

Otto Bütschli (1848–1920): Where we will genuflect?

Sergei I. Fokin

*Department of Biology, Unit of Protozoology, Pisa University, Italy, and
Department of Invertebrate Zoology, St. Petersburg State University, Russia*

Summary

The article's subject is the life story of Prof. Bütschli and his main achievements in Protozoology and Cytology as well as his relationship with Russian scientists. For the first time the unknown history of his grave and the grave monument are revealed. It has been found out that the grave is located in Karlsruhe but not in Heidelberg, as thought earlier, where the scientist spent 42 most productive years of his life. The article is illustrated with several unique photos.

Key words: Otto Bütschli, ciliates, cytology, Heidelberg, Karlsruhe, protozoology, zoology

Introduction

Johann Adam Otto Bütschli (1848–1920) is a world-renowned German zoologist-protistologist and an eminent cytologist who made an epoch in investigation of unicellular organisms, first of all in Ciliophora studies. Obviously, his name is well-known to readers of this journal, but probably quite often just the name. Despite of his outstanding contribution to the development of Protistology (Protozoology) and general Cytology and education of several generations of zoologists in the last quarter of the XIX – the beginning of the XX centuries, he has been seldom remembered by historians of science until recently (Corliss, 1978; Churchill, 1989, 2010; Fokin, 2000, 2001, 2004, 2011, 2012). Actually, after the death of Bütschli, only his closest students and colleagues devoted to him some articles and memoirs¹⁾ (Goldshmidt,

1920; Gamburger, 1920a; Novikoff, 1922). Later on, there came a long period of silence and only two short publications came out which were dedicated to the century of the scientist (Spek, 1949; Dobell, 1951). Then, again Prof. Bütschli was mentioned in recollections made by his former students (Novikoff, 1952, 1954; Goldshmidt, 1956). Nobody has remembered his 150 anniversary in 1998, and a couple of publications that appeared later on stated only the short biography of the man (Berger, 1970; Zaharias, 2000)²⁾. Quite a big collection of the personal documents that belonged to Prof. Bütschli is located in Heidelberg University Archive (HUA. Rep. 84) and it still awaits thorough investigation.

²⁾ I could not find the other 2 articles dedicated to Prof. Bütschli: “O. Bütschli, Pioneer of Cytology (1848–1920)” and “O. Bütschli” published in 1953 and 1967, correspondingly. A number of short biographies (or biographical data) of the scientist are published in the Internet: for instance, at www.deutsche-biographie.de/sfz7214.html.

¹⁾ Seven articles and the list of publications of Prof. Bütschli were collected in the special issue of the *Naturwissenschaften* journal.

The reasons for Russian scientific community to remember Bütschli's name with gratitude are no fewer, than for the German one (as well as for the others). More than 40 Russian students and scientists studied and worked at his institute and in many respects the roots of Protistology and Zoology of invertebrates in Russia at the beginning of the XX century are connected with the Heidelberg's 'soil' (Fokin, 2004, 2011, 2012). At that time it was acknowledged by Russian community: during the 25-anniversary of O. Bütschli professorship (1903) he was elected a Honorary Member of the St. Petersburg and Moscow universities, and as early as 1895 – a foreign Corresponding Member of Imperial St. Petersburg Academy of Sciences (IAS). Moreover, Russian students of Bütschli after his death have initiated the idea of perpetuating of the scientist's memory by building a monument on his grave. The strange thing is that at the beginning of the XXI century it appeared that already none of the successors of Prof. Bütschli, as well as historians of science, knew where the scientist was buried.

An attempt to find the burial place of Prof. O. Bütschli was one of the reasons of writing this article. It happened so that the year 2013 (when I found the location of the grave) was the year of the 165th anniversary of the scientist. This anniversary is far from being a classical jubilee year, but I am glad that it was possible to celebrate this event in such a peculiar manner.

THE LIFE OF PROFESSOR OTTO BÜTSCHLI AND HIS MAIN ACHIEVEMENTS IN PROTOZOOLOGY AND CYTOLOGY

Heidelberg, Gottingen, Giessen, Leipzig, Munich and Tübingen were the main centres of attraction for Russian biologists in Germany in the XIX – the beginning of the XX centuries, either for study or for research. From the middle of the XIX century, Heidelberg University apparently ranked first among them. In the early 1860s, about 10 percents of its students were our compatriots who usually were coming to work with the certain professors. The University had a notable professorship at its disposal. In different years, the eminent German chemists Robert Bunsen, Ludwig Carius, Emil Erlenmeyer, physiologist Hermann Helmholtz, biochemist Albrecht Kossel worked there. Amongst zoologists, there were such well-known scientists as Heinrich Bronn, Karl Gegenbauer, Heinrich Pagenstecher and Otto Bütschli. The Zoological Institute of the University reached the best condition largely due to efforts of the latter professor. From the time when he became a professor of Zoology at Heidelberg (1878) and up

to the beginning of the World War I (1914) he always attracted most of our compatriots (Fokin, 2012).

There are several purely scientific reasons for such interest. Prof. Bütschli was the one who wrote the first comprehensive scientific treatise on the Protozoa (Bütschli, 1880–1889); who might have claimed the discovery of the process presently known as mitosis; who first recognized the structures now so familiar to everyone as chromosomes, and was the first to understand and correctly interpret the conjugation of ciliated protists (Ciliophora) (Bütschli, 1876); and finally, he was a great lecturer and teacher. We may say that this man was the architect of modern Protistology. Prof. Bütschli worked in the place almost till the day of his death (2 February 1920) and, consequently, Heidelberg became, for many years, the protozoologists's Mecca (Dobell, 1951).

Otto Bütschli was born in Frankfurt-on-Main into a well-to-do merchant family with Swiss (father – Friedrich Bütschli) and German (mother – Caroline Kullmann³⁾) roots. His pathway to Protozoology was, however, not so straight and fast. Bütschli's early interest was in Mineralogy, Chemistry, and Palaeontology; and as a zoologist, and especially as a protozoologist he was largely a self-taught person (like some other great protozoologists).

In 1864, Bütschli got enrolled as a student into the High Polytechnic School (Technische Hochschule) in Karlsruhe, where he studied mainly Mineralogy, Chemistry and Paleontology. During one year there, he was an assistant in Geology and Paleontology under Carl Zittel and in 1866 moved to Heidelberg and worked with Robert Bunsen in Chemistry. But then in 1867 Bütschli passed his examinations not only in those 3 disciplines, but in Zoology as well and got a PhD degree at Heidelberg University. After that, he served one year in the army. Then Otto apparently decided to devote himself to Zoology and went in 1869 to Leipzig for training under the famous zoologist-parasitologist Rudolf Leuckart. However, the Franco-Prussian war (1870–1871) forced him to break off his studies and participate in the war in the rank of an officer. After the war was over, he resumed his scientific activity in Frankfurt, in the his private laboratory. The following two years (1873–1874), the young scientist spent in Kiel as an assistant of Karl Möbius, the founder of Marine Ecology. Until 1876, Bütschli again worked in his native city

³⁾ Spelling of the family name could also be Culmann (www.deutsche-biographie.de/sfz7214.html).



Fig 1. Students junket on a slope of the castle mountain. Heidelberg, engraving of the middle of XIX c. From the collection of S.I. Fokin..

privately. In October 1876, 28 years old Otto made Habilitation (Habilitationsschrift⁴ – *venia legendi*) in the Karlsruhe High Polytechnic School; he was a private-docent there. Fortunately, in 1878 according to the recommendation of Prof. Karl Gegenbauer, he got a chair at the Heidelberg University, where he further worked for over 40 years (HUA. Rep. 84. A11).

O. Bütschli, called by Prof. C. Dobell «an architect in Protozoology» (Dobell, 1951) and by Prof. J. Corliss, «a giant among giants» (Corliss, 1978), began to study ciliates, probably, in 1870, as the first publication in this field made by him appeared in the next year (Bütschli, 1871). Although he was a zoologist of broad interests, it was in Protozoology that he left the greatest trace. It should be stressed again that Bütschli's interest in ciliates and his fundamental knowledge in this area apparently arose from self education: for almost 4 years (1872, 1874–1876) he worked alone in a private laboratory in his native town, Frankfurt-on-Main (Novikov, 1922; Spek, 1949; Fokin, 2004; HUA. Rep. 84. A12).

His first work in Zoology was devoted to a bee development (Bütschli, 1870) and the next one – to ciliates⁵. The young scientist was distinguished by unusual productive capacity in studies and writing:

⁴This qualification is equivalent to the Russian degree of Doctor of Sciences.

⁵In 1866–1869 he published 3 articles in Geology.

for example, in 1871–1872 he published 9 papers (Hamburger, 1920b). In 1873, his first monograph dedicated to free-living nematodes was published. In this monograph O. Bütschli included the data on which after few years he discovered and described the main features of mitosis, the universal process of cell division (Bütschli, 1875, 1876).

During those years in Frankfurt, Bütschli carried out extended microscopical investigations that repudiated Stein's theory of the embryogenetic origin of protozoa and Balbiani's spermatozoid theory of the nucleolus. Alternatively, he promoted very much C. Siebold's unicellular interpretation and declared true biological meaning of conjugation in ciliates. The route to these assertions was a complicated one that took their expositor to the frontier of the new science of Cytology (Churchill, 1989). The definitive descriptions and statements made by Bütschli during those investigations appeared in 1876 as his Habilitationsschrift (Bütschli, 1876).

In the first two chapters of the study, the scientist discussed the earliest developmental events of the eggs of nematodes and snails. There, he clearly illustrated the spindle, equatorial plate and chromosomes of first cleavage. He described the metaphase, anaphase, and telophase in the division of embryonic chick cells. Bütschli had gained through his efforts the recognition that the nuclei of metazoan cells could be identified by the structures and events of division (Churchill, 1989).

In the third, the longest part of the study, Bütschli published a treatise where the functions of ciliate nuclei were correctly interpreted for the first time after the conjectures of Ch. Ehrenberg, F. Dujardin and E. Claparède (Corliss, 1978; Churchill, 1989; Fokin, 2000, 2001) and the transformations of nuclear apparatus during conjugation were elucidated. For this, he used his own observations of the nuclear reorganization process made for more than 10 species of ciliates (Bütschli, 1876). According to the morphology and behavior of the macro- and micronuclei of ciliates, he insisted that the nuclei of these protozoans possessed a strong similarity to, and therefore could be equated with the nuclei of the cells of higher organisms (Bütschli, 1876).

It should be noted that another protozoologist, T. Engelmann, arrived to the similar conclusions simultaneously and independently, proposing the term «reorganization» for conjugation changes of the nuclear apparatus (Engelmann, 1876).

Besides the ciliates' sexual process, Bütschli studied their physiology and morphogenesis, life cycle and cytology. One of greatest impacts of the scientist on Protozoology, of course, was his monumental monograph on the Protozoa in H. G. Bronn's "Klassen und Ordnungen des Thier-Reichs", which appeared in instalments from 1880 to 1889 (published in 3 volumes). It consists of 2035 pages and 79 plates. The third volume (953 pages!) was devoted almost exclusively to ciliates (Bütschli, 1887–1889). This work for many years was the Bible of the protozoologist; it took Bütschli 10 years to write it – "the best years of my life", as he said – and is still, though long out of date, an indispensable source-book for every serious student, for it critically analyzes and summarizes the works of all his predecessors, and gives a complete picture of the state of knowledge at the time when it was written (Berger, 1970).

The cytological investigation area led Bütschli to the analysis of protoplasm (cytoplasm) structure, where he applied his knowledge of colloid and physical chemistry. His classical work in the field was "Untersuchungen über mikroskopische Schaume und die Struktur des Protoplasmas" ("Microscopic forms and the structure of protoplasm") (Bütschli, 1892). The theory of alveolar cytoplasm structure created by Bütschli in 1890s was widespread for a long time (Bütschli, 1892; Novikov, 1922; Hartmann, 1929), and, in some respects, corresponds to the nowadays well-accepted cell matrix concept.

In later life, Prof. Bütschli's work laid mostly outside the field of Protozoology; but those researches into the microphysics and microchemistry of "living matter", and other "structures", led to fundamental

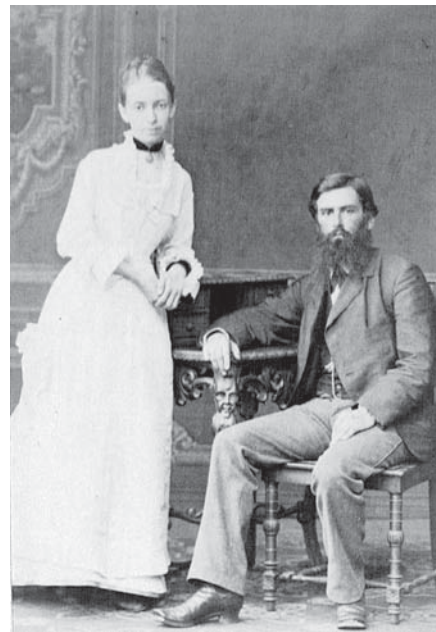


Fig. 2. O. Bütschli with his wife Hedwig. Karlsruhe, 1878? From the archive of L. Groos, Karlsruhe.

discoveries in the domains of colloid chemistry and physics. He also worked on publication of his fundamental "Comparative anatomy course" (Spek, 1949; Berger, 1970). The textbook "Lectures on Comparative Anatomy" was published in four parts, in 1910, 1912, 1921 and 1924, but later his assistant Dr. C. Hamberger edited and published also parts 5 and 6 (1931-1934). The first part was translated into Russian by Bütschli's student, Sergei Chakhotin, who noted in the foreword: "Broad horizons and daring thoughts – this is what distinguishes of Bütschli's lectures" (Fokin, 2012).

Bütschli's appearance at his mature age was figuratively described by Ilya I. Metchnikoff in his memories made on the 100th anniversary of Charles Darwin: "Cambridge wanted to celebrate memory of Darwin <...>. On the eve of an official celebration a large number of scientists from all globe gathered. They were gathered in a solemn hall of the Cambridge University at evening time. Many were in uniform that gave to the meeting a type of masquerade <...>. The German scientists were in cloaks of less bright, but with various attributes, depending on university or academy which representatives they were. Considering this motley crowd, my neighbour was surprised about the scientist passing by, dawned by a long gray-haired beard and dressed in medieval black cloak and the same beret. The question turned to me who could be this man with such majestic bearing and a beautiful physiognomy, I, without hesitation, answered



Fig. 3. O. Bütschli. Heidelberg, 1886. From the collection of the Moscow Society of Naturalists.

that this is doctor Faust of the legend which was immortalized by Goethe. Actually it was the well-known professor Bütschli from Heidelberg, one of outstanding German biologists” (Metchnikoff, 1946. p. 122). It makes sense to mention here that Goethe was the favourite poet of Prof. O. Bütschli.

PROF. O. BÜTSCHLI AND HIS RELATIONSHIP WITH RUSSIAN SCIENTISTS

Prof. Bütschli was not only a great scientist, but also an excellent teacher. During 41 years of his professorship at Heidelberg University (1878–1919), Bütschli raised several generations of students and followers. Among them were such well-known German scientists in different fields of biology as Friedrich Blochmann, August Schuberg, Richard Goldschmidt, Max Hartmann⁶⁾, Robert Lauterborn and Clara Hamburger. Doors of the Zoological Institute of Bütschli were open for students and scientists from all over Europe and, certainly, for Russians, who found a very cordial reception in Heidelberg.

⁶⁾ M. Hartmann studied biology under Prof. R. Hertwig in Munich.

One of his Russian students, later an eminent histologist Aleksey Zavarzin wrote from Heidelberg in 1905: “Well, – after arrival to Heidelberg, I went on the next day to Bütschli with Schewiakoff’s letter. And he, to my astonishment, didn’t banish me, and accepted even very kindly. I have got my place, and since Thursday I started to work. The whole day is spent here for working. About 8–9 Bütschli works in laboratory; from 9–13 he has lectures; from 13–15 – a dinner, and from 15 to 20 again in the laboratory. At ten o’clock it is necessary to go to bed – so the whole day is taken <...>. In Bütschli’s laboratory Russians are more numerous than Germans and it is enough consolatory!”⁷⁾.

As it was mentioned already, more than 40 Russian students and scientists in Biology had attended lectures and worked in Heidelberg in 1878–1914. The following prominent scientists graduated from Heidelberg University under Bütschli’s supervision: zoologist-protistologist, Prof. Wladimir T. Schewiakoff (1859–1930), St. Petersburg and Irkutsk Universities, Imperial Women Pedagogical Institute, vice-minister of the Ministry of Public Education of Russia, a corresponding member of the IAS; Nikolay N. Adelung (1857–1917), a senior zoologist of the Imperial Zoological Museum of the IAS; Wladimir W. Redikortzeff (1873–1942), a senior zoologist of the Imperial Zoological Museum of the IAS; zoologist and histologist, Prof. Mikhail M. Novikoff (1876–1965), a rector of Moscow University, Russian University in Prague, Karlov University of Prague and Bratislava University, Munich and Regensburg Universities; zoologist of invertebrates, Prof. Alexander S. Schepot’eff (1879–1937), Minsk University and Krasnodar Pedagogical Institute; zoologist of vertebrates and ecologist, Prof. Wladimir W. Stanchinsky (1882–1942), Kharkov and Smolensk universities; biophysicist Sergei S. Tchakhotin (1883–1973), I.P. Pavlov assistant in IAS and a senior scientific fellow of USSR AS.

The following outstanding researchers worked in the Prof. Bütschli’s Institute: zoologist of invertebrates, Prof. Alexander A. Tikhomirow (1850–1931), a rector of Moscow University; zoologist, Mikhail M. Davidoff (1852–1933), a director and manager of the Russian Zoological Station at Villefranche-sur-Mer; zoologist, Prof. Nikolay I. Ivanzoff (1863–1927), Tambov and Moscow Universities; zoologist-entomologist, Prof. Juliy N. Wagner (1865–1946), Polytechnical Institute of Kiev and Belgrade University; zoologist-

⁷⁾ Private archive of A.A. Zavarzin family.

Fig 4. O. Bütschli. Figures from the third part of “Protozoa. Bronns Klassen und Ordnungen”. Infusoria. Morphology of *Paramecium* and its details. Leipzig, 1887-1889.

entomologist Pavel N. Spesivzeff (1866–1936), the member of St. Petersburg Forest Institute and Stockholm University; microbiologist, academician, Prof. Georgiy A. Nadson (1867–1939), Women Medical Institute and a director of Microbiological Institute of the USSR AS; zoologist and immunologist, Prof. Sergei I. Metalnikoff (1870–1946), Higher Women Courses, member of the Pauster Institute in Paris; zoologist and geneticist, Prof. Nikolay K. Koltzoff (1872–1940), Higher Women Courses of Moscow, a director of Institute of Experimental Biology, a corresponding

member of the IAS; zoologist-entomologist, Prof. Mikhail N. Rymisky-Korsakoff (1873–1951), Petrograd University and Forest Academy of Leningrad; zoologist of invertebrates Boris W. Sukatcheff (1874–1957?); zoologist of invertebrates Dmitriy N. Borodin (1887–1957); zoologist, Prof. Nikolay A. Kas’yanoff; zoologist-protistologist and ichthyologist, Prof. Sergei V. Averinzeff (1875–1957), Pedagogical Institute of Moscow; biochemist and philosopher, doctor of Bonn University Vera N. Polovzeva (1877–1936); zoologist, Prof. Georgiy G. Doppelmair (1880–1951), Forest Academy



Fig 5. O. Bütschli with his students on an excursion. Heidelberg, 1890. Stand at the left: F. Blochmann (first), R. Lauterborn (fourth), N.N. Adelung (seventh), W.T. Schewiakoff (ninth). Sits – daughter of O. Bütschli – Hedwig. From the archive of Heidelberg University.

of Leningrad; zoologist-cytologist, Prof. Ivan I. Sokoloff (1885–1972), Institute of Cytology of the USSR AS; histologist, Prof. A. A. Zavarzin (1885–1945), Military Medical Academy and Institute of Experimental Medicine, a member of the USSR AS; zoologist, Prof. Ivan I. Puzanoff (1885–1971), Gorkiy and Odessa universities, and some others (Fokin, 2004, 2011, 2012).

From 1896, when one of the first Bütschli's Russian students, the leader of the national Protozoology, corresponding member of IAS W.T. Schewiakoff became the head of the Zootomical Cabinet of St. Petersburg University (Fokin, 2000, 2001), the number of Russians in Heidelberg kept growing. It was natural that the testimonial of the occasion of Bütschli's professor activity silver jubilee (1903) among 100 people who have signed, a quarter was Russian scientists and students. According to this event, the Consulate of Imperial St. Petersburg University stated: "Wishing to honor extremely useful service to science and to thank for the benevolent relation to young Russian scientists during the management of its scientific occupations made by the well-known German scientist, doctor O.

Bütschli, he was elected in the meeting on April 28, 1903 the honorary member of the University"⁸⁾.

Chauvinism spreading in Germany, especially on the eve of the World War I was absolutely alien to Bütschli. He treated students equally regardless of their nationality. The scientist prized Russians for their talents and could overcome certain carelessness in work of many our compatriots by systematic organization of work and discipline. But being an exacting tutor he did not foist the study material to his students, and consequently not all of them were involved into Protozoology, his forte.

Without question, Russian students of Bütschli influenced the development of Zoology and particularly Protozoology in Russia (Fokin, 2000, 2001, 2012), and since some of them emigrated from the country after October 1917 (e.g., Chakhotin, Kas'yanoff, Metalnikoff, Novikoff, Wagner and others), they extended the influence of the Heidelberg scientific school to other countries. Thus, it

⁸⁾ St. Petersburg Central State Historical Archive. Folder 14. Description 1. File 9704. List 5.

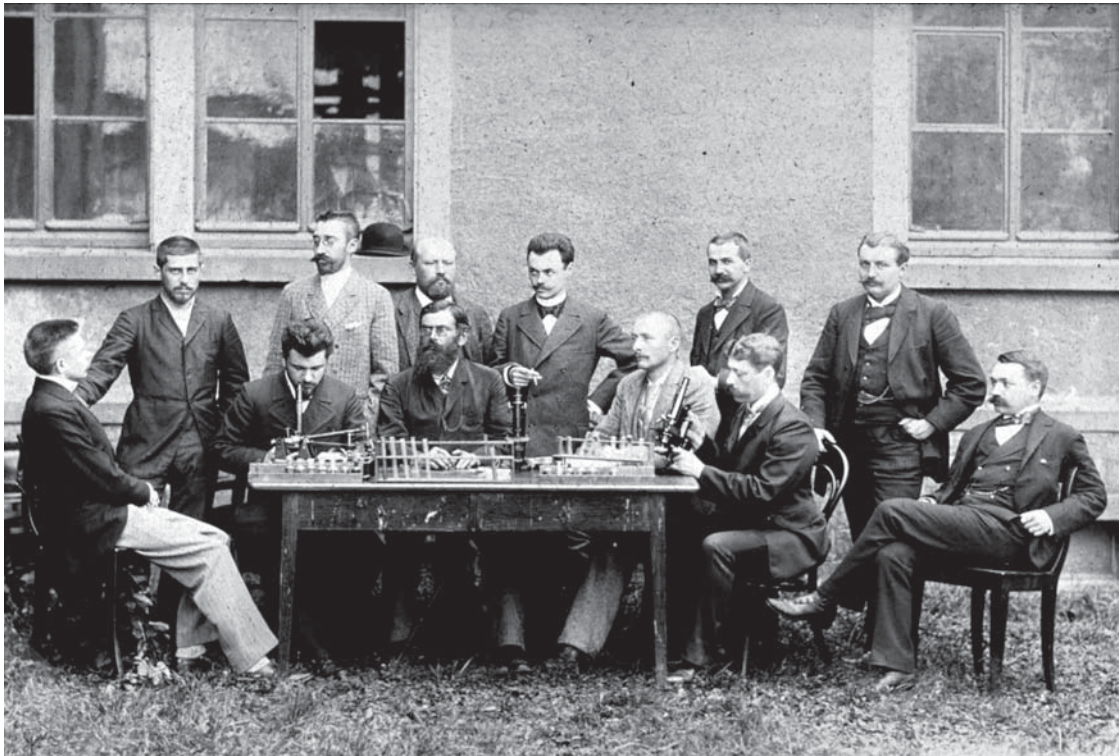


Fig 6. O. Bütschli with his students in front of the Zoological Institute. Heidelberg, 1892. Stand at the left: N.I. Ivanzoff (first), W.T. Schewiakoff (second), R. Lauterborn (fourth). From the collection of K. Hausmann, Berlin.

is possible to say that Bütschli's zoological school had considerable impact on the development of the science in Russia at the turn of the XIX and the XX centuries.

HISTORY OF BÜTSCHLI'S GRAVESTONE MONUMENT FINDING

Working some years ago with documents of Prof. M.N. Rymisky-Korsakoff deposited in St. Petersburg branch of the Russian Academy of Sciences Archive (SPb RASA. Folder 902. Description 2), I found several letters sent in the beginning of the 1920th by Prof. M.M. Novikoff⁹⁾ to Prof. M.N. Rymisky-Korsakoff and vice-versa (Governmental Archive of the Russian Federation: GARF. Fol. P-6767. Des.1. F. 54). In the correspondence there was a

discussion about perpetuating the memory of Prof. O. Bütschli, including installing an artistically made monument on his grave. The letters, excerpts from which are given in Appendix of this article, allowed to establish that the money for a monument, although with understandable difficulties (hard economical situation all over Europe after the World War I), was raised by followers and admirers of Bütschli. The monument on his grave was established, apparently, in the end of 1923 or beginning of 1924. As I had a plan to visit the University Archive in Heidelberg and work with Bütschli's documents, it was decided to visit the grave as well. However, it was quite astonishing to realize that nobody in Heidelberg University or in the Archive knew the burial place of Bütschli. No indications of Bütschli were found also at the web sites of Heidelberg cemeteries, although a number of tombs of well-known university professors from the beginning of the XX century were mentioned there.

Nevertheless, there exists the announcement of Heidelberg University that "the funeral ceremony of Prof. O. Bütschli will take place in the cemetery's chapel on Thursday 5, 1920". For an explanation of

⁹⁾ You can find out more information about Prof. M.M. Novikoff from articles by Aleksandrov D.A. (2000) and Fokin S.I. (2013); about Prof. M.N. Rymisky-Korsakoff – from the part of his recollection, published by Fokin S.I. (Rymisky-Korsakoff, 2009).



Fig 7. Students on the Bütschli's lecture. The first line from the left – C. Hamburger (third), the second line – W.W. Stanchinsky (third), M.M. Novikoff (fourth). Heidelberg, 1903? From the archive of Heidelberg University.



Fig. 8. Russians in Heidelberg; on the Neckar river; 1903. Stand at the left: M.N. Rymisky-Korsakoff, M.M. Novikoff, P.A. Spesivceff; sits – W.W. Stanchinsky. From the collection of S.I. Fokin.

the subsequent events it was necessary to assume that it was a question of cremation only. By the time of O. Bütschli's death (February 2, 1920), his first wife Hedwig Hoffmann (1856–1879) had already passed away as well as his elder daughter, Hedwig Linz, nee Bütschli (1879–1914), born from this marriage. It is possible that Bütschli could have a will to be buried in one grave with the relatives who had died before him; this situation is rather typical for Germany. As the first wife of Bütschli was born in Karlsruhe where the scientist studied and started his career, I paid attention to burials in this city, too, which is located quite close to Heidelberg. Fortunately, via the Internet I succeeded to find a book published in Karlsruhe in 2006 by Anett Beckmann and dedicated to the cemeterial sculpture of the city graveyard. Sculptor Otto Feist (1872–1939) who made sculpture for Bütschli's tomb (stone, bronze) in the beginning of the 1920th was listed there. Thus, it was found out that a well-known German zoologist-protozoologist Prof. Bütschli, who spent 42 years of his life in Heidelberg, was buried at Karlsruhe city cemetery (Hauptfriedhof). It is unknown in which time this was done – definitely, not immediately after his death. Unfortunately, the staff of the Karlsruhe city cemetery does not have documents connected with the appearance of the grave.

Simultaneously, via Heidelberg University

Archive staff it became possible for me to find probably the only relative of Prof. O. Bütschli who is currently alive. Mrs. Lucia Groos is the widow of O. Bütschli grand-grand son, Michael Groos (1941–1999), a citizen of Karlsruhe. She kindly accompanied me to the grave of Bütschli, which she visited regularly, and made explanations about all relatives of Prof. O. Bütschli who were listed on the stone. All of them were connected with O. Bütschli via his only daughter from the first marriage. Among them there were artists, a lawyer, an engineer, but no scientists. The fate of Bütschli's two other daughters from the second marriage (with Mathilde Lange, 1856–1930) is still not clear for me. At least in a relatively large Bütschli's collection in the Heidelberg University archive, I have found some documents connected with another daughter of the scientist, Luise Hesse-Bütschli, and his granddaughter, Erika Hesse (HUA. Rep 84. A21, C2).

So, if you want to genuflect on the grave where the world-renown biologist and eminent protozoologist Prof. O. Bütschli lies, it is necessary to go to Karlsruhe, but not to Heidelberg!

Acknowledgements

I am warmly grateful for the help during collecting materials for this article to Mrs. Maria Babanina, Munich; Mrs. Lucia Groos, Karlsruhe; Dr. Dagmar Drüll-Zimmermann, Universitätsarchiv, Heidelberg, and Dr. Michael Schweikert, Stuttgart, Germany. I would like to thank T.S. Fokina for the critical reading of the manuscript.

References

- Aleksandrov D.A. 2000. Mikhail Mikhailovitch Novikoff: scientist, public figure, organizer of science. In: *Figures of Russian science of the XIX–XX centuries*. Iss. 2. SPb. pp. 89–108 (In Russian).
- Berger J.D. 1970. Otto Bütschli. In: *Dictionary of scientific biography*. London, pp. 625–628.
- Bütschli O. 1870. Zur Entwicklungsgeschichte der Biene. *Zeit. Wissensch. Zool.* 19, 519–564.
- Bütschli O. 1871. Unsere Kenntnis von der sogen. Infusionstierchen. *Die Nature.* 6, 12–62.
- Bütschli O. 1875. Vorläufige Mitteilung über Untersuchungen betrag die ersten Entwicklungsvorgänge im befruchteten Ei der Nematoden und Schnecken. *Zeit. Wissensch. Zool.* 26, 201–213.
- Bütschli O. 1876. Studien über die ersten Entwicklungsvorgänge der Eizelle, die Zelleilung und die Conjugation der Infusorien. *Abh.d. Sen-*



Fig. 9. O. Bütschli in the laboratory. Heidelberg, 1905. From the collection of S.I. Fokin.

ckenb. Naturf. Ges. Frankfurt a. M. 10, 1–250.

Bütschli O. 1880–1889. *Protozoa. Bronns Klassen und Ordnungen*. Winter, Leipzig, 1–3, pp. 1–2035.

Bütschli O. 1887–1889. *Protozoa. Bronns Klassen und Ordnungen des Thier-Reichs. III. Infusoria und System der Radiolaria*. Winter, Leipzig, pp. 1–953.

Bütschli O. 1892. *Untersuchungen über mikroskopische Schäume und die Struktur des Protoplas-*



Fig. 10. Dmitriy Borodin in front of his own drawings made in O. Bütschli's laboratory. At the left corner O. Bütschli's portrait. Heidelberg, 1910. From the collection of S.I. Fokin.

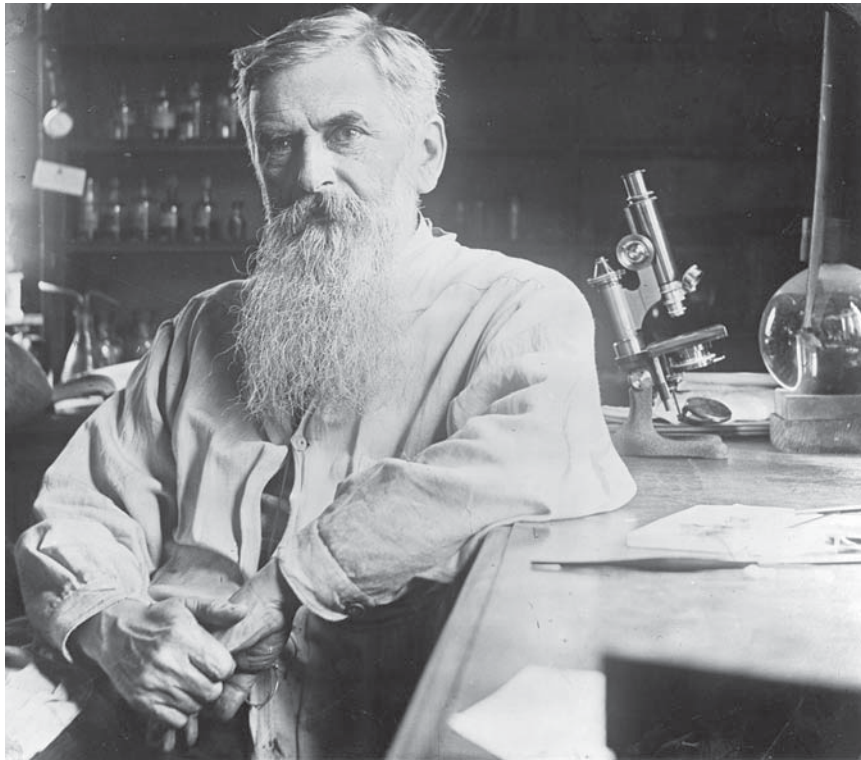


Fig 11. O. Bütschli at the working place. Heidelberg, about 1915. From the collection of K. Hausmann, Berlin.

mas. Engelmann, Leipzig, pp. 1-230.

Churchill F.B. 1989. The Guts of the matter. Infusoria from Ehrenberg to Bütschli: 1838–1876. *J. Hist. Biol.* 22, 189–213.

Churchill F.B. 2010. August Weismann embraces the Protozoa. *J. Hist. Biol.* 43, 767–800.

Corliss J.O. 1978. A salute to fifty-four great microscopists of the past: a pictorial footnote to the history of protozoology. Part. I. *Trans. Amer. Micros. Soc.* 97, 419–458.

Dobell C. 1951. In memoriam. Otto Bütschli (1848–1920) “Architect of Protozoology”. *Isis, Cambridge, Mass.* 42, 20–22.

Engelmann T.W. 1876. Über Entwicklung und Fortpflanzung der Infusorien. *Morph. Jahrb.* 1, 573–635.

Fokin S.I. 2000. Professor W.T. Schewiakoff: life and science. *Protist.* 151, 181–189.

Fokin S.I. 2001. The rise and development of protistology in St. Petersburg, Russia. *Protistology.* 2, 68–72.

Fokin S.I. 2004. Professor Otto Bütschli und Seine Russischen Schüler. *Microkosmos.* 93, 91–99.

Fokin S.I. 2011. O. Bütschli’s (1848–1920) Hei-

delberg scientific school and Russian zoologists at the end of XIX – beginning of the XX centuries. In: *Science as a medium of communication between Germany and Russia in the 19th century.* *Relationes.* 6, 421–436 (In Russian, with English summary).

Fokin S.I. 2012. Otto Bütschli and his Russian students. *Science in Russia.* 188, 89–94.

Fokin S. 2013. Mikchail Novikoff (1876–1965). Fate of an errant professor. *Russian word.* 2, 23–27 (in Russian).

Goldschmidt R.B. 1920. Otto Bütschli 1848–1920. Dem Andenken an Otto Bütschli. *Naturwissenschaft.* 8, 543–548.

Goldschmidt R.B. 1956. Portraits from memory. *Recollections of a zoologist.* Seattle, University Washington Press.

Hamburger K. 1920a. Otto Bütschli als Protozoenforscher. Dem andenken an Otto Bütschli. *Naturwissenschaft.* 8, 559–560.

Hartmann M. 1929. *General biology. Introduction on doctrine of life.* Part 1. Cell, static, dynamics, metabolism. Translation by A.D. Nekrasov. M.-L., Giz. (in Russian).

Metchnikoff I.I. 1946. *Pages of recollections.*



Fig 12. Grave of O. Bütschli at Karlsruhe city cemetery. 2013. Photo by S.I. Fokin.

The Academy of Sciences of the USSR Press, Moscow (in Russian).

Novikoff M.M. 1922. O. Bütschli and his scientific work. Reports about scientific-technical works in the Republic. Petrograd, Sci. chem.-tech. pub. 9, 3–23 (in Russian).

Novikoff M.M. 1952. From Moscow to New York. My life in science and politic. New York, Tchehov Press (in Russian).

Novikoff M. 1954. Otto Bütschli. New York.

Rymsky-Korsakov M.N. 2009. Zoological recollections. Composition, introduction and comments by S.I. Fokin. Studies in the history of biology. 1, 108–136 (in Russian, with English summary).

Spek J. 1949. Otto Bütschli (1848–1920). Zum hundertsten Geburtstag. Protoplasma. 39, 99–102.

Zacharias H. 2000. Sensuousness in science. The wandtafel company of Rudolf Leuckart. Visal zoology. (Ed: Redi C.A.). Ibis, Como-Pavia, pp. 47–48.



Fig. 13. Bas-relief of O. Bütschli on his grave stone. Karlsruhe, 2013. Photo by S.I. Fokin

Appendix

EXCERPTS FROM CORRESPONDENCES SENT IN 1922—1924 BY PROF. M.M. NOVIKOFF TO PROF. RYMSKY-KORSAKOFF. (SPB RASA. FOL. 902. DES. 2. F. 357.) AND VICE-VERSA (GARF. FOL. P-6767. DES.1. F. 54). ORIGINALS IN RUSSIAN.

28. XI. 1922. Heidelberg L. 3¹⁰⁾

I do not work at the Zoological Institute, my eldest daughter works there. It seems to me, the situation there and Stimmung¹¹⁾ are completely different, if compared with Bütschli's time and it doesn't attract me. There are no Russians at the place, except for my daughter and all people are new, different. With Herbst I am not so close, and Frau Hamberger is sick all the time and almost nominally is listed as an assistant.

Concerning Bütschli's heritage, I absolutely agree with you that it is good to raise this question again when zoologists will meet for their congress next time. As for a celebration form, it seems to me that the Zoological Institute somehow evades the former traditions and it will be hardly possible to get something from them. However, there is a marble bust, and it would be possible to attach a small artful wreath to it. And then, if sufficient funds were raised, it would be possible to try to find a grant for Russian students-zoologists, or as a contribution to the Scientific Institute to improve the equipment of the zoological laboratory organized by me now, and have in it at least one working place which constantly would be provided to the Russian scientist. The last, of course, would be the strongest form of celebration, but whether it will be possible to raise sufficient funds?

At the Zoological Institute, now there are no Bütschli's colleagues except for Hamburger. All of them are in different cities, and Merton, who lives here, works at home. In Berlin, I saw only Shuberg and Hartmann. All are crying here because of high prices. They are afraid, whether for University will be available sufficient amount of coal for all winter.

10. II. 1923. Petrograd. L. 3

Certainly, we will make here everything what is possible to raise more funds and to send money to

¹⁰⁾ Here and further the number is the list of the file.

¹¹⁾ Mood (German).

Hamburger. I will make it through the German Red Cross in the American or English currency. I have already begun to collect money. And then I suppose to give a lecture about Bütschli at the University. I will write about Bütschli to Spesivceff (he is in Stockholm), I think that he can send some money. Whether you know Kas'yanoff's location?

21. IV. 1923. Prague. L. 2

Frl. Hamberger some days ago wrote to me that they collected already 1 ¼ million marks, and Spesivceff sent 100 thousands marks¹²⁾; from Russia, as she reports with bitterness, there is still no answer at present, though, as a matter of fact, the initiative of creating a tombstone on the Bütschli's grave came substantially from Russians. She asks you very much to tell her on what is the approximate sum that it can be counted for. It is extremely important to know it to start a preparatory work now. If she did not write to you, it grows out of the modern material defects of the German professorate, at which they hesitate to spend money for stamps.

8. VI. 1923. Prague. L. 53

I apply herewith Frl. Hamburger's note with the news about receiving your parcel. Now, thanks mainly to British and Americans, the construction of the monument is settled, but if something else would be sent from Russia, it will be very useful, and important for our consciousness, as Russian students and admirers of Bütschli. Koltzoff, as I read in newspapers, sings the praises to the administration and, apparently, our small interests and worries don't attract him any more. Borodin's money has already arrived.

27. VIII. 1923. Petrograd. L. 5

I rejoice that it was succeeded to collect something for Bütschli's monument. Not so long ago I

¹²⁾ In Germany at that time there was a big inflation.

received 1 chervonets¹³⁾ from W.W. Stanchinsky, collected among members of the Society of natural sciences in Smolensk, converted it into dollars, added also my own money and have sent to Frl. Hamburger 5 dollars through the German Red Cross. I hope that she will shortly receive them. Averinzeff has sent money after conversation with me. I saw him in Petersburg. Yes, it is a shame to

Koltzoff that, having become such important person, he didn't respond me on my letter.

Beginning of 1924. Prague. L. 54

From Hamberger I have received news that Bütschli's monument at last was built, but in the light of high prices which have descended upon them, the collected money is not sufficient. Nevertheless, the son-in-law of Bütschli, the artist, adds a considerable sum and thus, this business is settled. The monument will be very much artistic. Possibly, you have already received the 4th part of the Comparative anatomy of Bütschli from Heidelberg.

¹²⁾ Gold coin "chervonets" was minted by Russian Federation in 1923 and had at the beginning equal value with ten tsar's gold rubles (about 12 000 rubles in Soviet bills).

Address for correspondence: Sergei I. Fokin. Dept. Invertebrate Zoology, Faculty of Biology and Soil Science, Saint-Petersburg State University, Universitetskaya emb. 7/9, St. Petersburg, Russia, 199034; e-mail: *sifokin@mail.ru*