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**BABBAGE'S CALCULATING MACHINES, THE PROTEUS
FROM POSTOJNA CAVE, AND THE CARNIOLAN MUSEUM
SOCIETY**

**BABBAGEJEVI RAČUNALNIKI, PROTEUSI IZ POSTOJNSKE
JAME IN KRANJSKO MUZEJSKO DRUŠTVO**

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Abstract

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Stanislav Južnič: Babbage's Calculating Machines, the Proteus From Postojna Cave, and the Carniolan Museum Society

We verified some data in Shaw's description of Babbage's visit to Postojna. To compare with, we calculated the exact date of Babbage's voyage from his own descriptions. We researched the motives for his interests in the Proteus anguinus. We described other Babbage's scientific activities at the time of his visit to Carniola. We claimed his surprising incompetence in geography. In Babbage's time, Carniolan scientific research of the Proteus anguinus began under Dežman's leadership of the Museum Society. For the first time we researched the early Carniolan contribution to the Proteus research. We discussed possible reasons for the previous neglect of the Museum Society work and Dežman's publications in particular.

Key words: Babbage, Proteus anguinus, Postojna, Slovenia Karst, Karel Dežman.

Izvleček

551.44 (497.4)(091)

Stanislav Južnič: Babbagejevi računalniki, proteusi iz Postojnske jame in Kranjsko Muzejsko društvo

Dopolnili smo Shawovo raziskovanje Babbagejevega obiska Postojne. Preverili smo čas Babbageovega potovanja po Kranjski in skušali ugotoviti od kje njegovo zanimanje za postojnsko človeško ribico. Seznanili smo se s tedanjimi Babbagejevimi znanstvenimi hotenji in opozorili na njegovo domala smešno nepoznavanje geografije. Babbagejeve zmede s postojnskimi ribicami so sovpadale z prvimi domačimi preučevanji lastnosti le-teh pod okriljem Muzejskega društva za Kranjsko. Prvič v slovenskem zgodovinospisju opisujemo naravoslovna predavanja in pogovore o proteusu na mesečnih sestankih društva pod Dežmanovim vodstvom. Predstavili smo verjetne vzroke za dosedanje zapostavljanje delovanja Muzejskega društva in še posebej Dežmana.

Ključne besede: Babbage, Proteus anguinus, Postojna, slovenski kras, Karel Dežman.

INTRODUCTION

The foreign visitors always admired *Proteus anguinus* from Carniola and carried several samples with them. The *Proteus* was widely discussed in correspondence between Scopoli from Idrija and Linné of Sweden. Before Shaw's publication, it was not widely known that the famous English mathematician Babbage took part in that kind of export from Carniolan caves. He was probably not aware of the damage he is doing in the karst area with destroying the samples of *Proteus*.

BABBAGE IN POSTOJNA

During his travels, the famous Charles Babbage (* December 26, 1792 London; † October 18, 1871) loved to collect things that were not directly connected with his own scientific pursuits, but might yet be highly interesting to other people he knew. If those findings were not too heavy, he was willing to purchase them because he was certainly rich enough. On one occasion Babbage visited Postojna (Adelsberg) in Carniola; he was not very fluent in the geography and in his letter sent back home put the town into neighboring Styria. It was a little mistake for a great man, but quite a great error for the small town of Postojna, famous and proud for its cave and the karst region around it. Babbage took a look at "human fishes" that he rightly recognized as the *Proteus*. He described the animal as the "creature living only in the waters of dark caverns, which has eyes, but the eyelids cannot open". That interesting and right description of the *Proteus* could be among the oldest in English language.

Babbage hired some local people to hunt as much samples of the *Proteus* as they could; eventually six was the highest number he could afford. He paid quite a lot of money for them, although he did not specify the amount and we could only make a rough guess. It was a small expense for a wealthy man of his kind, anyway.

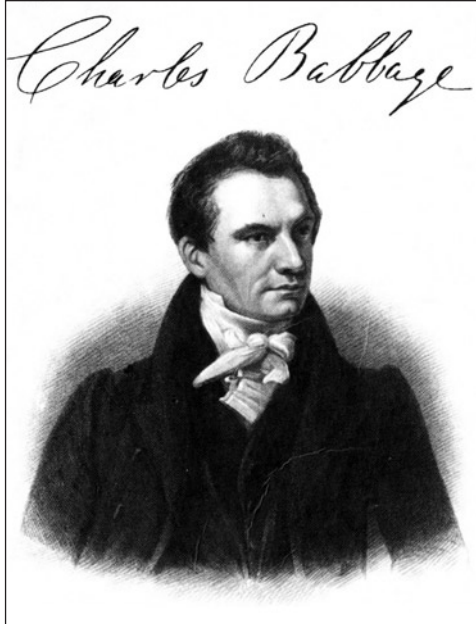


Figure 1: Charles Babbage (1792-1871).

Slika 1: Charles Babbage (1792-1871).

During the night he kept *Proteus* in a large bottles filled with river water. He was very proud of his new pets that he even changed their water every night. During the journey, Babbage placed the bottles in "large leathern bags lashed to the barouche seat of his calash". During the nights, he usually placed the animals "in a large wash-hand basin of water, covered over with a napkin". He frequently visited them with a candle during the nights. The animals behaved in an especially extraordinary manner during such night visits. One of them even jumped out from the vessel and received the real admiration of its new English owner. Babbage knew quite a deal about the famous *Proteus anguinus* and showed his samples to the people he met during his travels. The rare animals were matters of

great interest to many naturalists Babbage visited in his rambles, and procured for Babbage “several very agreeable acquaintances”.

Babbage felt very sad when all of his *Proteus anguinus* died one after another during his voyage to Ljubljana, Vienna, Prague, and Berlin. The first of Babbage’s new pets died at Vienna, and another in Prague. Just two were still alive in Berlin, among them probably his favourite one who used to jump out from the vessel. Sadly enough, even the very last died far away from home in Prussian land.

So the *Proteus anguinus* “gloomy lives terminated”. As a practical man, Babbage just preserved the animals in spirits. He sent them to his friends to English universities, English colonies and even as far as India. May be those *Proteus anguinus* were among the very first to reach Indian subcontinent.

Certainly, Babbage’s butler was to blame for the tragedy of little animals; he changed their water from the ordinary kitchen pipe although he was supposed to use the river water (Shaw 1999, 240-244, 290-291). Probably the servant did not bother too much about science and just took the easiest way.

Babbage did not tell us the date of his visit in Postojna, but Shaw discovered his signature at the book of Postojna guests signed on July 17, 1828. Babbage’s own story verified the date. In 1827, he was on a longer visit in Florence as a guest of the grand duke Leopold II on several occasions. From Florence Babbage travelled to Berlin. He arrived during the autumn of the year 1828 and met Alexander von Humboldt (* 1769; † 1759) there. Babbage’s old friend Humboldt told him that in a few weeks German naturalists and physicians will have their yearly meeting in Berlin (Babbage 1994, 287, 323-324). Certainly, Babbage travelled from Florence to Berlin through Postojna, although he did not give us any other detailed information about his journey schedule. From those dates, we could conclude without doubt that Babbage bought the Postojna *Proteus* in July 1828; he was thirty-seven at that time. During his trip, Babbage had already finished his first work on the differential engine, which was the real ancestor of the modern computers. We are sure that he had many things to talk about with his occasional travel friends he met in Carniola and nearby when he was proudly showing them his samples of *Proteus anguinus* in the mid while.

BABBAGE’S SOURCES ABOUT CARNIOLAN KARST PHENOMENA

Babbage very early in his teens realized that British mathematicians are staying behind the continental European scientific development of his time. Therefore, he demanded the copying of European achievements and he even organized Analytical Society with his friends George Peacock and John Herschel in 1812.

Babbage’s interest in the sophisticated European science was the main reason for his European travel that brought him as far as Postojna. We can only guess if he met the best Carniolan scientists of his time. The leading Ljubljana scientist of the era Žiga Zois (* 1747; † 1819) died before Babbage could meet him. The famous Pole Karol Schulz Edler von Strassnitzki (Strasznicki, * March 3, 1803 Krakow; † 1852) taught mathematics at Ljubljana Lyceum between 1827 and 1834. Schulz von Strassnitzki had already published mathematical articles and a book and in 1840 he published his famous series for the calculation of the number π ; Babbage with his European orientation was probably aware of his work. On the other hand, Schulz von Strassnitzki was eleven years younger.

Janez Krstnik Kersnik (* March 26, 1783 Moste pri Žirovnici na Gorenjskem; † 24. 6. 1850 Ljubljana) taught physics and chemistry at Ljubljana Lyceum, but he was certainly not a scientist of Schulz von Strassnitzki or even Babbage's rank. The last but not the least, there was very successful Franc de Paula Hladnik (* March, 29, 1773 Idrija; † November 25, 1844 Ljubljana), the botanical student of Franc Ksaver Wulfen (* November 5, 1728 Beograd; † SJ October 14, 1745 Košice; † March 17, 1805 Celovec).

Where did young Babbage learn about the *Proteus Anguinus* and Postojna cave? Baron Žiga Zois probably told the scientific world about the *Proteus* of the Postojna caves in the first place (Davy 1831, 176). Seven years before Babbage's visit, the famous Congress of the Holy Alliance took place in Ljubljana and made Carniola the centre of the world for a little while. Postojna was already a famous tourist place in Babbage's time. Most of later English travelers took the information about Carniola from William Archibald Cadell (* June 27, 1775 Carron Park; † February 19, 1885 Edinburgh) and Sir Humphry Davy's (December 17, 1778 Penzance Cornwall; † May 29, 1829 Geneva) writings (Čermelj 1963, 35-36). Mathematician Cadell became a fellow of the Royal Society on June 28, 1810; during time of Napoleonic war he was even in a French prison and escaped only after some years by pretending to be a Frenchman. His excellent knowledge of all sorts of languages including French and Slovene helped him a great deal in his adventures. Babbage became a fellow of the Royal Society in 1816 and Davy became the president of the Royal Society on November 20, 1820. Immediately after Davy's death Babbage published a controversial book against the scientific politics of England and the Royal Society in particular in 1830. We could suspect Babbage and



Figure 2: Sir Humphry Davy (December 17, 1778 Penzance Cornwall; † May 29, 1829 Geneva) in the time of his Carniola travels (National Portrait Gallery, London).

Slika 2: Sir Humphry Davy (17. 12. 1778 Penzance Cornwall; † 29. 5. 1829 Geneva) v času svojih popotovanj po Kranjskem.

Davy's political views were not exactly the same. Babbage certainly read his fellow mathematician Cadell's writings and as a mathematician liked him better than Davy.

Davy visited Postojna for the very first time in July 1819, nine years before Babbage. Did Davy meet his thirteen years younger fellow-countryman Babbage in Carniola? Davy and his friend's son physician John J. Tobin left London on March 29, 1827; they hunted and fished around Ljubljana between May 4 and May 18, 1827. From August 30 until October 6, 1828, Davy and Tobin were in Ljubljana again and afterwards crossed Postojna area in his way to Trst (Brilej 1953, 11-12; Čermelj 1963, 6). On their way back, they stayed in Postojna until October 13, 1828. Davy liked Črna jama better than Cerknica lake, and speculated about the breathing system of the *Proteus* using Harvey's theories of blood circulation. Tobin, called "Eubathes" in Davy's book, was a student of the famous Scott Joseph Black (* 1728; † 1799) and claimed somewhat a different explanation of the *Proteus* breathing combustion carbon process (Davy 1831, 181, 185).

Tobin mentioned in a footnote, that he had already examined the behaving of the moving *Proteus* in the water; he got the specimen from the "professor of Ljubljana" whose name Tobin unfortunately did not tell us. Probably the professor



Figure 3: One of the very first Postojna postcard made after Babbage's death.

Slika 3: Ena prvih razglednic Postojnske jame, posneta po Babbagejevi smrti.

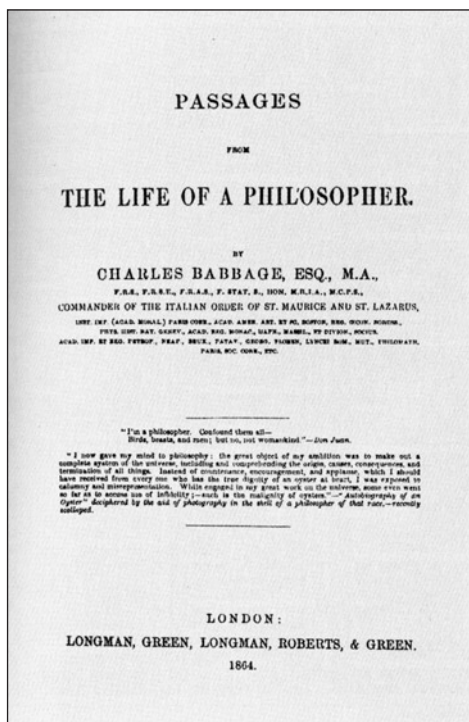


Figure 4: The head-page of Babbage's book containing his *Proteus Anguinus* story.

Slika 4: Naslovnica spisa, v katerem je Babbage opisal svoj obisk pri nas in zaplete s človeškimi ribicami.

was Hladnik himself. Therefore, Tobin liked the extraordinary *Proteus* and looked for some samples in the Črna jama waters, but in vain (Tobin 1832, 158, 164-165, 197).

Since Babbage was in the same area visiting Postojna on July 17, 1828, they probably just missed each other. Davy was already very ill at the time and probably did not care too much to meet his extravagant country-man Babbage. Davy wrote some visions of his *Consolations* during his travel through Carniola and finished the book with a preface dated in Rome on February 21, 1829, when he was already mortally ill (Tobin 1832, 120; Davy 1831).

THE PROTEUS RESEARCH IN LJUBLJANA AFTER BABBAGE'S VISIT

Both Davy and Babbage were on pretty much the same route and it was more or less just coincidence that they did not meet each other. They were both interested in local affairs and probably noticed some scientific achievements of the local people. Carniolan natives soon continued the foreign research of the *Proteus Anguinus*, especially at the regular monthly meetings of the Museum Society led by its capable Museum curator Karel Dežman (Deschmann, * 1821; † 1889). On July 8, 1857, Dr. Karel Vesel (Vesel, October 13, 1808 Postojna; † January 27, 1863 Ljubljana) presented to the Museum two of Dr. Hyrtl's letters about the anatomy of *Proteus anguinus* from Črna jama in Postojna. Vesel received the letters a decade after Babbage's visit in 1842 and 1843, when the famous anatomist Hyrtl was still professor in Prague. The Italian Mauro Rusconi (* 1776; † 1849) had previously discussed the same *Proteus* anatomy questions in his work that Vesel cited as *Saggio sul proteo anguineo*, probably the work published with a slightly different title in 1819 (Confogliachi & Rusconi 1819).

In the second letter, Hyrtl discussed his microscope observations. He examined the organs of twelve Vesel's excellent samples of the *Proteus anguinus*. Hyrtl later published the details of his discoveries in Müller's *Archiv*. Hyrtl compared the skeleton of *Proteus anguinus* with Diluvium *Ichthiosaurus* (*Ichtyosaurus*) and an other amphibian (Dežman 1858, 119-120). The dolphin-like reptile *Ichtyosaurus* measured about 6.5 feet (2m) and was certainly much bigger than *Proteus*; but their functions somewhat resembled each other.

Dr. Vesel was interested in *Proteus* from his very youth in Postojna. He studied medicine in Vienna together with a veterinary surgeon Janez Bleiweis (* 1808; † 1881). Vesel finished his studies a year after Bleiweis with a dissertation at the faculty of medicine defended on June 15, 1833. From 1834 until 1836, Vesel was a physician in Ljubljana, later until 1840 in Ribnica



Figure 5: Johann Peter Müller (* 1801 Koblenz; † 1858) at the time he published Hyrtl's *Proteus* research in his *Archiv*.

Slika 5: Johann Peter Müller (* 1801 Koblenz; † 1858) v času, ko je v svojih Arhivih objavil Hyrtlovo raziskovanje *Proteusa*.

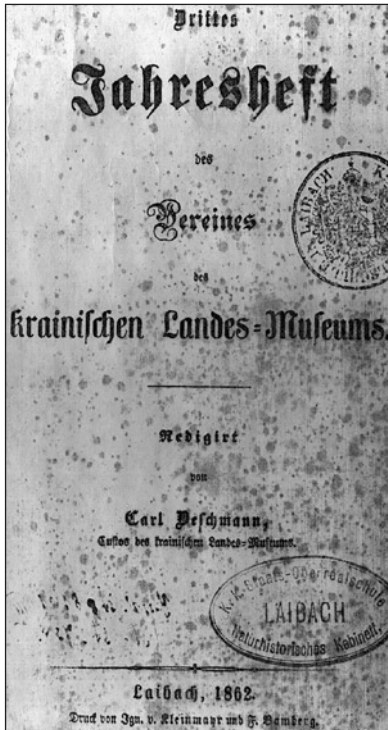


Figure 6: The head-page of Dežman's Acts of Museum Society of Carniola published in 1862.

Slika 6: Naslovnica Dežmanovega Glasila Muzejskega društva iz leta 1862.

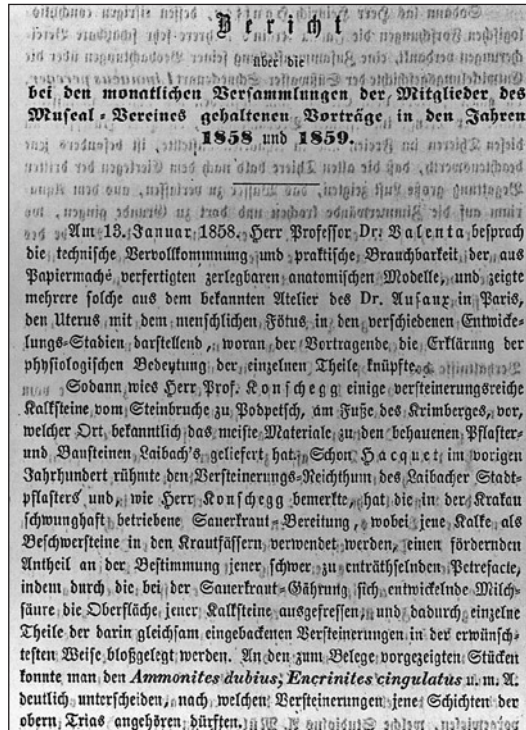


Figure 7: The head-page of Dežman's yearly reports on monthly meetings of Museum Society of Carniola published in 1862.

Slika 7: Naslovnica Dežmanovih poročil o mesečnih sestankih Muzejskega društva, objavljena leta 1862.

and finally at his home town of Postojna until 1849. Back home again near the famous cave, he grew interested in *Proteus* again and began his correspondence with somewhat younger Hyrtl. He sent several living *Proteus* of Črna jama to Hyrtl and therefore prepared his famous Bohemian friend for the anatomical discoveries. After Postojna, Vesel returned to Ljubljana as a district physician. Vesel was a member of the *Agricultural Society* in Ljubljana after 1838, and a regular member of the Museum Society. He participated in the movement to build the General Hospital of Ljubljana, which began in 1853. He spoke several times about cholera in Carniola in 1853; the manuscripts of his talks are presently kept at the Archive of the Slovenian physicians. In 1861 Vesel was co-founder of Carniola Reading Society; he gave it his own specialist library as a gift and thus founded library (SBL 13: 425). He also gave some of his natural history books to the Museum Society (Dežman 1886, 280).

Joseph Hyrtl (* December 7, 1810 Eisenstadt; † July 17, 1894 at his home near Vienna) was among the very best anatomy experts of his time in all Habsburg monarchy; it was no surprise that Carniolan Museum Society handled his letters with such a great care and respect. Hyrtl accepted the professorship of anatomy at the University of Prague in 1837. He made a great reputation as a teacher and writer of anatomy in Prague and even hesitated for a little while to accept the chair of anatomy at Vienna in 1845. But he eventually accepted the honour, anyway.

Hyrtl collaborated with Johann Peter Müller (* 1801 Koblenz; † 1858), who edited the very popular *Archiv für Anatomie, Physiologie und wissenschaftliche Medicin* in Leipzig. Müller and his successors published 34 volumes between the years 1834 and 1876. Hyrtl was one of Müller's best early correspondents. Hyrtl's *Archiv* paper about Postojna *Proteus* was widely read. Müller founded the first school of physiology in Germany; among his students was the famous Hermann Helmholtz.

The Ljubljana merchant Dr. Franc Wutscher (Vučer) was a member of the Museum Society in 1856. On 16, 1859, he showed to the members of the Museum Society the characteristics of his anatomical samples of *Proteus anguinus* and described some of his experiments with living specimens. He was especially interested in the breathing system, heart, circulation system, and digestion organs of the animals and observed their behaviour outside the water. Wutscher probably wished to continue his report at the next Society meeting; but there was the break because of the Italian war. (Dežman 1862, 235-236). After the battles of Magenta on June 4, 1859 and Solferino twenty days later, the Lombardy was lost forever from the Habsburg empire. The glory of Habsburg arms was never to recover again, but there were many great scientific achievements still on the program of the dying Danube monarchy.

CONCLUSION

As we might expect, Babbage's visit coincided with the beginning of scientific research on *Proteus anguinus* in Carniola. Babbage was one of the most influential mathematical scientists visiting modern Slovene territory after the Ljubljana Congress in 1821; Davy's and Babbage's visits to Postojna could be considered as second only to Augustin Louis baron Cauchy's (* August 21, 1789 Paris; † May 23, 1857 Sceaux near Paris) stay in Gorica between 1836 and 1838, nearly a decade after Babbage left. Cauchy was the very best mathematician of their time; but Babbage was also notable.

We can hardly guess about Babbage's mathematical interest in Carniola. We only have the data

about his interest in *Proteus anguinus*, which was certainly not the field of his main research interests. Considering Babbage's influence in his own and especially our computer era, we can benevolently forgive him for misplacing Postojna from Carniola into Styria.

Dežman's reports of the Museum Society meetings show him and his circle as the centre of the Ljubljana scientific activities of their time. We suspect Dežman's contributions to the Carniolan sciences were probably neglected because of his political pro-German views and it is probably high time to repair that injustice. He was certainly the first class scientist at several fields including karstology, even if he was probably not always an exceptionally clever politician.

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BABBAGEJEVI RAČUNALNIKI IN PROTEUSI IZ POSTOJSKE JAME

Povzetek

Dopolnjujemo Shawovo raziskovanje Babbagejevega nakupa postojnskih človeških ribic. Čeprav je bil Charles Babbage povsem osredotočen v matematične vede in ni bil pripravljen zbrano poslušati niti opere, kaj šele pocestnih glasbenikov, je vendarle rad zbiral prirodopisne zanimivosti ob svojih popotovanjih. Za *Proteusa* in druge zaklade Postojnske jame je bržkone izvedel iz Cadellovih ali Davyjevih londonskih zgodb, čeprav rojaka Davyja ni osebno srečal na Kranjskem.

Kot razgledan izobraženec svoje dobe se je Babbage zavedal pomembnosti in redkosti človeških ribic. Čeravno ni bil zoolog, je bil pripravljen zanje odšteti kar čedno vsoto denarja in s tem podpreti lokalno postojnsko »črno«^o gospodarstvo. Lepota bistrh živalic je ganila Charlesovo matematično srce, tako da jih je z navdušenjem preučeval, celo ponoči pod svečo. Tako ga je v resnici prizadela služabnikova nemarnost, zaradi katere so živalce poginile na poti od Postojne do Berlina. Babbage je bil seveda bankirjev sin; tako je izgubo živalic sprejel s podedovano gospodarno žilico. Mrtve ubožice je dal po tedanjih navadah preparirati v alkoholu; nato jih je razpošiljal po vsem svetu, celo svojim angleškim prijateljem v Indijo.

Čeprav Babbage ni bil geolog ali krasoslovec, je po Davyjevem vzoru prav rad iskal uteho pred življenjskimi tegobami v popotovanjih. Pot ga je zanesla celo k nam in ga na zanimiv način vpisala v zgodovino raziskovanja jamskih živali. Njegov prispevek k raziskovanju postojnskih človeških ribic je dovolj tehten, da mu lahko oprostimo nedoslednost ob predstavitvi Postojne na Štajersko.

V času Babbagejevega obiska se je na Kranjskem začelo znanstveno raziskovanje človeške ribice podprto z mikroskopiranjem in primerjalno anatomijo. Pomembno spodbudo tedanjim naravoslovnim dosežkom je dajalo Kranjsko muzejsko društvo, ki ga je leta 1855 oživil muzejski kustos Dežman. Ljubljanski naravoslovci so bili tesno povezani s praškimi in dunajskimi strokovnjaki za anatomijo človeške ribice. V tem prispevku prvič v slovenskem zgodovinopisju podrobneje opisujemo poročila o raziskovanju človeških ribic na mesečnih predavanjih in sestankih Društva po poročilih, ki jih je urejal Dežman.