁴⁰ <http://www.nol.hu/archivum/archiv-461960> , 2009-06-16

⁴¹ <http://www.levego.hu/kamionstop/kamionkiadvany1.pdf> ,2009-06-16

⁴² <http://www.khem.gov.hu/data/cms1168940/kerparoskozlekedes.pdf> , 2009-06-13

car. If the velomobiles would be manufactured in large serials (10 000 pcs), then the price would be considerably decreased. It might fall to around € 3000.⁴³ It costs about 20-30 HUF/km (8-12 EUR cent) to operate a car, while the costs of a velomobile is roughly 0-2 HUF/km (0-0,8 EUR cent), depending on the ratio between the rider's strength and the electric actuation.

Environmental impacts: Transportation is responsible for 50 percent of carbon dioxide emission and for 61 percent of NO_x emission. A velomobile emits about 0 gramm and a car about 180-200 gramms of contaminants per kilometre. **In Hungary**, between 2003 and 2007, the transportation made by car rose by 29 percent, the truck transportation by 28 percent, the transportation by bus by 3 percent, and the motorbike transportation increased by 10 percent. **On the contrast, transportation by bike decreased by 30 percent.** We can say that a car is about forty-fold larger contaminant than a velomobile. (According to accurate calculations, a velomobile driver with a speed of 25 km-s/h and 80 W, emits 5.2 gramms of carbon dioxide per kilometre.).⁴⁴ If we want to be more exact, we can calculate the carbon dioxide emission of the car driver as well because he also breathes even if not so intensively as a velomobile driver.

Health preservation: Somebody making exercises regularly has greater chances to avoid lots of dreadful diseases of modern society. „Short-distance cycling on some days of the week can strengthen the physical stamina as any other sporting activity. In comparison to those people making insufficient physical activities, by cycling six hours daily, heart and circulatory diseases, diabetes and obesity can be reduced by 50 percent and hypertension by 30 percent. According to tests made, optimal prevention can be reached by a daily 20-minutes' cycling. Going by bike to work for example, can also considerably relieve stress. It should be also mentioned that about USD 250 fuel costs can be saved yearly if one covers the 7-km long way to work daily.”⁴⁵

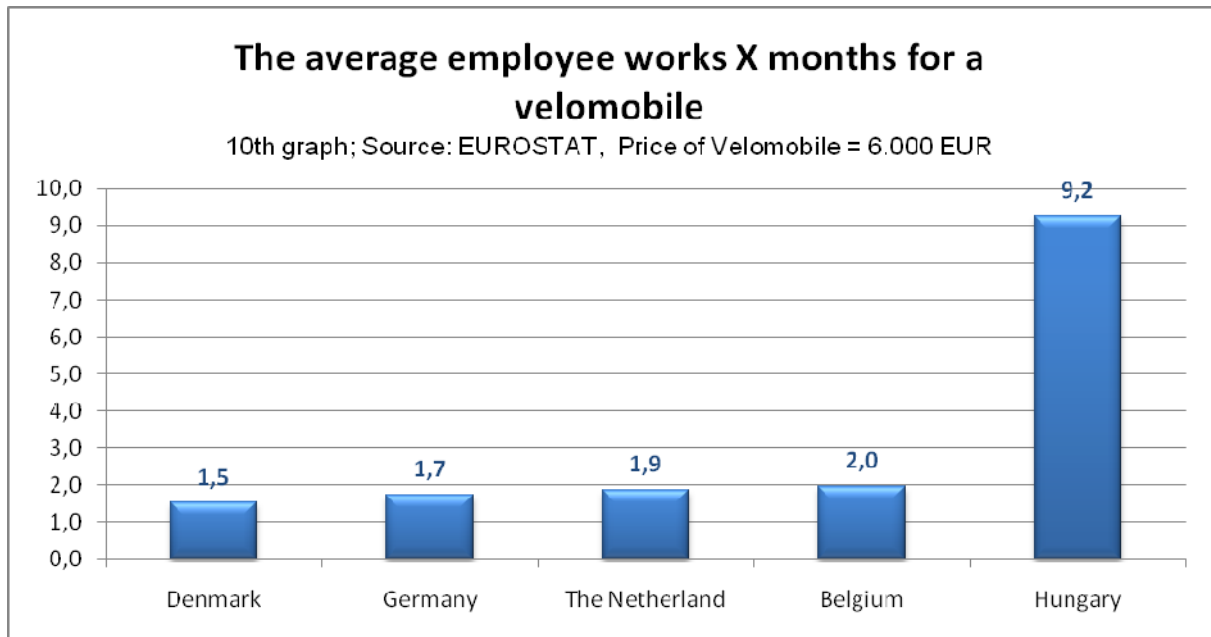
Velomobil price: If we put the average price of a velomobile at € 6 000, then, based on the average salaries and wages, a Hungarian wanting a velomobile has to work more than nine months. In case of developed countries, 1.5-2 months are sufficient.⁴⁶ That is illustrated by the following graph.

⁴³ Van De Walle, Frederick: The Velomobile as a Vehicle for more Sustainable Transportation, page 65.

⁴⁴ According to the calculation by Jürgen Eick

⁴⁵ <http://www.khem.gov.hu/data/cms1168940/kerparoskozlekedes.pdf>, 2009-06-13

⁴⁶ <http://www.epp.eurostat.ec.europa.eu>, Earnings in industry and services (average gross annual earnings of full time employees in enterprises with 10 or more employees)



Some typical objections to the question why people do not go by bike to work:

How can I bike in a suit – some people say, though it can be done in good weather and by a traditional bike as well. But you can go by a velomobile, wearing a suit, at any time mainly if the velomobile is equipped with an electric actuation.

How can I arrive at work when I am sweaty: If it is impossible to have a wash at work, then this problem can be solved by a bike or a velomobile which is equipped with an electric actuation because we can pedal so much and with such an intensity that is just agreeable for us.

Consequently, bicycles and velomobiles are not only the vehicle of the poor and sport equipment of the rich. A bicycle can be a means of transportation, can be used for carrying goods and can also be as an equipment for sport, joy and health preservation.

14. What Should a Velomobile be Like if (Going on) Hungarian (Roads)?

Some factors should be mentioned which make the use of velomobiles difficult. Maybe some of them are only Hungarian specialties. The potential use circle can be divided into two groups. Some of them would like to have velomobiles because of the speed, the race and the sport, the other ones would like to buy velomobiles due to environmental consciousness, or because it can be used in all weather conditions and every day. As for me, I belong to this latter group, and so that will be underlined in my viewpoints.

Quality of roads: A bicycle passes on one track, but a velomobile passes on three tracks. You can, even if not easily, avoid road damages by two wheels, but there is hardly any chance for it by three wheels especially if there are cross-ribs of an arm's length and potholes on the road. Most of the Hungarian cycle lanes are narrow that is why broad velomobiles are not very practical though they are more stable. Thus, in our country only velomobiles can be used which are especially massive and have

good spring suspension, the construction is higher and they are narrow. (It is somewhat contradictory, however, the ideal Hungarian velomobile would be like this.)

Shoulders and road approaches: Probably it is another Hungarian specialty. In many places, the obstacles between the pavements and the roads are not eliminated. We can often find a 15-20 cm high shoulder, however a real and frequent speciality is the so-called K border. People are inclined to put it in the gateways. It must have been designed by someone who has not ridden a bicycle and has not pushed even a pram. A velomobile cannot climb the high Hungarian shoulders but it cannot roll down either because it comes to a halt and cannot move further. In this case, you cannot do anything else but to get out of the velomobile, and to lift it manually and manoeuvre. This problem could be eliminated by large wheels in the front and in the back, especially good springing and high construction.

Traffic in darkness: I could find out something for all weather and road conditions. It can be solved easily that people see me (light-reflecting elements, rubbers, lamps, flags etc.). However, it is impossible to solve that I, as a velomobile driver, could see in darkness. Not because I am lacking good headlights but because the velomobile is low, and all car headlights, even the dimmed headlights have such strong lights which make me blind. An eye-shade, used also in cars, can somewhat help but thereby the visible field gets also narrower. A further problem is that on the plastic windscreen the light disperses and you can hardly see through it. A hard PVC plate is stable but it spreads light. The soft plate is not stable but it transmits light well. This problem can be somewhat eliminated by combining these two.

Elimination of moisture on the windscreen: The windscreens of velomobiles are usually made of plastic. You can put some kind of wiper on them but they soon will be scratched. Only AERORIDER and LEITRA use glass windscreen. Evidently these types of velomobiles have no such a problem. I tried to solve this problem by two methods. One is an elongated windscreen „projecting roof”, which is not nice but practical and efficient. The other solution is the layer formation of the drop remover. That is quite good if it is raining but of no use in snowfall.

Mist elimination on the windscreen: Transparency of the windscreen is prevented not only by the external precipitation but also by the internal mist in cold weather as well. I have used three methods against that. I drilled small holes on the bottom of the windscreen, and so the difference between the external and internal temperatures decreased, and so did the mist. In the back of the velomobile, I built in a 3-W fan, taken out of a computer. Thus I made a forced ventilation. The consumption is minimal, however, it operated properly only if I started it right at starting. When the mist already appeared it did not help remove it. The third solution is to use one-finger gloves, made of some absorbent cloth. It is by this method that the mist can be removed in the most efficient way. If needed, you simply wipe the inner surface of the windscreen.

Getting in and out: As for most velomobiles, it requires a real gymnastics show to get in or out. Most of velomobiles have relatively high side walls, they have the shape of a tub. Exceptions are the types where the whole cover can be opened (Leitra, Butterfly, Thunderstorm). In return, it is more difficult to close them.

Manoeuvrability: Most velomobiles are of a tadpole structure. The cover allows only in a limited way to turn the wheel, therefore mostly 7-8 metres are needed to

turn (Leitra is an exception to this). In most cases, this is satisfactory, however, there are places on the roads where it prevents from taking a small bend. Consequently, in Hungary those velomobiles are more favourable which have smaller turning radius.

Braking: Due to the very bad conditions of roads, in Hungary it is advisable to mount disc brakes on all wheels. Thereby it is possible that a velomobile could be slowed down or stopped if the driver observes some road damage in time.

Ventilation: Everything undergoes changes, and this is especially true for weather. That is why it is favourable to form a roof which is portable, and can be hidden in the inner part of the velomobile, and with one movement, it can be transformed to conform the prevailing weather conditions (precipitation, wind, cold, warm etc.). I made several trials to solve this, I mounted various combined windscreens. For the time being, one movement is not enough yet, however, everything can be solved from the convertible to the totally closed cover for winter. It is also true that sometimes it is at the expense of nice appearance.

Boot: As for the boot, a velomobile is unbeatable. Almost every type has about 60-100 liters closed loading space. In contrast to traditional bikes, you do not have to bother with fixing the luggage. It is almost impossible to lose the cargo, it will not get wet, and you have easy access to them en route.

Colour and visibility: Yellow colour is recommended, because in this case a car driver can notice the velomobile, mainly in countries where pedestrians and bikers are not highly esteemed. Every available item should be used so as to be seen by others (prisms, reflectors). It is very important that the velomobile should have a flag or blinker at the eye level of the car drivers.

Based on the above, a velomobile running on Hungarian roads should be narrow and high, should have extremely good springing, be of yellow colour, having very good brakes, manoeuvrable and should be sold at a reasonable price. You can hardly find such a velomobile, thus, compromises should be made.

15. What is the Spreading of Velomobiles in Hungary Prevented by?

For the time being, conditions for velomobile riding are quite adverse in Hungary. Probably this will not prevent their spreading in the future. The velomobile was received positively and with interest at the places I visited. My website has been visited by more than 50 000 people in the past two years. Several hundreds of car drivers, motorbike riders and bikers face my velomobile on the road section where I go day by day. I am convinced that many of them would happily get in it instead of their metal box if they were in the position to do so.

At first, people are surprised at seeing the velomobile, then they smile and the courageous inquire about it, the most courageous people even test it. Some typical questions: Is it operated by foot or is driven by a motor? Is it not difficult to pedal it? Does anybody sit in that? And the questions always include the one concerning the price. I always answer that it costs as much as a small car. This response seemingly reduces the number of those wanting to buy one. Nevertheless I think, though price can be a grave problem, maybe this is not the main cause which prevents the velomobile from spreading. People spend much higher sums than that for purchasing less useful material goods (e.g. a second car, and lot of smart devices which are

superfluous in fact). Or, they smoke into the air the sum which is higher than the price of a velomobile.

All these are well supported by a study made in 12 North-American and European countries. It was stated that the means of transportation and the decisions made concerning this **are not influenced by the income, the technology level or the level of culture or urbanization. In the background of differing decisions there are first of all the decisions made by authorities, municipalities or governments as well as attitudes deriving from public education or environmental views.**⁴⁷

If so, what is their spreading prevented by? We have to admit that the Hungarian wages and salaries, which are well behind to those in developed Western countries, limit the Hungarian demand. In addition, I see two main reasons of the slight interest. On the one side, ignorance and lack of information, on the other side, aspect and attitude hold back the spreading of velomobiles in Hungary for the time being.

If we put the question to a hundred people in Hungary what is a velomobile, then 99 percent do not know what it is because they have not seen but even have not heard of it. Recumbent bikes are better known because several people have already seen one.

Three Hungarian websites dealing with velomobiles can, partially or wholly, somewhat help the lack of information. First of all, those interested in velomobiles can be offered essential facts by the systemic velomobile collection of Mr Viktor Györi⁴⁸. From this site, the websites of all velomobile manufacturers are accessible, and you can read interesting things about velomobiles. The author also offers much new information in his blog. Mr Attila Murlasits⁴⁹ enthusiastically propagates recumbent bikes. He gives account of a velomobile of own construction in his high-standard website. He operates a recumbent bike shop which is the single one in Hungary and he has valuable information concerning velomobiles. You can find information on velomobiles and recumbent bikes also on my website⁵⁰. Unfortunately, all of the few Hungarian sources available are listed above.

It must also be admitted that a velomobile is not the goods you purchase without trying it first. A potential Hungarian buyer can get information on the velomobiles on the Internet, however, it is like when you try to appease hunger by looking at the menu... If you want to make a good choice then it would be good to test other types as well. But most of the velomobile manufacturers are about 800-1200 km-s far from Hungary. This is not an invincible distance, however, the vehicle being so far away, makes some people think it over to start off and visit the manufacturers. It would help a lot if there were a model shop in Hungary or near to it where velomobiles could be looked at and tested, just like cars.

Velomobiles are not manufactured for being on stock. You can obtain one only after waiting about 6-12 months, so, a model shop remains to be an illusion. If the potential buyer would like to have a closer look and test the models he has two possibilities. Either he visits Spezi at Germersheim in spring, or a velomobile meeting in autumn. Only a few people are willing to do so for the time being. A further

⁴⁷ <http://www.parlament.hu/naplo34/191/1910049.html> , 2009-06-13

⁴⁸ www.velomobil.lap.hu , 2009-06-14

⁴⁹ www.ambringa.hu , 2009-06-14

⁵⁰ www.antibringa.hu , 2009-06-14

obstacle is that velomobile manufacturers are not willing to provide any trade discount. Thus, salesmen wanting to deal with them are not interested, just enthusiastic.

Another obstacle is that less is done than necessary by the state, the authorities so that the environmentally-friendly means of transportation, cycling and thereby velomobile riding could be more and more spreading. Nowadays it is fashionable to speak about environmental protection, but there are only a few people who really do something for it. We are still far away from the critical mass which will bring a breakthrough in the bicycle use.

It seems that the mentality of „let us take it and you should carry it” remains unchanged. It is difficult to represent truthfully the cause of bicycling if the decision-makers, instead of cycling, only speak so as to prove their EU and environmental conformity.

The following examples also prove the lack of responsible attitude as well as the conscious and supportive representation of the environmental protection.

Double measure: As a car-owner, I am obliged to maintain my car in a state suitable for road traffic. If I fail to do so, I will be punished or I will not be given a traffic license. Cycle lanes are possessed by the state or the municipalities, but they are allowed not to maintain them in good state without any consequences. If someone asks them, they innocently open their arms saying, „we have not got the necessary funds”. Interestingly enough, when I have to pay taxes, this kind of justification is never accepted.

Environmentally-friendly vehicles, two-person TWIKE-s with electric and manual driving have been manufactured in Germany (previously in Switzerland) for about twenty years now. I wanted to import one to Hungary. However, according to the competent transportation authority that cannot be put into circulation in Hungary because they cannot classify it. It is funny to note that it was possible to classify it in Switzerland, Germany, Great Britain and US.

I made inquiries with the transportation authority whether a velomobile could be put into circulation in Hungary which is equipped with an electric motor of more than 300 W. They were at their wits' end what a velomobile is. They have not seen or heard of one yet. The first official-in-charge replied that this would be hardly possible. I spent much time in anterooms and finally I found an expert who said that if this vehicle had been licensed in an EU country, then it should be accepted by the Hungarian transportation authority as well.

Széchenyi Races have been organized by enthusiastic young people in Hungary for years now where alternatively driven vehicles compete. It is remarkable that no expert from side of offices or authorities is present at the races the tasks of whom it would be among others to encourage and support these initiatives, despite the fact that several creative solutions can be found there. Of some creative participants this year let me mention three-wheeled vehicles as follows: one battery-driven (Pápamobil Mini), one with fuel-cells (Hygo) as well as one operated by solar panels (Pannon Rider). The backwardness of the civilians is well demonstrated by a comment according to which the show of the alternatively driven vehicles is but a ridiculous show without petrol. Though Hungary is not missing creative people,

several good ideas appear not to reinforce but rather to destroy each other. In contrast to several European countries, in Hungary there is no organization which would help or coordinate the development of man-powered vehicles.



9th picture Széchenyi Race, Pápmobil Mini, Pannon Rider, Hygo

Source: www.szechenyifutam.hu , Photo: Attila FÖLDI D.

The list can be continued. We can only hope that the spreading of velomobiles in Hungary will not have the same fate as the moped cars and individually-manufactured electric vehicles. These are being banned out from the roads by the authorities with different intensity in the various counties.

The above attitude will preserve the fact that, while one part of Europe awakened, the Hungarian society is still living under the spell of automobiles. Partly, without any doubt, there is no other alternative as you often cannot go even to work by mass transportation. On the other hand, there are several people who use cars more often that it is unavoidable. Car drivers are willing to wait for several hours in filthy traffic jams, poisoning themselves and pedestrians alike though they could go on foot, by bicycle or by mass transportation. The motto is to drive a car by all means, even at the shortest distances. Let us not forget that half of the distances to be covered daily in Budapest are shorter than 3 km-s. It is prestigious to possess a car, the car is leading right after the flat, or rather before it in the imaginary prestige order. It should be as big as possible, as strong as possible and as newest as possible. With some exaggeration it can be said: if you have no car you are not a human.

I am always surprised how many jeeps (idiomatically called „man-of-war”) are cruising in towns and cities. Maybe a considerable part of them have not been on a real terrain, it is just fashionable to have them, they are status symbols. „Hey, look here, I can afford even that.” Some kind of conservatism can also be observed. People recognize that the velomobile is a clever invention, however, I often see people sneering as if I were imbecile when I speak about the advantages of the velomobile. They do not grasp what is the good of a velomobile. The resistance can be similar to that when the iron horse, the steam engine started its conquest. Today the number of bicycles is estimated at 3.5 million in Hungary. Maybe it also shows some conservatism that, among the great number of bikes, there can roughly be

only 250 of recumbent bikes in Hungary. Nevertheless, several people try to make own recumbent bikes.

16. Summary

In contrast to the estimated number of velomobiles, amounting to 1000-1200 in the world, roughly 2100-2300 are now used. The yearly manufacture is about 350 pcs. The manufacture is dynamically increasing, hopefully the yearly production of a thousand pieces will soon be realized. In Hungary, there is one factory-made and one home-made velomobile in use now.

Velomobiles are most widespread in countries where the cycling is natural and is well-developed, e.g. in Holland, Denmark and Western territories of Germany. The general use of velomobiles is in close connection with the development of cycling. Therefore, every factor, which can put the cycling into a favourable position, can speed up the spreading of velomobiles as well.

Environmental impacts caused by transportation, climatic changes, decrease in the energy resources, forceful spreading of transportation at the expense of arable lands, health problems arising from the lack of physical activities, as well as the economic recession keeping on, these all will have the result that material and energy saving and environmentally friendly solutions must be found in the transportation as well. The use of bicycles and velomobiles will play an outstanding role in the lives of people who consciously pay attention to the living spaces of themselves and their grandchildren.

These problems cannot be solved only by improving the harmful internal combustion technologies or even by their changes. The transportation means and their structure must also undergo considerable changes, well-organized public transportation, including railway traffic and man-powered vehicles, bicycles, should be more and more spreading.

The above factors will bring the revival of cycling, the former sport and luxury article will again become an everyday means of transport. A new epoch of the dynamic evolution of bicycles began in the developed countries many decades ago, and this must also be the case in the developing countries. Not only the number of bicycles, but also the number of recumbent bikes and velomobiles will also be increasing.

Gaining ground of cycling mainly depends on the wisdom and intention of decision-makers (governments, authorities, municipalities). It partly depends on how soon they realize that there is no other realistic alternative, and partly on what resources will contribute to the development of cycling as well as the scheduling. This process can be accelerated by the pressing from civilians and their conscious selections.

Though many people think the spreading of velomobiles will be delayed by high prices, the truth is that lack of information, motorization attitude and the conservative views play a greater role. Radical changes can only be reached by the decisions of competent people and the improvement of the use conditions.

We can but agree with the standpoint of the Hungarian Cyclist Club: **Cycling should be an integrated and equal part of transportation.** This viewpoint should be

consequently considered with every transportation improvement during the planning, authority tasks and operational jobs. It is impossible to build independent cycle lanes in every street, and there is no need of that. Independent cycle lanes are required in some places (e.g. mainly on freeways and outskirts), but it is generally advisable in the dense municipal road network that the cyclist could go together with other vehicles.

Solutions are good by the help of which the safe traffic of cyclists are based primarily on the mutual cooperation of the participants and not the total physical separation thereof.⁵¹ Total separation from the vehicles gives a false sense of security for both sides, and it does not require due care in the junctions. In municipal surroundings, the bulk and most severe traffic accidents happen in the junctions of cycle lanes and public roads! The risk of accidents can be reduced by careful planning.⁵²

We hope when the next Velomobile Conference will be held, perhaps in Hungary, the first sales clerk can state that there are several velomobiles in use and the demand is ever increasing. ☺ And we are confident that the following sarcastic comment, made by a velomobile manufacturer⁵³ will not become an eternal truth:

„I think Velomobiles are made for a small group of people. Normally the people are stupid and lazy and like to drive cars, there will be no change in the future, so it is a business for enthusiasts.”

⁵¹ Wolfgang Rauch: Roads for Cycling. Published by the Hungarian Cyclist Association, based on the publication of the Austrian Traffic Club (Verkehrsclub Österreich, VCÖ) 2001

⁵² <http://www.kerekparosklub.org/tervezesi-szempontok> , 2009-06-14

⁵³ Thomas Seide, 2009.04.07

APPENDICES

1st chart

| Velomobile manufactures in the order of total manufactured quantities (pcs) | | | | | |
|---|-----------------------------|-------------|------------|-----------------|----------|
| | Type of Velomobiles | Total | 2008. | Country | Note |
| 1. | ALLEWEDER 1-2 (FAW) | 500 | 0 | the Netherlands | |
| 2. | LEITRA | 299 | 6 | Denmark | |
| 3. | GO-ONE | 200 | 30 | Germany | |
| 4. | QUEST 26" | 187 | 73 | the Netherlands | |
| 5. | ALLEWEDER 3- 4 (AAW) | 170 | 29 | Germany | |
| 6. | CAB-BIKE | 150 | 10 | Germany | |
| 7. | QUEST 20" | 129 | 0 | the Netherlands | |
| 8. | MANGO | 114 | 0 | the Netherlands | |
| 9. | VERSATILE | 75 | 9 | the Netherlands | |
| 10. | SINNERMANGO | 62 | 41 | the Netherlands | |
| 11. | WAW | 60 | 15 | Belgium | |
| 12. | AERORIDER | 50 | 4 | the Netherlands | |
| 13. | LIMIT (C-Alleweder) | 40 | 0 | the Netherlands | |
| 14. | LEIBA CLASSIC | 39 | 8 | Germany | |
| 15. | SUNRIDER | 34 | 26 | the Netherlands | |
| 16. | ALLEWEDER 6 (AAW) | 20 | 20 | Germany | |
| 17. | LEIBA XSTREAM | 15 | 15 | Germany | |
| 18. | BOREALIS (TRICE) QNT | 12 | 0 | Canada | |
| 19. | THUNDERSTORM | 9 | 9 | Austria | |
| 20. | AURORA NIMBUS | 8 | 0 | Canada | |
| 21. | LEIBA BRISE | 7 | 3 | Germany | |
| 22. | MILAN | 7 | 7 | Germany | |
| 23. | RAINSHADOW | 6 | 1 | USA | |
| 24. | LEITRA ADVENCE | 5 | 5 | Austria | |
| 25. | BRIES | 5 | 5 | Belgium | |
| 26. | ALLEWEDER 5 (AAW) | 5 | 2 | Germany | |
| 27. | CABRIOVELO | 5 | 4 | Germany | |
| 28. | TRISLED SORCERER SERIES IV. | 4 | 0 | Australia | |
| 29. | VELAYO | 3 | 3 | Germany | |
| 30. | AERORIDER SPORT | 3 | 2 | the Netherlands | |
| 31. | BUTTERFLY | 2 | 0 | Switzerland | |
| 32. | BEZERK | 1 | 0 | Australia | Estimate |
| 33. | GLYDE | 1 | 0 | Australia | Estimate |
| 34. | REFLEX | 1 | 0 | Australia | Estimate |
| 35. | TRISLED AVATAR | 1 | 1 | Australia | Estimate |
| 36. | BAKMOBILE | 1 | 0 | Belgium | |
| 37. | CARCYCLE | 1 | 0 | Canada | |
| 38. | LA FLECHE | 1 | 0 | France | Estimate |
| 39. | CARNOT | 1 | 0 | New Zealand | |
| 40. | BERKUT | 1 | 0 | Russia | Estimate |
| 41. | PED-3 | 1 | 1 | Slovenia | Estimate |
| 42. | BRICYCLE | 1 | 1 | USA | |
| 43. | RAINSHADOW | 1 | 0 | USA | |
| 44. | STORMY WEATHER | 1 | 0 | USA | Estimate |
| 45. | SINCLAR 5 | 1 | 0 | United Kingdom | Estimate |
| 46. | WEGA | 1 | 1 | | Estimate |
| 47. | Other velomobiles | 60 | 19 | | Estimate |
| | TOTAL | 2300 | 350 | | |

2nd chart

| Velomobile manufactures in the order of the 2008-year manufactures (pcs) | | | | | |
|--|-----------------------------|-------------|------------|-----------------|----------|
| | Type of Velomobiles | Total | 2008. | Country | Note |
| 1. | QUEST 26" | 187 | 73 | the Netherlands | |
| 2. | SINNERMANGO | 62 | 41 | the Netherlands | |
| 3. | GO-ONE | 200 | 30 | Germany | |
| 4. | ALLEWEDER 3- 4 (AAW) | 170 | 29 | Germany | |
| 5. | SUNRIDER | 34 | 26 | the Netherlands | |
| 6. | ALLEWEDER 6 (AAW) | 20 | 20 | Germany | |
| 7. | WAW | 60 | 15 | Belgium | |
| 8. | LEIBA XSTREAM | 15 | 15 | Germany | |
| 9. | CAB-BIKE | 150 | 10 | Germany | |
| 10. | VERSATILE | 75 | 9 | the Netherlands | |
| 11. | THUNDERSTORM | 9 | 9 | Austria | |
| 12. | LEIBA CLASSIC | 39 | 8 | Germany | |
| 13. | MILAN | 7 | 7 | Germany | |
| 14. | LEITRA | 299 | 6 | Denmark | |
| 15. | LEITRA ADVENCE | 5 | 5 | Austria | |
| 16. | BRIES | 5 | 5 | Belgium | |
| 17. | AERORIDER | 50 | 4 | the Netherlands | |
| 18. | CABRIOVELO | 5 | 4 | Germany | |
| 19. | LEIBA BRISE | 7 | 3 | Germany | |
| 20. | VELAYO | 3 | 3 | Germany | |
| 21. | ALLEWEDER 5 (AAW) | 5 | 2 | Germany | |
| 22. | AERORIDER SPORT | 3 | 2 | the Netherlands | |
| 23. | RAINSHADOW | 6 | 1 | USA | |
| 24. | TRISLED AVATAR | 1 | 1 | Australia | Estimate |
| 25. | PED-3 | 1 | 1 | Slovenia | Estimate |
| 26. | BRICYCLE | 1 | 1 | USA | |
| 27. | WEGA | 1 | 1 | | Estimate |
| 28. | ALLEWEDER 1-2 (FAW) | 500 | 0 | the Netherlands | |
| 29. | QUEST 20" | 129 | 0 | the Netherlands | |
| 30. | MANGO | 114 | 0 | the Netherlands | |
| 31. | LIMIT (C-Alleweder) | 40 | 0 | the Netherlands | |
| 32. | BOREALIS (TRICE) QNT | 12 | 0 | Canada | |
| 33. | AURORA NIMBUS | 8 | 0 | Canada | |
| 34. | TRISLED SORCERER SERIES IV. | 4 | 0 | Australia | |
| 35. | BUTTERFLY | 2 | 0 | Switzerland | |
| 36. | BEZERK | 1 | 0 | Australia | Estimate |
| 37. | GLYDE | 1 | 0 | Australia | Estimate |
| 38. | REFLEX | 1 | 0 | Australia | Estimate |
| 39. | BAKMOBILE | 1 | 0 | Belgium | |
| 40. | CARCYCLE | 1 | 0 | Canada | |
| 41. | LA FLECHE | 1 | 0 | France | Estimate |
| 42. | CARNOT | 1 | 0 | New Zealand | |
| 43. | BERKUT | 1 | 0 | Russia | Estimate |
| 44. | RAINSHADOW | 1 | 0 | USA | |
| 45. | STORMY WEATHER | 1 | 0 | USA | Estimate |
| 46. | SINCLAR 5 | 1 | 0 | United Kingdom | Estimate |
| 47. | Other velomobiles | 60 | 19 | | Estimate |
| | TOTAL | 2300 | 350 | | |

| | | Users of Velomobiles | | | | | | | | | | | | | | | | | | | | | | | | 3rd chart Manufacture | |
|-----------|----------------------|----------------------|-----------------|-------|--------|---------------|----------|-------|-----------|-------------|-------|-----|-----------|-------------|----------|---------------|----------|--------------|--------|-------|--------------|-----------|-----------------------------|-------------------|-----------------------|--------------------------|------------------------------|
| | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | 25. | 26. |
| Countries | | ALLEWEDER 1-2 | QUEST | LETRA | GO-ONE | ALLEWEDER 3-4 | CAB-BIKE | MANGO | VERSATILE | SINNERMANGO | LEIBA | WAW | AERORIDER | C-ALLEWEDER | SUNRIDER | ALLEWEDER 5-6 | BOREALIS | Thunderstorm | AURORA | BRIES | Letra Avance | BUTTERFLY | Others types of velomobiles | TOTAL USERS (pcs) | Users distribution, % | TOTAL PRODUCTION (pcs) | Manufacturer distribution, % |
| | | 1. | The Netherlands | 360 | 228 | 2 | 10 | 75 | 6 | 77 | 60 | 45 | 2 | 10 | 37 | 29 | 29 | 3 | | | | | | | 41 | 1013 | 44 |
| 2. | Germany | 68 | 39 | 152 | 140 | 75 | 81 | 19 | 8 | 8 | 48 | 6 | 7 | 5 | 5 | 22 | 2 | | | | | | 29 | 714 | 31 | 621 | 27 |
| 3. | Belgium | 20 | 11 | | 5 | 10 | 5 | 6 | 4 | 2 | 2 | 28 | 2 | 2 | 1 | | | | | 5 | | | 4 | 108 | 5 | 66 | 3 |
| 4. | USA | 14 | 10 | 17 | 10 | 5 | 13 | 2 | 3 | 2 | 2 | 5 | 1 | 1 | 1 | | 3 | | 3 | | | | 4 | 96 | 4 | 9 | 0,4 |
| 5. | Denmark | 1 | 1 | 74 | 3 | 1 | 5 | | | | 1 | 2 | | | | | | | | | | | 4 | 92 | 4 | 299 | 13 |
| 6. | Canada | 6 | 4 | 3 | 2 | | 15 | 1 | | 1 | | 3 | 1 | | | | 5 | | 5 | | | | 2 | 47 | 2 | 21 | 1 |
| 7. | France | 9 | 6 | 5 | | | | 2 | | 1 | 1 | 2 | 1 | 1 | 1 | | | | | | | | 1 | 30 | 1 | 1 | 0,0 |
| 8. | Schweiz | 4 | 1 | 16 | | | | 2 | | | | | | | | | | | | | | 2 | 1 | 26 | 1 | 2 | 0,1 |
| 9. | United Kingdom | 8 | 6 | 4 | | | | 1 | | 1 | 1 | | 1 | 1 | 1 | | 2 | | | | | | 1 | 26 | 1 | 1 | 0,0 |
| 10. | Austria | | | 7 | | | | | | | | | | | | | | 9 | | | 5 | | 1 | 22 | 1 | 14 | 1 |
| 11. | Norway | 2 | 1 | 6 | | | | 1 | | | | 1 | | | | | | | | | | | 1 | 12 | 1 | | |
| 12. | Sweden | 1 | | 7 | | | | 1 | | | 1 | 1 | | | | | | | | | | | 1 | 12 | 1 | | |
| 13. | Finland | 2 | 1 | 1 | | | | 1 | | | 1 | 1 | | | | | | | | | | | | 7 | 0 | | |
| 14. | Japan | 2 | 1 | 1 | | | | 1 | | | | | | | | | | | | | | | | 5 | 0 | | |
| 15. | Italy | 1 | 1 | | | | | | | | 1 | | | | | | | | | | | | | 3 | 0 | | |
| 16. | Australia | 1 | 1 | | | | 1 | | | | | | | | | | | | | | | | | 3 | 0 | 8 | 0,3 |
| 17. | New Zealand | | | 2 | | | | | | | | | | | | | | | | | | | | 2 | 0 | 1 | 0,0 |
| 20. | Hungary | | | | | | | | | | 1 | | | | | | | | | | | | 1 | 2 | 0 | 1 | 0,0 |
| 18. | Israel | | | 1 | | | | | | | | | | | | | | | | | | | | 1 | 0 | | |
| 19. | Slovenia | | | 1 | | | | | | | | | | | | | | | | | | | | 1 | 0 | 1 | 0,0 |
| 21. | Ireland | | | | | | | | | | 1 | | | | | | | | | | | | | 1 | 0 | | |
| 22. | Others | | 5 | | 30 | 4 | 24 | | | | | | | | | | | | | | | | 13 | 76 | 3 | 61 | 3 |
| 23. | TOTAL (pcs, %) | 500 | 316 | 299 | 200 | 170 | 150 | 114 | 75 | 60 | 61 | 60 | 50 | 38 | 37 | 25 | 12 | 9 | 8 | 5 | 5 | 2 | 103,6 | 2300 | 100 | 2300 | 100 |
| | Estimate | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Type distribution, % | 22 | 14 | 13 | 9 | 7 | 7 | 5 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 100 | | | |

Data collection closed on March 31, 2009 2009.március 31.

Manuscript closed on: June 30, 2009

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