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MASTER AND PUPIL – DR. JÁN BRTEK AND I

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Abstract
Large branchiopod studies were born and bred in the Danube basin in some Eastern European countries (the former Czechoslovakia, Hungary, and Romania). The leading expert was the late Dr. Ján Brtek in Slovakia. Large branchiopods are usually habitants of such temporary lakes and ponds as inland bodies of fresh, mineralized, salt water or hypersaline. This article has two distinct goals: (1) to review the history of large branchiopod studies and (2) to draw attention to some of the scientific interest and value of ephemeral aquatic habitats, introducing my reminiscences of Dr. Brtek.
Keywords: Crustacea, large branchiopods, living fossil, Anostraca, Spinicaudata, temporary ponds, underground mineral waters, Mongolia

1. INTRODUCTION

RNDr. Ján Brtek, CSc., the Father of Large Branchiopod Studies, who devoted his lifetime to the research and descriptive works of the primitive crustacean group and accumulated great scientific achievements for more 50 years, was modest and self-effacing man (Figure 1). As his style of living, he passed away peacefully. His strikingly original works are supported by his bold touch and direct expression of drawing, differ from those of miniaturists. Brtek's drawing attracted me to be one of his followers. Late in life, illness prevented him from drawing. I deeply regret his adversity.

As World War II came to an end, Ján Brtek moved with all his family, i.e. his parents and two brothers from the country into Bratislava, which was the largest city next to Prague, the capital of the former Czechoslovakia.

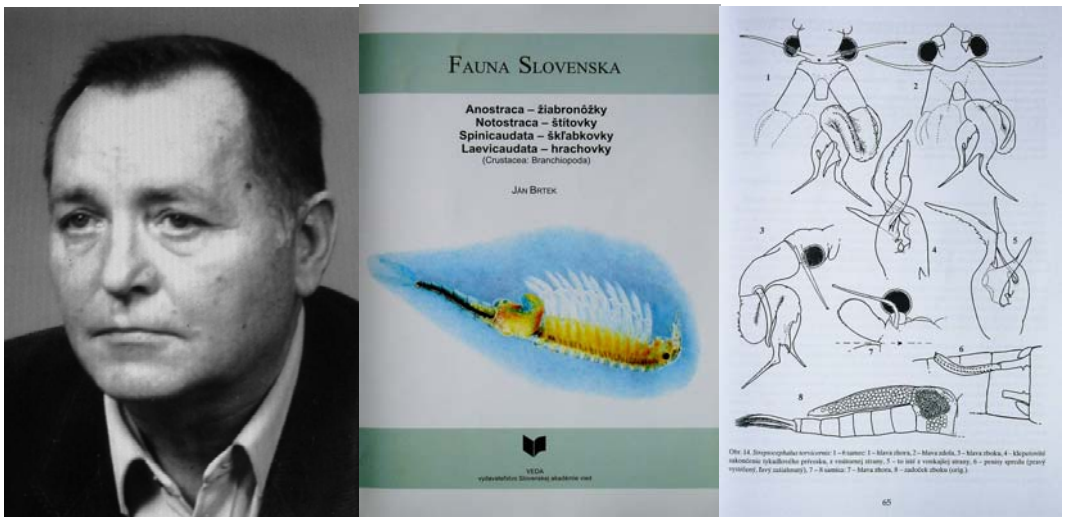

Fig.1. Dr. Ján Brtek (1926–2005) and his last work (Brtek, 2005)

Under the influence of his father who was a technical official of the chair of zoology at the university, the eldest son Ján was fascinated by the Blue Danube and he gave himself up to the world of hydrobiology more and more. After obtaining the degree of Doctor of Science (RNDr., CSc.) from the former Czechoslovakia, Ján got a position as an assistant professor, but he resigned it soon before his 30th birthday. And then he has been constant in his devotion of a lifetime to research on the hydrofauna, as a worker at the regional natural history museum (Mura et al., 2006). The above is the gist of his personal history which I partly understand now.

2. LARGE BRANCHIOPOD STUDIES

There is a great gap in age between Brtek and I, and it is more than that of a true father and son. When I was born in the 1960s in Japan, he had already made great undertakings (Table 1). On this account, although it was when I was eleven years old that I took up the observations on large branchiopods, at that time I did not recognize such a great European large branchiopod worker as Brtek at all – I was only a schoolchild in Japan then. Thus, I have had no acquaintance with him for so many years. After my growing up to be a man and when I was absorbed in large branchiopod studies as a fledgling hydrobiologist, but even then, I had still imagined him as an unapproachable person. For he received wide recognition and my impression of his publications was quite strong, even awe-inspiring.

Table 1. Brilliant scientific achievements (Naganawa et al., 2007)

(1) Large branchiopods described by Ján Brtek
- Anostraca: *Chirocephalus hardingi* Brtek, 1965
  - *C. murae* Brtek and Cottarelli, 2006
  - *C. orghidani* Brtek, 1966
  - *C. povolnyi* Brtek, 1967
  - *C. slovacicus* Brtek, 1971
  - *C. tereki* Brtek, 1984
  - *C. vornatscheri* Brtek, 1968
  - *Eubranchipus moorei* Brtek, 1967
  - *Branchipodopsis brehmi* Brtek, 1997
  - *Tanymastigites cyrenaica* Brtek, 1972

(2) Taxa founded by Ján Brtek
- Anostraca: Family Artemiopsidae Brtek, 1966
  - Subfamily Branchinectellinae Brtek, 1966
  - Subgenus *Creaseria* Brtek, 1966
  - Subgenus *Forbesia* Brtek, 1966
  - Family Linderiellidae Brtek, 1964
  - Genus *Dexteria* Brtek, 1965
  - Genus *Linderiella* Brtek, 1964
  - Subfamily Branchipodopsinae Brtek, 1997
  - Subfamily Metabranchipodinae Brtek, 1972
  - Subfamily Pumilibranchipodinae Brtek, 1997
  - Subfamily Tanymastiginae Brtek, 1972
  - Genus *Tanymastigites* Brtek, 1972
  - Subgenus *Branchinellopsis* Brtek, 1997
  - Genus *Gurneya* Brtek, 1996

(3) Taxa named in Ján Brtek's honor
- Anostraca: *Tanymastigites brteki* Thiéry, 1986
- Spinicaudata: Genus *Brtekia* Naganawa, 2001

Extremely modest and shy man – this is Professor Mura's (University of Rome "La Sapienza", Italy) impression of Brtek. She is one of his lifelong friends. Because of such a gentle character, it was unusual for him to come into conflict with others, but unexpectedly, he was nevertheless apt to be misunderstood by his very seriousness. Indeed, once he wrote in his letter to me as follows: "Please accept my comments as straight; however,

redundant words and unsubstantial smudging phrases have no application to cordial and amicable efforts to improve some your conceptions."

The Danube basin has been regarded as a birthplace of the study of the primitive crustacean group. Large branchiopod crustaceans: the Anostraca (fairy shrimp), Notostraca (tadpole shrimp), Spinicaudata and Laevicaudata (clam shrimp) are characterized by a multi-segmented trunk, ending with a telson bearing two prong-like furcal rami. The trunk comprises a thorax and abdomen of near identical ring-like somites, and thorax bears two distinct sets of numerous appendages. Fossil records and the associated biota of common Jurassic-Cretaceous (about 140–65 million years ago) freshwater fish *Lycoptera* together with charophytes indicate a freshwater environment. Like modern large branchiopods, the fossil ones appear to have been predominantly a detritivore or a filter feeder, and probably also a facultative predator. They may well have had a short life cycle, developing and molting rapidly in mainly temporary freshwater, mineralized water, or saline ponds or shallow pools along rivers and lakes (Naganawa and Zagas, 2006).

The evolution with various survival strategies of large branchiopods as living fossil is fascinating to us and it is a useful focus for a discussion. For example, they were successful in gaining the ability to produce and use hemoglobin not only for respiration under hypoxic conditions but also for keeping of diapause in the resting eggs (Naganawa and Brtek, 2006). Furthermore, there are evidences of a mutualistic relationship between some green algal epibionts and their host, one of East Asian anostracans *Branchinellites kugenumaensis* (Ishikawa, 1895), indicating a positive cost-benefit balance for both of them (Naganawa and Zagas, 2006).

3. MONGOLIA – THE FINAL FRONTIER

A classical monograph about fossil Conchostraca (currently divided into Spinicaudata and Laevicaudata) from Mesozoic Mongolia written by a Russian paleocarcinologist (Novojilov, 1954) has been assigned to me by Brtek, for he well knew that I am an energetic worker of East Asian large branchiopods. In addition, he asked me about Novojilov's present address for contact. Brtek supposed it was not so difficult for me to earn the answer, because I was working then at one of the scientific institutions in Russia.

Evidently his supposition was quite right, but unfortunately, Professor Novojilov already passed away about fifteen years ago. I told the whole truth to Brtek, and then he soon replied to me and gave me another proposal instead of the question. He wrote to me, "Find out the truth of the unconfirmed lakes appearing in Novojilov's monograph." At first it seemed to me Brtek's second question was much difficult, but, it is surprising that my dream of making a fieldwork at the Gobi region in Mongolia has come true some months later. The lakes remain there as they were in 1950s!

According to the Institute of Meteorology and Hydrology, Ministry of Nature and Environment of Mongolia (Ulaanbaatar), there are at least 500 temporary water bodies of various sizes in the arid regions of Mongolia, potentially harboring large branchiopods, whereas my own estimations of potential habitats for large branchiopods throughout the country reach over 2500. Recently, a Russian-Mongolian joint research team elucidated the gaseous composition of the underground mineral waters all over Mongolia (Pisarsky et al., 2003; Ganchimeg, 2006). There are three underground water provinces in Mongolia: (1) Nitric thermal waters (southwestern and north-central parts); (2) Carbonic cold waters (northeastern part); and (3) Methanoic salt waters (southern and northwestern parts). It is very interesting that the gaseous composition of the underground waters directly reflects the quality of the temporary waters placed just above them.

Our expeditions are the long-term mission: to explore new limnoworlds for large branchiopods; to seek out new species, new populations, and new limnofauna and flora; to boldly go where no people have gone before.

Letters from Brtek to me always contained cordial greetings to my wife Tatiana and my son Toshio, and also for myself, the words that he was looking forward to hearing from me soon. Once I received a letter dated of the 18th of February, 2004 from him, but I couldn't reply soon; during my official trip for a scientific meeting my son urgently entered hospital. And our exchange of letters stopped since. According to Professor Mura, it was not long before Brtek suffered from a cerebrovascular accident and then he was bedridden. I didn't know the fact for long time. He couldn't even walk and speak because of total paralysis, he remained conscious, though.

4. VOYAGE FOR NEXT GENERATION

After a year and more, and when the late summer heat was very severe in Japan, I received a foreign mail covering with a gray, rough recycled paper. The address written by a masculine hand was quite familiar to me, at the same time, I felt it to be a handwriting made by a complete stranger to me because of my long silence. The mail was postmarked Bojnice September 2, 2005. There had no letter in it; only a new publication written in Slovak produced by Brtek was enclosed. He well knew that I understand Slovak and as he had promised he presented me his latest work. Probably he wrote my name and address on the envelope by using all his strength. And then, on the 23rd of the next month he ended his life as long as 79 years.

Among his memoirs the vividest matter for me is that once he denied my proposal of coauthorship. He wrote, "My present situation is transitory and a bit complicated, so my current cooperation with you may act as a brake on your work." This is the reason; he only wanted to behave himself just like him. Yes, he was on the bed of sickness and every day and night he was surely looking forward to hearing from me in a distant, strange land. My

wife Tatiana asked me every moment, “Have you already sent a reply to Dr. Ján Brtek?” I am regretting my sin; I should have replied to him soon.

I dedicate this article to the memory of my mother Koto Naganawa.

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