

# Johann Friedrich Gustav von Eschscholtz – a pioneer naturalist and explorer of the Pacific Islands and Western North America

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Johann Friedrich Gustav von Eschscholtz (1793-1831) was a Baltic-German naturalist, scholar and explorer. In the early 19<sup>th</sup> century he took part in two expeditions to the Pacific Ocean and to Russian America, present Alaska. During these expeditions he collected extensive scientific materials and described a great number of new species from many animal groups. Eschscholtz's work formed the basis for the significant pioneer study of the beetle fauna of Western North America by the Finnish statesman and entomologist Carl Gustaf Mannerheim (1797–1854).

Johann Friedrich Gustav von Eschscholtz was a Baltic-German scientist and explorer (Fig. 1). He took part in two Russian-organized expeditions to the Pacific Ocean and to Russian America and California in early 19<sup>th</sup> century (Kotzebue & Eschscholtz 1830). During these expeditions he collected extensive scientific materials. Eschscholtz's publications based on the collected data covered many topics, from the systematics and morphology of several invertebrate groups to the description of new mammal and bird species and to the biology of coral reefs and to botany. Early death interrupted his career as a promising scientist, and great parts of the collected material remained unidentified and unpublished.

Work by Eschscholtz was important to the scientific career of Count Carl Gustaf Mannerheim (1797–1854) (Fig. 2). Some of the North American beetle species described by Mannerheim were based on individuals collected by Eschscholtz, and Mannerheim used extensively his materials and publications. In addition, the insect material collected by Eschscholtz was used



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◀ Fig. 1. Johann Friedrich Gustav von Eschscholtz (1793–1831).



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▶ Fig. 2. Carl Gustaf Mannerheim (1797–1854), Finnish statesman and entomologist, by Johan Erik Lindh.

by at least the French entomologist Pierre Francois Marie Auguste Dejean (1780–1845), the German-born Russian entomologist Johann Gottlieb Fischer von Waldheim (1771–1853), and the Russian officer and entomologist Victor I. Motschulsky (1810–1871). Eschscholtz gave insect and plant specimens also to some fellow naturalists, for example to Jacob Fellman (1795–1875) who acted as priest in the northernmost Finnish Lapland (Väre 2011).

Eschscholtz's extensive collections ended up after his death to Moscow University, where they still are. Beetle collections have been organized in the 19<sup>th</sup> century, and e.g. Motschulsky re-labelled part of it. Some of his beetle samples are also in the collections of the universities of Tartu (Estonia) and Helsinki (Finland).

Friedrich Eschscholtz as a naturalist is nowadays rather poorly known. Therefore, we consider it is time to present his career and research more broadly. Here, we mainly focus on his entomological research and collaboration with Carl Gustaf Mannerheim.

## Brief biography

Johann Friedrich Gustav von Eschscholtz was born in Tartu (Estonia, then Livonia) on November 1, 1793 and his parents were Johann Gottfried and Katherine Hedwig Ziegler Eschscholtz. They belonged to the Baltic-German nobility.

Eschscholtz began studying zoology and medicine at the University of Tartu (Universität Dorpat) and also served as an assistant to Carl Friedrich von Ledebour (1785–1851), Professor of Botany. Eschscholtz graduated in medicine in 1815. He took part in two long expeditions organized by the Russian administration in 1815–18 and 1823–26. After the first expedition, Eschscholtz married Christine Friedrike Ledebour. In 1819 he was appointed to an Adjunct Professor of Anatomy at the University of Tartu and in 1822 to director of the Zoological Museum, University of Tartu. He is considered as the founder of this museum. Finally Eschscholtz was nominated as Professor of Anatomy in 1828. He died on May 7, 1831 in Tartu, being only 37 years old.

## The first expedition

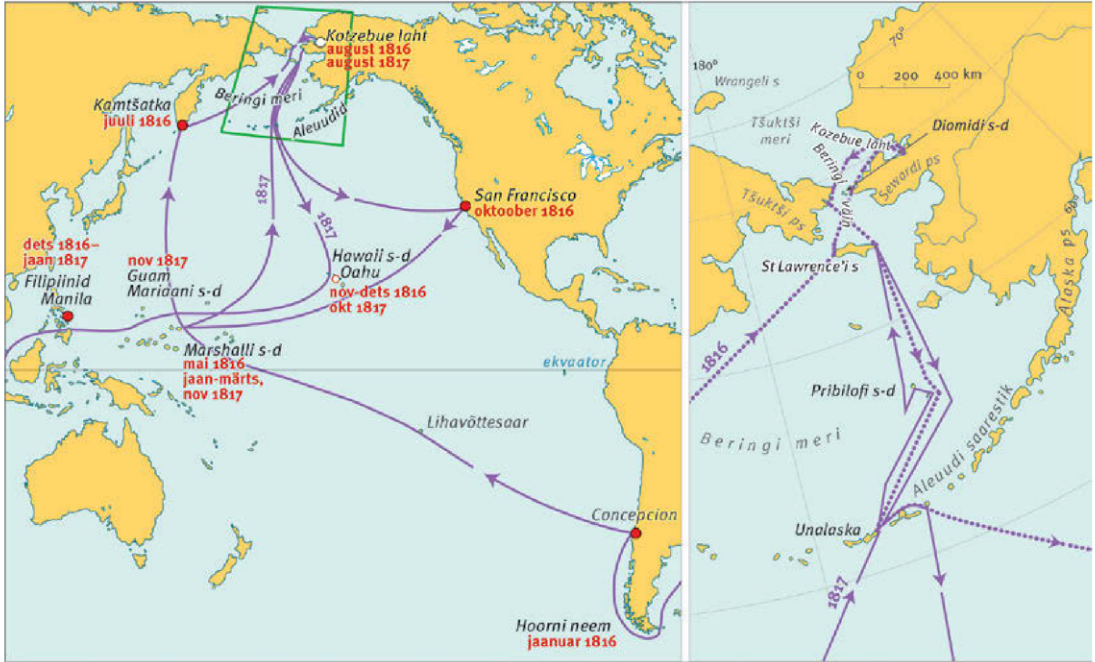
By the second half of the 18<sup>th</sup> century, Russia had expanded to the North American side of the northern Pacific Ocean. The main settlement and the administrative center of Russian America, Sitka, was founded in 1799. The Russian administration was very interested in studying the natural conditions and resources of Russian America, especially as seal populations and other game in the area began to deplete due to overhunting. In 1815, the Russian administration sent the research ship *Rurik*, led by Otto von Kotzebue (1787–1846), a Baltic-German naval officer in Tallinn (Fig. 3), to search the Northeast Passage and to explore the North Pacific coast. Friedrich Eschscholtz was appointed as a physician and naturalist on this expedition. Adelbert von Chamisso (1781–1838), a French-born Prussian army officer, poet and naturalist who lived a colorful life, served as a botanist on the expedition. Eschscholtz worked closely with him.

*Rurik* set out on a voyage of exploration from Kronstadt (outside of St. Petersburg) on June 30, 1815. The voyage initially sailed to the Canary Islands, which she reached in September. From there they continued across the Atlantic Ocean to Santa Catalina, Brazil. Cape Horn was toured in January 1816, and after many months of voyage across the Pacific Ocean from Chile through the Marshall and Mariana Islands, *Rurik* reached the Kamchatka Peninsula in July 1816. In late 1816, area of Bering Strait, the Aleutian archipelago, the Californian coast, and the Hawaiian Islands were visited and explored (Fig. 4).



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Fig. 3. Otto von Kotzebue (1787–1846), leader of the expeditions.



▲ Fig. 4. Routes of the expedition by Rurik in the Pacific Ocean 1816–1817 (Speek 2015).

► Fig. 5. German-Russian artist Louis Choris (1795–1828) took part in Rurik's expedition. He painted sceneries of the journey and he also documented lifestyles of indigenous peoples. In this painting, the research vessel Rurik is anchored in the Bering Sea near Saint Paul Island, a hunting area of fur seals.



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Eschscholtz collected a large number of animal and plant samples from each research locality and he also studied the nature of the visited sites in a variety of ways (Fig. 5). Because Kotzebue, the leader of the expedition, fell ill in 1817, the

expedition was suspended and they headed home through Hawaii (again) and the Philippines. They continued through the Sunda Strait and around Cape of Good Hope to Europe, arriving to St. Petersburg in August 1818.



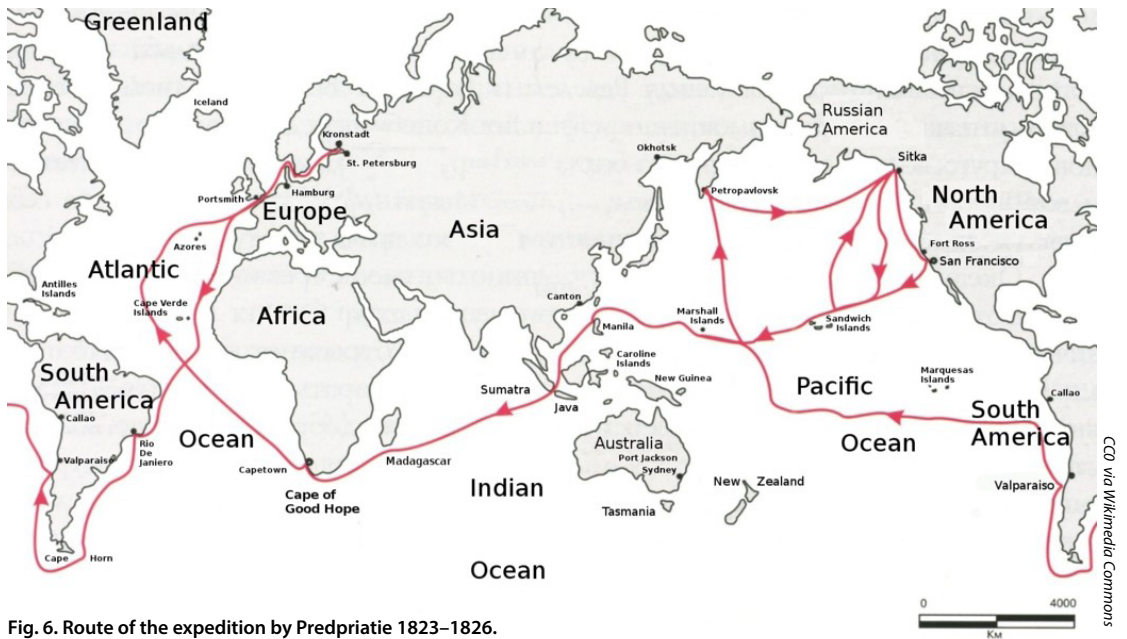


Fig. 6. Route of the expedition by Predpriatie 1823–1826.

## The second expedition

The second expedition was also led by Kotzebue and Eschscholtz again participated in it as a naturalist and physician. The research ship *Predpriatie* ("Enterprise") set sail from St. Petersburg on July 28, 1823. After three years, *Predpriatie* returned to St. Petersburg in July 1826; the route of the expedition is on the enclosed map (Fig. 6). The main purpose of this trip was to protect the Russian-American trading company from smugglers but the trip also enabled active sample collection. Particularly extensive insect material was collected from Hawaii, Alaska, and California.

An interesting historical detail of the expeditions is that Kotzebue named an island in the Marshall Archipelago as Eschscholtz Atoll. In 1946, the name was changed to Bikini. Both the Kotzebue Strait and the Eschscholtz Bay can be still found on the coast of northwestern Alaska.

## Results of the first expedition

Otto von Kotzebue, the leader of the tour, published results of the journey in three volumes of *Entdeckungs-Reise in die Süd-See und nach der Berings-Strasse zur Erforschung einer nord-östlichen Durchfahrt unternommen in den Jah-*

*ren 1815, 1816, 1817, und 1818*, which also included the zoological and botanical reports of Eschscholtz and Chamisso (Kotzebue 1821, 2013).

The scientific results of the expedition were reported in several series: *Horae physicae Bero-linenses* (1820), *Memoires de l'Academie Imperiale des Sciences de St. Petersburg* (1826), and *Linnaea* (1826–1836). Botanical findings by Eschscholtz from California were published in *Descriptiones plantarum Novae Californiae, adjectis florum exoticorum analysibus* (1826). This publication was the first to scientifically describe Californian flora (Speek 2015). In addition, it was the first scientific publication using the name of California in the title of the publication.

The name Eschscholtz is probably more familiar to plant enthusiasts than to zoologists due to the California Poppy, *Eschscholzia californica*, described by Chamisso (Fig. 7). Eschscholtz published some of his entomological findings in the *Entomographien* series (Part 1, 1822). In this publication, Eschscholtz described about 85 insect taxa, of which 50 were beetles, mostly from southern localities (Brazil, Chile, Philippines), but half a dozen beetles were from the Aleutian islands and Alaska. From this journey, Eschscholtz also described as new to science a monkey, the Mitered Langur (*Presbytis mitrata*) from Sumatra

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Fig. 7. The California Poppy, *Eschscholzia californica*, described by Chamisso 1820 in honour of Eschscholtz.

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Fig. 9. *Pachliopta kotzebuea*, a papilionid butterfly described by Eschscholtz 1821 in honour of Otto von Kotzebue.

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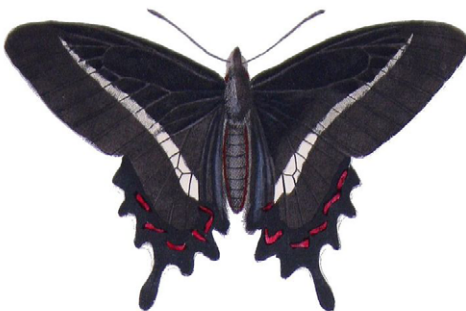


Fig. 10. *Parides chamissonia*, a papilionid butterfly described by Eschscholtz 1821 in honour of Adelbert von Chamisso.

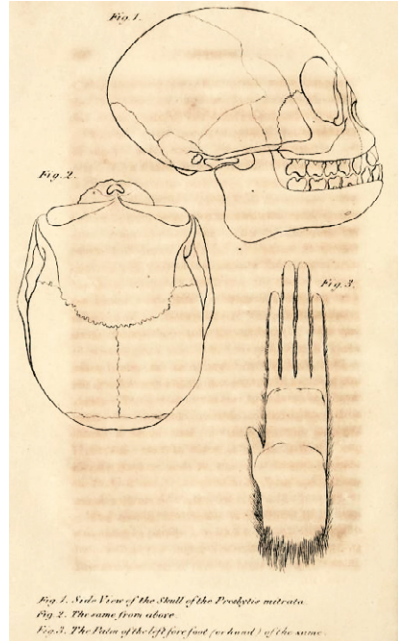


Fig. 8. Detail drawings of *Presbytis mitrata*, a monkey from Sumatra described by Eschscholtz 1821 (Kotzebue 1821).

(Fig. 8) and many butterflies, of which the papilionid butterfly species *Pachliopta kotzebuea* from the Philippines (Fig. 9) and *Parides chamissonia* from Brazil (Fig. 10) in honour of his traveling companions. In addition, he studied e.g. the physiology and biology of jellyfishes and some geological aspects in expedition destinations.

### Results of the second expedition

Kotzebue and Eschscholtz (1830) reported the general results of the second expedition in *Neue Reise um die Welt, in den Jahren 1823, 24, 25 und 26*. Eschscholtz presented zoological findings of the journey from each research locality in general terms as an extensive appendix to Part II of the publication. In it, Eschscholtz also summarized the species numbers studied or only recorded during the expedition by taxonomic group (the systematics was then partly different from the current one): 28 Säugethiere (mammals), 165 Vögel (birds), 33 Amphibians (amphibians), 90 Fische (fishes), 40 Annelen (annelids), 127 Crustacen (crustaceans), 1400 Insecten (insects), 28 Arachniden (arachnids), 10 Cephalopoden (cephalopods), 172 Gasteropoden (gastro-



poDs), 45 Acephalen (mussels), 28 Tunicaten (tunicates), 21 Cirrhipeden (barnacles), 60 Echinodermaten (echinoderms), 63 Acalephen (jellyfish, etc.) and 90 Zoophyten (corals, bryozoans etc.), for a total of 2400 animal species. Friedrich Eschscholtz published his species descriptions and faunistic observations in the books *Zoologischer Atlas* (five parts, 1829–33) and *System der Akalephen* (1829), the latter dealt with e.g. swimming polyps. In the *Zoologischer Atlas* series (Fig. 11) he described as new to science a large number of species from several groups of animals. These include, for example, among mammals the Snow Sheep (*Ovis nivicola*) from Kamchatka and one of world's largest fruit bats, a flying-fox (*Acerodon jubatus*) from the Philippines (Fig. 12), from birds the Least Seedsnipe (*Thinocorus rumicivorus*) from Chile (Fig. 13). In addition, Eschscholtz described e.g. the Olive Ridley Sea Turtle (*Lepidochelys olivacea*) from Manila Bay (Fig. 14), the California Giant Salamander (*Dicamptodon ensatus*), and lizard, fish, insect, jellyfish and sea snail species (Fig. 15).

In this publication Eschscholtz also described as new to science several genera of beetles with identification keys and sixty new beetle species, of which six species from Sitka and several from California, where Fort Ross near San Francisco was the centre of the Russian colony. Species descriptions by Eschscholtz are often accompanied by illustrations.

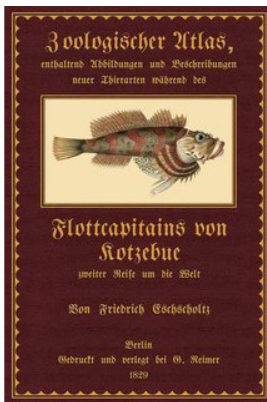


Fig. 11. On the cover of *Zoologischer Atlas* by Eschscholtz (1829; reprinted by Fines Mundi Verlag 2016) is the Red Irish Lord Fish *Blepsias ventricosus* described by Eschscholtz from Sitka, Alaska.



Fig. 12. The Giant Golden-crowned Flying Fox (*Acerodon jubatus*) described by Eschscholtz from the Philippines (*Zoologischer Atlas* 1831).



Fig. 14. The Olive Ridley Sea Turtle (*Lepidochelys olivacea*) described by Eschscholtz from Manila Bay (*Zoologischer Atlas* 1829).

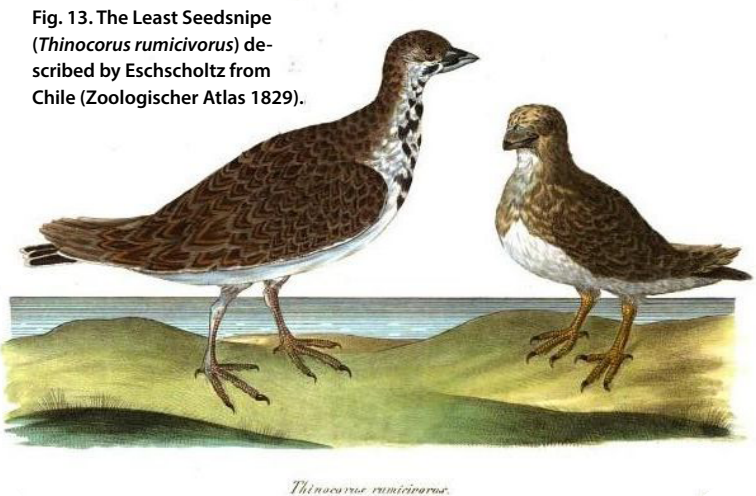


Fig. 13. The Least Seedsnipe (*Thinocorus rumicivorus*) described by Eschscholtz from Chile (*Zoologischer Atlas* 1829).



Fig. 15. Marine gastropods described by Eschscholtz (Zoologischer Atlas 1829).

## Study on the beetle fauna of Russian America

### Naturalists from Finland in Russian America

In 1809 Finland became an autonomic part of Russia. During the long period under Swedish regime Finns had gained experience in seafaring and naval warfare. Consequently, Finnish ships, naval officers and sea captains achieved soon important roles in the administration of Alaska and in the trade between Alaska and Europe. Two Finnish admirals Adolf Etholén (1799–1876) and Hampus Furuhjelm (1821–1909) served as Governor Generals of Russian America (or the Russian American Company). Consequently, there was a strong Finnish colony living in Sitka, capital of Russian America (Viljamaa 1977).

Worth of mentioning among naturalists from Finland studying Alaska are the famous entomologist Reinhold Ferdinand Sahlberg (1811–1874, journey 1839–43) acting as a physician in Sitka, Uno Cygnaeus (1810–1888, journey 1839–45), who traveled with Sahlberg on the same ship and served as a priest in Sitka, physicians Alex-

ander Friedrich Frankenhaeuser (1812–1884, journey 1841–1853) and Achilles Pippingsköld (1809–1866, journey 1846–47), as well as geologists Henrik Johann Holmberg (1818–1864) and Friedrich Christian Frankenhaeuser (1820–1887, journey 1849–51), these two moved widely in the Bering Sea area. They all collected insects to C.G. Mannerheim. (Varjola 1989).

Estonians (Eschscholtz and Kotzebue) and Finns (Mannerheim, Alaskan governors Adolf Etholén and Hampus Furuhjelm, and numerous Finnish naturalists in Sitka) played an important role in the study of the flora and fauna of Alaska and California. For example, Finns who traveled in the area observed both the local culture and nature, and they collected plant and animal samples from many groups as well as geological and ethnographic objects (Viljamaa 1977). A good idea of this activity can be seen in the travel reports of R.F. Sahlberg (Saalas 1958).

### Eschscholtz and Mannerheim's work on the Russian American beetle fauna

The collecting work, coleopterological studies and publications by Eschscholtz formed the basis for Count Carl Gustav Mannerheim's significant comprehensive study of the Russian American beetle fauna (four publications 1843–53). Due to this study Mannerheim is one of the leading pioneers in entomology of western North America. Because of his administrative duties Mannerheim never visited North America himself.

The importance of Eschscholtz can be seen especially in the first publication, in which Mannerheim (1843) described 101 species as new to science, 14 of which were based on individuals collected by Eschscholtz, and more than half (as many as 158) of the 300 species of the publication were described earlier by Eschscholtz. Eschscholtz described a large number of species and genera of beetles as new to science (Fig. 16). Naturally, a number of these are nowadays considered as synonym names. These two officials of the Russian Empire knew each other and were in contact dealing with beetles until Eschscholtz's early death (Mannerheim 1843). Later, Mannerheim took advantage of Eschscholtz's collection, which was moved to Moscow. Mannerheim de-

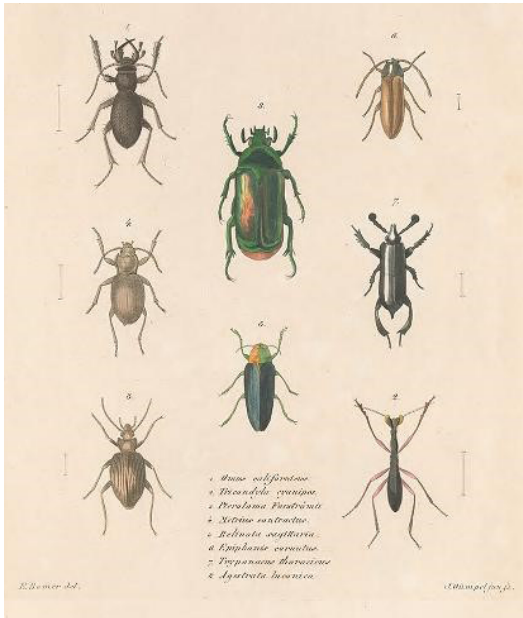


Fig. 16. Beetles from various localities, six of these described by Eschscholtz (plate from Zoologischer Atlas 1829). Number 6 (upper right corner) is a false click beetle *Epiphanius cornutus* from Sitka, Alaska. Eschscholtz described both the genus and the species as new to science, as well as its family Eucnemidae.

scribed and named a darkling beetle species, *Coniontis eschscholtzii*, in honour of Eschscholtz in 1840.

As a conclusion, Mannerheim compiled the Coleoptera fauna of Russian America based mainly on work of Eschscholtz, on museum materials from Moscow and St. Petersburg, and on large collections by the above-mentioned Finns based in Sitka.

*Acknowledgments.* We thank Olavi Kurina and Toomas Tammaru (Tartu) and Kirill G. Mikhailov (Moscow) for the information about Eschscholtz and his collections. We are grateful to the Turku University Foundation for research room scholarships in the Granö Centre, Tartu, and to the Societas Entomologica Helsingforsiensis for financial support.

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