SPECIAL ISSUE • YEAR 2019 • VOLUME 11

Insectifera

Colias ponteni

47 years of investigation, thought and speculations over a butterfly

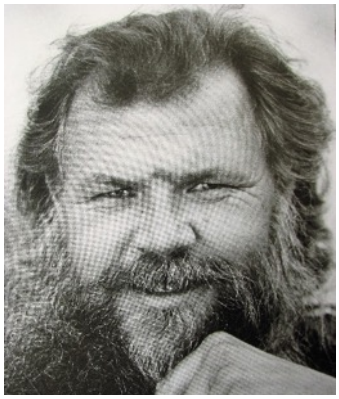
Insectifera December 2019, Volume 11

Special Issue Editor Pavel Bína & Göran Sjöberg

Sjöberg, G. 2019. *Colias ponteni* Wallengren, 1860. 47 years of investigation, thought and speculations over a butterfly. *Insectifera*, Vol. 11: 3–100.

Contents

Colias ponteni Wallengren, 1860



47 years of investigations thought and speculations over a butterfly

Göran Sjöberg, Avellaneda Museum, Gävle, Sweden
ngsjoberg@gmail.com

The world's most wanted butterfly - the only butterfly we do not quite know in which part of the world it was collected!

Where was it? Does it still survive? Which locality is the most likely? What theories are there today, 167 years after the last specimens were collected? Can the riddle be solved?

These are questions that I have thought about during my spare time and searched for the answers over the last 47 years.

With improved DNA technology, there is perhaps now finally an opportunity to gain clarity to this mystery, which, for a long time employed me and a host of researchers worldwide including many of my friends since 1972. With this article I want to tell you about the background to this mystery which, since the late 1800s, has caused so many headaches. I am also aware that in this article there are some repetitions but ask your readers to overlook this as it has been written during a period of more than 30 years and I am now unable to edit the entire material before the forthcoming DNA investigations.

Syntype: male of *Colias ponteni* Wallengren, 1860. Naturhistoriska Riksmuseet Stockholm. Photo Göran Sjöberg.

Summary

This is an account of what I consider after 50 years of study with regard to the mysterious butterfly *Colias ponteni* which was described in 1860, eight years after it was said to have been found in Hawaii during midsummer of 1852. The Swedish Frigate Eugenie made a two-week long beach anchorage at Honolulu on the island of Oahu in the Hawaii Archipelago for restocking food and water and for collecting animals and plants. Since that visit the butterfly has never been found again. On the other hand, it is said that another three, two males and one female, of the same species, were found in a herbarium in the Bank's collection in 1871. The herbarium was considered to originate from the English expedition with *HMS Adventure* to the southernmost South America from 1826 to 1827 under the leadership of Captain Phillip Parker King. Arthur Gardiner Butler then described these butterflies as a new species in 1871, i.e. 44 years after they were possibly collected. Who collected these butterflies is unknown as well as where this collection really was made. Butler listed Port Famine, a trading and refueling station with an old penal colony on the northwest coast of the Strait of Magellan in southernmost South America as a catch site, based on some plants in this herbarium identified with Port Famine as their collection site. Live specimens of the butterfly have never been found.

Three more specimens of the species are now available at the British Museum Natural History. Two of these, one male and one female are labelled "*Sandwitsch Inseln*", something that suggests that even these were collected before the frigate Eugenie's visit. Since the name Sandwich Island was the name James Cook gave the islands when they were discovered by him in 1778 to honour his most significant benefactor John Montagu, 4th Earl of Sandwich. These two butterflies are derived from Elwes´ collection but when and by whom they are collected is unknown. The third specimen is labeled Honolulu and belonged to Lord Rothschild's private collection. This male as far as I can understand from the labels on the butterflies comes from Felder's collection and bears the label "*Felder collection Ponteni Wallengr*.". Possibly this specimen, but perhaps also the two others, can also originate from the Swedish Scientific Sailing trip round the World with the frigate Eugenie in 1851 – 1853. More about that later.

I first saw this mysterious butterfly on a visit to the Natural History Museum in Stockholm in 1972. Over the years I have occasionally tried to solve the mystery with the help of a lot of friends from all over the world. The mystery being as to where the species was actually collected. The butterfly *Colias ponteni* has, after all, been considered the world's most sought-after butterfly and at the same time probably the only described butterfly that you do not know in which continent it was collected! In addition, I had the pleasure at the Museum of Evolution in Uppsala, in connection with the museum being re-opened after a comprehensive restoration, in finding two unknown males of the species and a pupal case of a parasitized pupae whose origin is also probably derived from the described species *Colias ponteni*. In total, we now have 11 specimens, 7 males and 4 females divided into 4 museums, 3 in Sweden and 1 in England. But where were they collected? Hawaii? along the Strait of Magellan? Tahiti? Valparaiso? San Francisco? Galapagos Islands? Unfortunately, we lack the knowledge of whom or which people really made these collections as well as when and where this was done. The questions are many but the answers unfortunately are few, which opens up for extremely interesting speculations. A dream scenario for me as an investigator even in my civilian work.

My own reflections

I think I have now come up with a number of indications that point to the Hawaiian Islands as the most likely place where the butterflies were collected. However, with this article I would like to show that there are actually circumstances that may possibly speak against this assumption.

The assumption is based on a series of indications**,** and careful studies of many possible locations along the route of the frigate Eugenie from 1851 to 1853, and also a completed isotope study where some of

the collected *Colias ponteni* butterflies were compared to butterflies collected on both Oahu on Hawaii islands and in the areas along the Strait of Magellan. As far as I can see, everything suggests that Oahu, with the areas just outside Honolulu, being the place where the butterfly once existed. However it was eradicated shortly after the priest Samuel Pontén, probably together with the botanist Nils Johan Andersson and maybe even the expedition's zoologist Johan Kinberg, collected at least five, but possibly another one or even three specimens in midsummer of 1852. The reason for the extinction of this butterfly is very likely to be attributed to the new planting of sugar cane and other crops that were planted in the area around Honolulu on Oahu in the mid-1850s after the extensive European colonization. When these butterflies are said to have been collected, the original Polynesian population, mainly through various diseases that these colonists had brought with them, had been reduced from about 300,000 when Cook discovered the islands in 1778 to only 70,000 in the mid-1850s when the Swedish frigate Eugenie visited Hawaii.

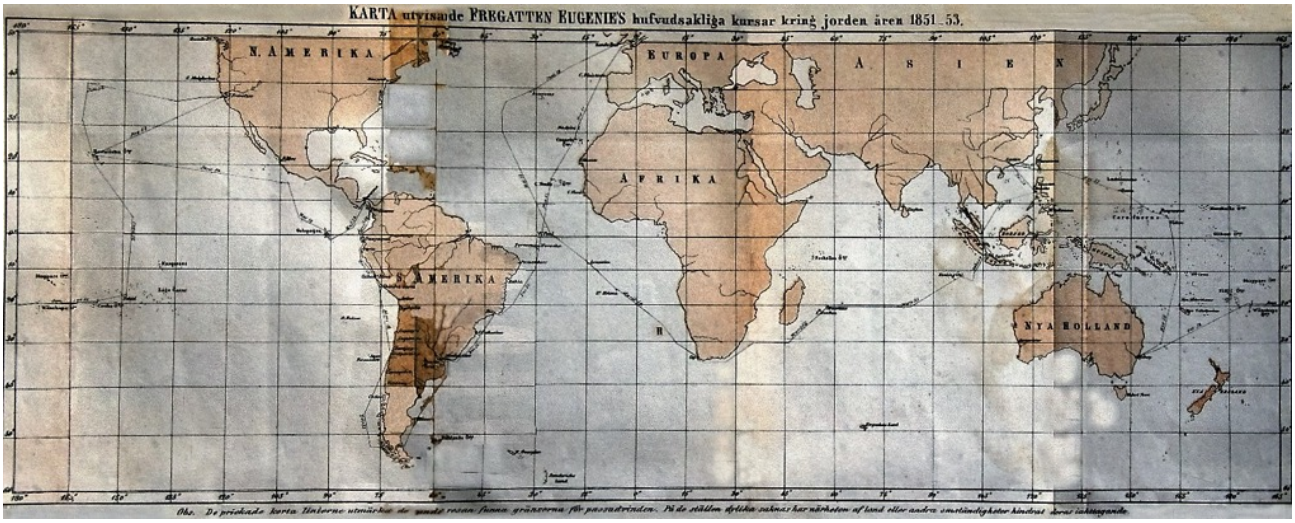
Why do I write and publish this article in spring 2019?

I decide to publish the results of my studies as I have heard that it is time to carry out new DNA investigations of all the butterflies that are found in the four museums where the species are represented. **Hopefully, maybe my studies can also provide valuable information when it comes to analyzing and understanding the upcoming DNA results.** I look with the utmost zeal towards what these modern DNA studies can provide. I participated more than 20 years ago in such an investigation. Unfortunately, at this time, the technology was too deficient in such old specimens, and would not give us adequate results in terms of kinship with other *Colias* species. Hopefully, the new DNA surveys may indicate *Colias ponteni's* kinship and perhaps also show from where the species once arrived in Hawaii from. If Hawaii turns out to be the right place for the species? The parasitized pupa can hopefully give clues as to where this unique butterfly lived and if one can determine which parasitic species attacked the pupa and also which plant the pupa adhered to before hatching. However, there may still be a number of remaining questions even if one manages to determine the nature of the parasite and the plant. More about this below.

The background to the first Swedish scientific sailing round the world, 1851–1853

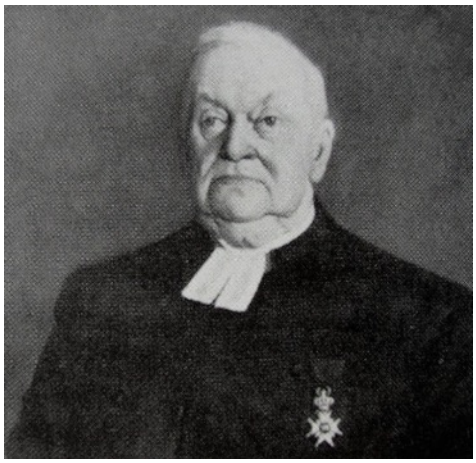
To put Sweden on the scientific world map in the mid-1800s the Swedish Academy of Sciences, under the Swedish king Oskar, equipped the first scientific sailing round the world. This certainly happened literally in the wake after the highly successful sailing round the world with the brig *Beagle* in 1831 - 1836 under Captain FitzRoy's command of the then relatively unknown, but later so much more famous, accompanying scientist Charles Darwin. Everyone knows that Darwin during this voyage, based on his observations in South America and especially on the Galapagos Islands, got impulses and ideas for his future life-work on how nature itself in open competition develops the individual species and not as previously assumed that their appearance had been determined by God once and for all.

Under the command of Commander Christian Adolf Virgin, at the end of September 1851, the Swedish frigate *Eugenie* sailed to South America. After passing the Strait of Magellan in January / February 1852, the Galapagos Islands were visited in May 1852. The journey then went north to the Hawaiian Archipelago, where they docked twice at Oahu in June / July and then in August 1852. Between the visits to Hawaii, San Francisco was visited for restocking of food and water. Then via the South Sea, with visits to Tahiti and Tonga they visited Australia before the trip was made home via China and the Cape of Good Hope to Gothenburg and Stockholm where they arrived in the summer of 1853.



Frigate Eugenie's route around the earth 1851–1853. Map from Christer Hägg's book.

During this journey, at virtually every landing, scientific collecting of both plants and animals took place for the Academy of Sciences. This collection of zoological material took place mainly under the direction of the 31-year-old medical doctor Johan Kinberg appointed by the Academy of Sciences. The 30-year-old botanist Nils Johan Andersson was mainly responsible for the collection of plants during the trip. For posterity the most helpful participant in the expedition was, after all, Lord Carl Johan Skogman who with his extraordinary ability, in writing, drawing and painting depicted the journey accurately for all of us who now, almost 170 years later, want to take part in this remarkable Swedish expedition. Through Skogman's notes and not least his journal of the travels of the frigate Eugenie's journey around the earth, "FREGATTEN EUGENIES RESA OMKRING JORDEN" published in 1855, it is possible for historians to follow the journey with all landings in detail. The most important participant in this expedition for this particular article, however, was 38-year-old Doctor of Philosophy Samuel Benjamin Pontén who was appointed as the ships priest. Samuel seems with his own interest, and most likely to the delight of his brother Jonas Otto Pontén, to have collected both plants and butterflies. The brother was a teacher of natural sciences at the High School of Strängnäs where he also collected various types of animals and plants.



Nils Johan Andersson. Carl Johan Skogman. Samuel Pontén.

All photos are taken from Christer Hägg's book about the Frigate Eugenie´s World sailing.

Since this article is about the butterfly *Colias ponteni* I will concentrate on the collection of insects made during the trip. From the compilation in the book "*Kungliga Svenska FREGATTEN EUGENIES RESA omkring jorden - Vetenskapliga Iakttagelser II*" which was written in 1858 - 1868, it appears that a total of 1311 species and subspecies of insects were newly described. (Appendix 3) Of these, 81 were of the order Lepidoptera. 19 of these were butterflies. A species first described in the book, (appendix 4) is undoubtedly, at least from an entomological point of view, the most remarkable find on the whole trip, it was a remarkable, extremely beautiful and very broad-banded Pierid. This was described in February 1860 by Sweden's most famous author since Linnaeus and Thunberg, Hans Daniel Johan Wallengren in "*Weiner Entomologische Monatschrift*" under the name *Colias ponteni.*

WIENER

Entomologische Monatschrift.

Nr. 2. IV. Band. Februar 1860.

Lepidopterologische Mittheilungen.

Von H. D. J. Wallengrén,
in Trolle Ljungby bei Christianstedt in Schweden.

Ich nehme mir hiermit die Freiheit, dem entomologischen Publikum Südeuropas einige Mittheilungen über exotische Schmetterlinge zu machen, die ich für neu halte. Nicht sehr reich an literarischem Materiale und nicht in der Lage, die Leistungen englischer Autoren benützen zu können, ist es immerhin möglich, dass eine oder die andere schon beschrieben ist. Der billige Kritiker wird aber diesen Umständen Rechnung tragen und eine allfällige Wiederholung entschuldigen.

Die Beschreibungen jeder Art werden in den „schwedischen Annalen" ausführlicher gegeben werden.

1. ***Colias Ponténi*** n. sp. alis supra fulvido-flavis, maris iridatis, macula discoidali anticarum, limbo latissimo omnium costisque extra cellulam nigris; apice anticarum flavo-maculato; omnibus maris infra fulvido-flavis, posticis apiceque anticarum feminae grisescente-flavis; anticis circulo discoidali ferrugineo, posticis macula ferruginea discoidali, costa flava intersecta, margineque interiore late nigro-pustulato.

Ad Honolulu in Ins. Oahu mensibus Junii et Julii D. D. Kinberg et Pontén speciem hanc elegantissimam colligerunt. Clava antennarum ejus quam in congeneribus magis determinata, fere ovata. Species in Museo Acad. Scient. Holm. et in Mus. meo.

Wallengren's description as in the English translation:

"Colias Ponténi n. sp. The wings are reddish yellow on the top, glossy in the male, the forewings with pale basal area, all the wings with a very wide border and black veins inside the pale areas; the forewing apex yellow; all the wings of the male red-yellow on the underside, the female's hindquarters and the forefinger tip gray; the forewings with rust-colored basal area, the hindwings with rust-colored basal area, with yellow, split front edge and with abundant black-stained inner edge.

The men Kinberg and Pontén collected this exquisitely beautiful species on the island of Oahu at Honolulu during the months of June and July. The antennal club, which in the relatives is completely smooth, is almost egg-shaped. The nature of the Stockholm Academy of Sciences and my museum."

The syntypes of *Colias ponteni* described by Wallengren, 1860 with the original labels.
The specimens in the Natural History Museum in Stockholm.
All photos unless otherwise stated: Göran Sjöberg.

Why then has this finding caused such a discussion over more than 150 years? The reason is simple.

Samuel Pontén and/or Johan Kinberg told Wallengren in the above description that they, but perhaps also with the Master Andersson, collected this butterfly on one of their excursions in the areas outside Honolulu on the island of Oahu in June 1852. In Sweden today, as far as I have found, we have 4 males and 1 female. After this collection in midsummer 1852, the butterfly has never been found alive. If the story ended with this, however, the collected butterfly would hardly cause any questions today.

Samuel Pontén most likely captured the butterflies in the Nuuanu-Valley or possibly on the lowland plateau after passing through the Pilu Pass just east of Honolulu but perhaps also along the coast near Honolulu when they were looking for plants. At this time, the island group was still called by many as the Sandwich Islands, the name Cook gave the islands 74 years earlier. Since we now know that much of the Hawaiian archipelago's flora and fauna has been eradicated since the "white man" began exploiting the islands in the 19th century, especially on the relatively partially unique low-lying island of Oahu with the capital of Honolulu. Hardly anyone would have reason to question this finding. Samuel Pontén's unique broad banded orange *Colias*-butterfly would thus only be one in the line of a variety of extinct insects and plants on the archipelago.

But as so often in both natural history and in our general history original conclusions are not always so obvious when more facts appear.

Oahu with Honolulu in the Hawaii archipelago.

In 1871, it is said that the main butterfly descriptor in England at that time, and perhaps also in the whole world, Arthur Gardiner Butler had encountered three butterflies in a herbarium in the so-called "Banksian cabinet" which was stored at the British Museum Natural History (BMNH). According to unconfirmed data, these butterflies had been found among various collected botanical material from the great English expedition with HMS Adventure to southernmost South America from 1826 to 1827 under the leadership of Captain Phillip King. However, this expedition, which was a forerunner to the now famous Beagle's expedition a few years later during Captain FitzRoy's command, and with Darwin as a scientific fellow passenger, had as its main goal to explore the waters of South America's southern tip, with the emphasis on the Strait of Magellan and the south lying Tierra del Fuego.

Based on the assumption that the butterflies Butler encountered really existed among dried plants in the above described Banksian cabinet, it is quite natural that Butler assumed that the butterflies were collected in the areas of the trading station Port Famine at the Strait of Magellan. Port Famine is located about 50 km south of today's Punta Arenas on the South American mainland's southernmost part, the Bachelor Peninsula. Consequently, a similar *Colias*-butterfly had been described from this region.

Butler assumed that he was dealing with a new and previously unspecified species. He gave this new magnificent butterfly the name *Colias imperialis*. Perhaps thinking of this extremely remote supposed capture site, as a tribute to the British world-wide empire, or did he think it was imperial but not powerful like the beautiful *Parnassius imperator*? I myself most probably think it was the first option since Butler's description consists solely of facts without any erratic adjectives. Unlike Wallengren's description where he describes how "exquisitely beautiful" the butterfly is. The original description as shown below. Butler has also attached a clear picture in which the male of the newly described species is depicted.

Genus Colias, Fabricius.

Colias imperialis, n. sp. (Plate XIX. fig. 2.)

♂. *Alæ supra aurantiacæ: anticæ area externa late fusca, flavo squamosa; macula marginem costali-externum attingente venisque nigris; basi costaque basali flavo-virescentibus; margine extremo costali fulvo; striolis tribus subapicalibus flavis in venis positis; ciliis fulvidis: posticæ area costali fusca, externa late nigra, abdominali flava: corpus fuscum, virescens; antennis fuscis, clava compressa.*

Alæ subtus flavo-virescentes: anticæ area discoidali fulvo tinctæ; puncto triangulari fulvo pupillato discocellulari; fascia discali nigro-fusca a margine interno ad ramum tertium medianum currente, extrorsum profunde dentata, introrsum diffusa; area interna late rufo-fusca; ciliis roseis: posticæ area medio-discali fulvo tincta; macula discocellulari aurantiaca fusco cincta, punctis duobus aurantiacis basalibus: corpus flavum, pedibus roseis.

Exp. alar. unc. 2.

♀. *Alæ supra maculis tribus subapicalibus et duabus subanalibus inter venas aureo-flavis; fundo obscuriore, aliter velut in mare: posticæ fuscæ; dimidio interno fulvo squamoso; fascia maculari discali maculis, e quibus duabus superioribus flavidis, inferioribus longioribus fulvis; area abdominali pallide sulphurea: corpus nigrescens, capite roseo hirto.*

Alæ subtus pallide virides: anticæ dimidio interno fulvo; marginibus costali et externo roseis; fascia submarginali ad ramum discoidalem superiorem continuata, aliter velut in mare: corpus albidum.

Exp. alar. unc. 1, *lin.* 11.

Port Famine (*King*)? Three examples, B.M.

From the supplementary cases of the Banksian cabinet, in company with a collection from Port Famine, presented by Capt. King. Allied to *C. thisoa, hecla*, &c., especially the female.

New or rare Pierinae

P. Z. S. 1871, Pl. XIX.

The butterfly is also depicted in colour as figure 2 on plate XIX in *"New and Rare Pieridae"*, published by the Zoological Society of London in 1879.

An interesting detail here is that on both of these images the butterfly is depicted with clear but still very normal antennal clubs. The picture of the butterfly is a clear image of one of the males that Butler found in the Banksian Cabinet. A very interesting detail, however, is that the depicted male lacks antennal clubs on the remaining antenna fragment, which explains why Butler in his description does not mention the uniquely large antennal clubs of this species.

In translation, Butler's description of *Colias imperialis*:

COLIAS IMPERIALIS, n. Sp. (Plate XIX. Fig. 2.)

♂. The wings orange-colored on the top: the outer part of the wings deep brown, with yellow scales; a spot along the outer portion of the leading edge and the ribs black; the wing root and the outer part of the leading edge yellow-green; outermost part of the front edge reddish; three yellow lines along the ribs closest to the wing tip; the lashes reddish; the front edge of the wing wings brown, their edge deep black, the inner edge yellow; body brown, greenish; the antennas brown with thin club.

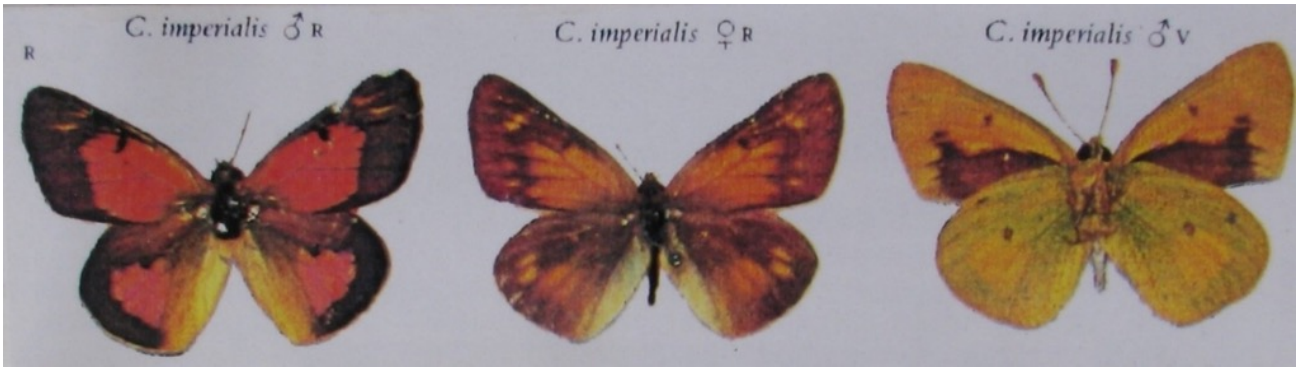
The wings are yellow-green on the underside; the wings red in the disk field; a triangular red spot; a black-brown disk string from the inner edge along the third center rib, outwardly sharp toothed, inward diffuse; inner surface deep reddish brown; the lashes cut; the backsplash disk field yellow; disk spot orange with brown circumference and two orange dots at the base; body yellow, legs cut. Wings span 2 inches.

♀. The front wings with three golden yellow spots at the wing tip and two at the anal angle between the ribs; the background darker, otherwise like the male; the back wings brown: the inner half scaly red; a disk line of stains, of which the two upper yellows, the lower ones longer and red; the surface along the rear body bleached sulfur yellow; body blackish, head hairy.

The underside of the wings light green: the inner half of the wings red; the front and outer edges pink; a sub-marginal line continues along the upper disk rib, otherwise as in the male; body whitish. Wings span 1 inch + 11 lines Port Famine (King). "

As shown on the previous page, Butler ends his Latin type description of *Colias imperialis* with a very interesting piece in English:

> Port Famine (King) ? Three examples, B.M.
> From the supplementary cases of the Banksian cabinet, in company with a collection from Port Famine, presented by Capt. King.
> Allied to *C. thisoa, hecla,* &c., especially the female.



Butler´s new sp. of *Colias imperialis* on the left side. In the middle and to the right a female and a male of the same species in BMNH's collection. This picture from the first edition: "*Butterflies of the Neotropical Region,Part 1*". Published in 1981 when BMNH apparently still claimed that their copies of *Colias ponteni* should be called *Colias imperialis* from Butler's description 1871. However, these two specimens, in the middle and on the right side, originate from Elwes´ collection and apparently carry the German name of the Hawaiian Islands at this time "*Sandwitsch Inseln*" This photo previously published with kind permission of Bernard D´Abrera in our magazine "*Insectifera"* in 1997. Please note the almost complete absence of antennae of the new described male on the left. More about this down here.

Based on the above description, where one can, of course, directly state that Butler's description, although it is considerably more detailed than Wallengren's description, nevertheless lacks any extremely essential characters that actually distinguish this species from any other of the around 80 species within the the genus *Colias*. What I first thought about when I read Butler´s description was, as stated above, the extremely thick antennal clubs.

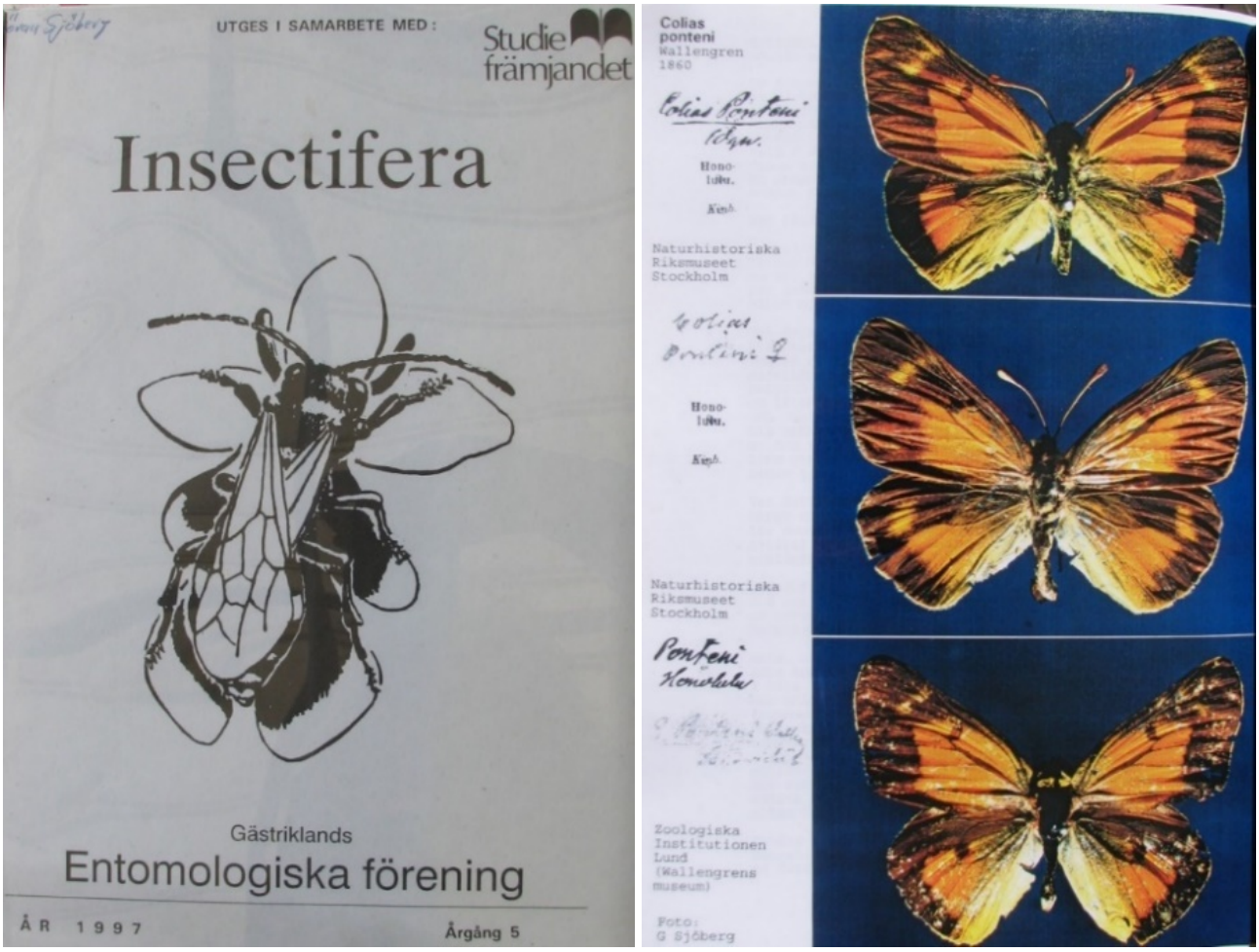
Butler's description of these: *"antennis fuscis, clava compressa", "the brown antennae with* ***thin*** *club*" is completely incomprehensible here. However, it is easy to explain why Butler in his description of the antennae does not mention any-thing about the species' fantastic and completely unique antennal clubs. All three specimens Butler encountered in this herbarium, two males and one female, lacked whole antennae with clubs attached. The male that Butler depicted on the above plate has, as can be seen on D´Abrera's picture above to the left, only half the right antenna remaining. The other two specimens in the herbarium lack both antennae. However, this does not explain why Butler in his description writes that the club is thin. Why this assumption? Another interesting detail in Butler's description is the question mark, (?), he set out for "King". He is obviously safe himself rightly doubtful about the local Port Famine for these butterflies!

My thoughts here go unchallenged to our Swedish artist and praised author Carl Clerck, who depicted "Papilio priamus" (today: *Ornithioptera priamus priamus*) without antennae, in his very famous book *Icones Insectorum Rariorum 1759-1764*. He chose to depict this extremely famous butterfly, Linnaeus first (!) described butterfly in *System Naturae 1758*, with antennae in the form of a dotted line rather than assuming how the antenna looked. The *Ornithoptera priamus* in Queen Lovisa Ulrika´s Natural-cabinet completely lacked antennae so neither Clerk nor Linnaeus had any idea how the antennae looked.

The first described butterfly in Linnaeus' 10th edition of *Systema Naturae* 1758. To the left Carl Clerck's painting of the butterfly and to the right Queen Lovisa Ulrika´s butterfly which is now available at the Museum of Evolution in Uppsala. Photos Göran Sjöberg.

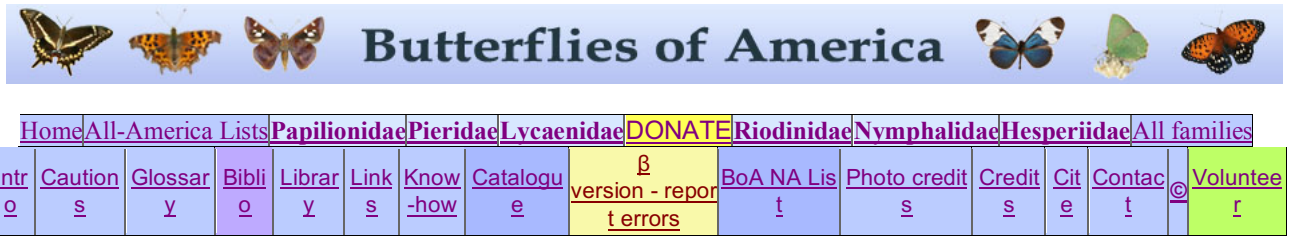
This fantastic butterfly is also in the same room as the two males of *Colias ponteni* and the pupa I found in the museum in October 2000 when the museum was renovated. More about this below.

In my article in *Insectifera* 1997, http://insectifera.se/04%20INSECTIFERA/Insectifera_1997.PDF pages 68 - 102 where I began the account of my research on the mysterious butterfly *Colias ponteni*, I showed my old pictures of the two syntypes at the Natural History Museum in Stockholm, also D´Abrera's pictures as well as all three known specimens we had in Sweden together with the original labels showing both the name and the locality which they were presented with when Wallengren described them in 1860.



"Insectifera" 1997 with the photos of *Colias ponteni* known at that time in Sweden. Photo Göran Sjöberg.

Regarding D´Abrera´s pictures of the three specimens of "*Colias ponteni* (*imperialis*)" from BMNH in London on page 12, I have of course only included the pictures I received permission from Bernard D´Abrera to publish in our magazine "*Insectifera*" 1997. If anyone wants to see good pictures of all six specimens of *Colias ponténi* in BMNH I can refer to, after some clarification, a very good web page, where in addition to Bernard D´Abrera´s pictures of *Colias ponteni* at BMNH, are also my own pictures of the specimens in Sweden.



http://www.butterfliesofamerica.com/L/Colias_ponteni_types.htm (June 2019).

Here, however, I feel that I have to make a clarification. When I first published this article I had with great surprise noted that on this site it was said that Dr. Gerardo Lamas had taken the pictures I published in our magazine *Insectifera 1997*. Gerardo explained to me, in an e-mail that this was completely wrong. He stated to me that he obtained the pictures from Bernard D´Abrera and was given permission to publish them, which he did on the website "*Butterflies of America*". Gerard then contacted Nick Garding when he received my article where I had written that he had stolen my pictures.

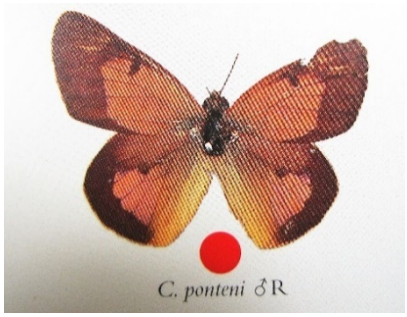
Nick is responsible for both the pictures and text to the pictures on this site. In a very friendly email to me he assumed responsibility for this mistake and has now acknowledged me as the right photographer for my photos from *Insectifera 1997*. I choose to accept this statement as I would like to have a good relationship with both Gerardo Lamas and "*Butterflies of America*" but I cannot see that I have done anything wrong in the past when I only cited what was published on the *Butterflies of America's* web site under my three pictures of the Swedish *Colias ponteni*: "*Photo taken by Gerardo Lamas and digitized by the Tropical Andean Butterfly Diversity Project, funded by the Darwin Initiative. Any use of this image, except for personal study, requires prior written consent of the housing institution*".

Gerardo has also in his mail to me pointed out that the term "Holotype", as used by the National Museum and which I have also used in a routine way for 30 - 40 years, in the description of the male Wallengren described in 1860 is incorrect because at this time they did not use this term. Correct designation of these specimens described by Wallengren, both the male and the female should be syntype. I would like to take this opportunity to thank Dr. Gerard Lamas for this remark. Of course, I want everything in this article to be as correct as possible even if the only, but still crucial aim for me with this long-standing investigation has been to find the right place where the butterfly was collected. I would also like to take this opportunity to thank my friend Bengt-Åke Bengtsson for clarifying the somewhat complicated type concepts regarding all the 11 known specimens of the adult butterflies of the species *Colias ponteni*. Therefore, for the butterflies I pictured in *Insectifera* 1997 where the above ambiguities are taken onto account and the 6 specimens of BMNH in London, the following applies:

These three specimens which Wallengren, according to his own statement, knew in his description in 1860, i.e. the male and female at the Natural History Museum in Stockholm and Wallengren's own specimen, which is now available at Lund University, are all **syntypes** of *Colias ponteni.*

With some surprise I noted that Bernard D´Abrera in his new revised edition of "*Butterflies of Neotropical Region*" *Part 1, Papilionidae & Pieridae* still has the same old pictures of these Colias specimens in BMNH but now he has changed the name of the butterfly from *Colias imperialis* to *Colias ponteni* which of course is quite correct but what amazes me is that he still has the red spot which in his books indicate that the illustrated specimen is the type of the species.

D´Abreras picture from his new revised edition of "Butterflies of Neotropical Region"", published 2016.



As everyone can easily see in a comparison with the photo on page 12 of this article it is the same specimen that D´Abrera showed in his first edition in 1981 of "*Butterflies of the Neotropical Region*". However, the male Bernard D´Abrera marked with a red spot is one of Butler's described "*Colias imperialis*", i.e. merely a junior synonym for *Colias ponteni* and therefore it completely lacks status as any kind of type!

This also applies to the other two specimens Butler described from those in the herbarium of the Banksian Cabinet. As far as I can understand, neither can the other three specimens in BMNH, i.e. Felder's and Elwes' butterflies be given any status as type specimens, or as syntypes or paralectotypes to *Colias ponteni*, as their origin cannot yet be determined with certainty. With the knowledge we possess today they may possibly have been collected by Samuel Pontén. Possibly, the upcoming DNA analysis could confirm their origin. If it can be proved that they were collected in the same local as Wallengren's syntypes, but at a later date, they could be termed topotypes. I also note that D´Abrera in his revised edition, possibly after information from BMNH with which he worked, changed the description year to 1862 from 1860, which is mentioned in the species description on page 7. Whether this is just a printing error or whether D´Abrera has really obtained evidence that this article was not published in the *Weiner Entomologische Monatschrift, February 1860* or possibly two years later I have not had the opportunity to investigate, although I doubt it. However, it should be noted that it is always the year of publication that applies.

However, it is hard for me to understanding why Bernard D´Abrera in his revised edition had not included the pictures I sent to him eight years ago of the five specimens of *Colias ponteni.* As well as with the information on the isotope investigation I had done with help of Oskar Brattström which at least suggests that Hawaii is the right place for this species. I also informed him about my finding of two more males of the species and also an empty parasitized pupa in the Museum of Evolution in Uppsala. More about this in the article below.

However, I am still very sorry for this as it was his first edition of this particular book "Butterflies of the Neotropical Region" with the pictures of *Colias imperialis* that I obtained in 1981 which became one of the most driving forces in my research on the butterfly *Colias ponteni*. Bernard D´Abrera's friendly and encouraging letter before the publication of the most crucial article for me in this investigation, the one in *Insectifera* 1997, strengthened my commitment. That is why it is so incredibly sad to hear that he is no longer with us.

Sometimes I am a little distraught over why no one in America, where many people should know about my studies of this butterfly, ever sought any contact with me. They obviously were aware of our issue of the magazine *Insectifera* 1997 and also of Hiroshi Hara's article in the famous Japanese magazine *Wallace*, Volume 8, in 2003. In which the discovery of two more specimens and a pupa of *Colias ponteni* and a picture of me and curator Lars Hedström can be found and also pictures of the newly found butterflies and the pupa. However, for various reasons, I have not found any reason to raise the issue with, for example, the Bishop Museum in Hawaii, since, as in most other "educational

institutions", it was assumed that the Oahu location is incorrect. See later in this article regarding a certain Mr. Zimmermann in the United States.

It is this kind of confident institute that unknowingly gathers knowledge and collects data but rarely mentions from where they have gained this knowledge that makes me so sad. I am just a happy "amateur" in the study of this unique *Colias* butterfly, with only my own personal interest in the butterfly without any financial support from any institution or so called "experts". I benefit from good and very valuable help from many friends at museums and universities around the world as well as many private amateur friends with butterflies only as a hobby in addition to their civilian professions, with as much knowledge of butterflies as the professional ones.

After this digression back again to the unique *Colias ponteni* butterfly after Butler's description of his discovery of the three butterflies in the herbarium and the pictures in BOA, *Butterflies of America*.

Extreme sex patches – androconia and antennae

Something that no one had obviously noted, before I observed it with the utmost astonishment, after an inquiry from my Japanese friend Hiroshi Hara, are the very strange scales along the front edge of the hindwings. Hiroshi Hara, in our correspondence about the species, asked if there were any "sex patches" ie. "sex spots" on the *Colias ponteni* butterflies? Sex patches or perhaps are better described as "scent scales" or *androconial patches*, i.e. “specialized scales in the male that carry chemical messages to females”. These occur in many different *Colias* species, but not in all of them. Special scent scales for this purpose, i.e. getting the female interested and receptive to the male's approaches occur in a variety of species of butterflies and can sometimes take bizarre forms such as large hair-tufts in, for example, the very beautiful *Agrias*-butterflies that patrol the Amazon rainforest canopy.

With the naked eye, of course, there were, as everyone easily can see, no clear normal "sex spots" as, for example in our Clouded Yellow, *Colias croceus* where these are about 1.5 x 3 mm in size and vary in color from completely yellow to light brown. The scented scales of our *Colias* butterflies are also not particularly strong but are obviously a prerequisite for a successful mating in these species. With my microscope, I started to look for the type of special androconia that are so typical of many *Colias* butterflies. This also applies to the species in the related genera *Zerena* and *Nathalis*.

It is also interesting to compare these two genera with the *Colias* genus for other reasons as well. Both *Zerene* and *Nathalis*. These have their main distribution in Central America from Southern California to Colombia. Characteristic of these genera is that they exhibit similar type of "sex spots" with very special scented wing scales that also occur in many species within the genus *Colias*, though not in the majority of *Colias* species in the USA and Canada. On the other hand, it should be noted that small *androconial patches* also are found on *Colias vauthierii*, which flies in southern South America both on the mainland as well as on Tierra del Fuego and thus also at Port Famine on the Strait of Magellan. It is well known that these scented scales on the male's hindwings are of great importance for the act of mating in these species. The foreplay of the male of *Nathalis* iole before mating as it approaches a female in the ground vegetation has been studied closely. Males patrol the ground in search of females. If he then finds a female but is rejected, he will probably be further involved by showing off with open vibrating wings and spreading his scent, pheromones, from the scent scales of the hindwings in the hope of attracting the female. I can very well imagine that the males of *Colias ponteni* behaved in a similar way when they got sight of a female. Unfortunately, we will never be able to experience this spectacle of this likely extinct butterfly. That these widespread scents also result in the oversized antennal clubs is also not a daring guess.

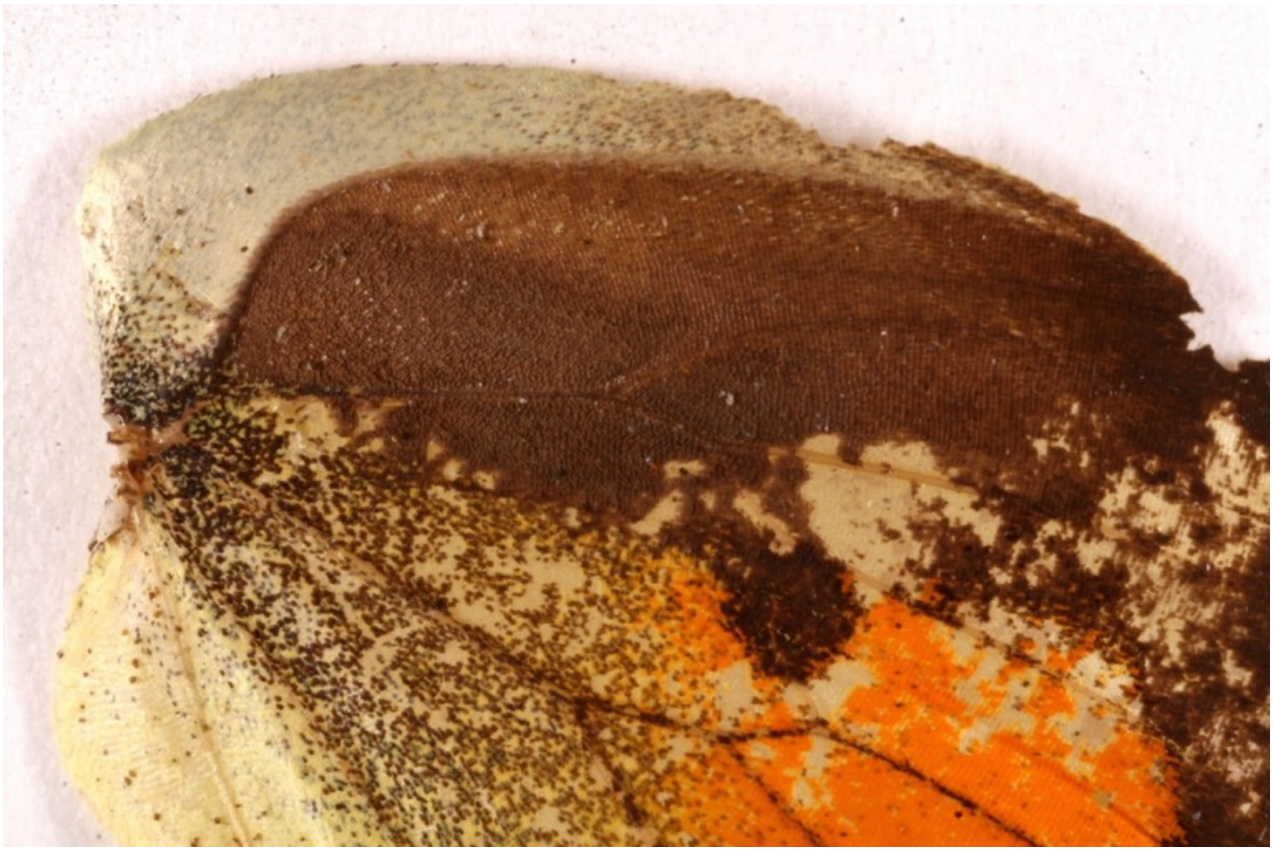
When the male of the syntype of *Colias ponteni*, which through Bert Gustafsson at the Swedish Museum of Natural History in Stockholm I graciously borrowed, had been gently softened it was possible to bring forward the forewing so that I could clearly see the front edge of the hindwing, I

immediately discovered that a lot of dark brown scales spread out over a large part of the front part of the hindwing. This part of the hindwing is completely hidden by the forewing with conventional butterfly preparation, as well as when the butterfly is in rest mode. Upon closer inspection of the wing scales in this field, I was struck directly by the similarity of these very large and clear wing-scales with those of some other *Colias* species´ androconial patches!

The scent scales “area” of the syntype *Colias ponteni* in greater enlargement. Photo Göran Sjöberg.

Obviously, the tremendous amount of scent scales in *Colias ponteni* certainly stands in clear correlation with the oversized antennal clubs of this particular *Colias* species! This also suggests that the sense of smell has been something that developed early on in this genus. Nor should it be overly daring to guess that the sense of smell in this species, based on the oversized antennal clubs and the enormous area of scent scales, has been a more primitive, or more original type, than the more "developed" scent scales in the remaining *Colias* genus.

There are many indications that this species among others, based on the genitalia, belong to a relatively "primitive" species within the genus *Colias*. Lucien Berger, who has extensively studied all the genitalia of the *Colias* butterflies, has just attributed *Colias ponteni* to a special sub-genus *Palaeocolias*. A highly developed sense of smell is, moreover, typical of a number of "primitive" insect species, while the eyesight through evolution seems to have evolved increasingly with "later" species.



The front edge of the hindwing of the male of *Colias ponteni*. Virtually the whole dark area is made up of large brown, strong scent scales or androconial "area". Photo Göran Sjöberg

One can imagine that nature itself develops its technology in the same way that we humans develop our technology with increasingly refined structures. Just compare Bell's telephone with today's mobiles. Perhaps one might ask why the female must have such large antennal clubs if the male now produces so much fragrance (pheromones) as one can assume he does with the large quantity of scent scales. However, nothing says anything about the quality of this scent scales.

The antennal clubs of the syntype of *Colias ponteni*. Photo Göran Sjöberg.

I will gladly return here to my example about the telephone. When the telephone was a big piece of equipment on the wall or on a table, the headset, i.e. the receiver, was gigantic in comparison to today's small earphones. Perhaps the same was true of this unique butterfly with regard to its antennae and especially the club itself where the sense organs are located? However, a trend towards today's small scent spots in the majority of "modern" *Colias* species should require both competition and a fairly large population.

A small population without competition often allows more bizarre forms to survive and specialize in ways that, unfortunately, also make them extremely sensitive if the conditions suddenly change. This is something that has often happened on solitary islands. We just need to think about the Dodo, *Raphus cucullatus*, in Mauritius. Even in Sweden we often use the saying “Dead as a Dodo” when we want to denote something that is really extinct. *Colias ponteni* could well be a similar example. Or rather an example of both of these scenarios where increasingly extreme attraction structures of the male are the prerequisite for female compliance, As is found in the development in males of the Birds of Paradise found in New Guinea, in the form of bizarre feathers instead of extreme scents. In addition, these very extreme Birds of Paradise species in New Guinea also seem to be linked to small isolated populations on the main island or its neighboring islands. We can, on the other hand, on this lovely island for us butterfly-lovers find at least as exclusive delightful butterflies as the Birds of Paradise. But like the Dodo once was, these birds are also extremely vulnerable to the worst predator on our planet, ourselves. Likewise, *Colias ponteni* has also come to meet the same fate as the Dodo, though not in our species' meat pots but forest- and land-destruction by the “development” of the islands.

These scent scales along with the extremely simple genitalia indicate that *Colias ponteni* would probably be, or at least belong to, the most original species within the genus *Colias*. or unfortunately perhaps have survived in our time. For this, the extremely large morphological difference between the sexes, i.e. the difference in the appearance of the male and female, also speaks of this particular species. I do not think about the basic colour that often clearly distinguishes the female from the male in that the females are usually yellowish-white while the males of a lot of species are darker red-brown. No, what I think of here is the marked difference in the wing patterns. Should one see a male and a female for the first time, it would be difficult, apart from the remarkable antennal clubs, to connect the male and female to the same species. These big differences, but especially the differences between this species and all the other ninety or so species of the genus *Colias*, would probably also be the cause of Lucien Berger's list in 1968 of the *Colias* genera where he attributed *Colias ponteni* to the subgroup "*Palaeocolias*". This marked difference between the sexes may also explain why in the 1970’s, in the collection drawer at the Swedish Museum of Natural History, there was a name label above the female named "*imperialis*" that actually aroused my special interest for this particular species!

The primitive genitalia of the species, based on Berger's description, has over the years been commented on by a number of experts, for example Shapiro and Lamas. None seem to have examined the butterfly more closely since no one, as far as I could find, mentions anything about the species’ strange scent scales and only in some cases in passing a comment on the species' fantastic antennal clubs!

Already in my earlier article on *Colias ponteni*, in *The Entomological Society of Gästrikland´*s magazine *Insectifera* in 1997, I was surprised that Butler, as I mentioned above, did not write anything about the extremely thick antennal clubs which is what you first notice when you see the type specimens of *Colias ponteni*. I had unfortunately at that time, not fully understood that the "type specimens" of *Colias imperialis* already at Butler's time apparently lacked complete antennae. This can of course explain Butler's lack of comments on the thick antennal clubs, but hardly his comment on the antennae. His opinion: "the brown antennae with thin club" is strange. Of the three butterflies Butler is said to have found among various plants from King's expedition just over 40 years earlier,

i.e. in 1826 - 1827, all complete antennae are missing today. Only short fragments of the antennas remain on two of the specimens while one of the males lacks any antennae.

Which butterfly Butler refers to when he describes the antenna as "brown with thin club" I do not know. The only specimen in the British Museum's collection, which, based on available photos, seems to have retained somewhat thinner antennae, would be the female found in the Rothschild's private collection. However, the third male of BMNH has retained both antennae in their entirety, as well as a thick antennal club. However, this male, as far as I can understand, Butler had no access to in his description of *Colias imperialis* in 1871. This particular male originates as far as we can understand from the label, from Elwes´ collection which he donated to BMNH, i.e. the predecessor of Lord Rothschild's own museum. However, we have no further information about where, when or from whom Henry John Elwes received these two specimens.

If I have something further to comment on with reference to Butler's description, it is that it does contain a large number of words in the description of, for example, the colors of the male and female, but without giving a clear picture of how the butterflies actually look. I actually think that Wallengren's more scant description is somewhat more distinct and clear. If it were not for Wallengren's local statement, Oahu, Honolulu, Butler should definitely have reacted to Wallengren's description. The big advantage of Butler's description, however, is the image of the male. Here you really get evidence of the old saying that a picture says more than a thousand words! However, something I lack in Butler's description is a picture of the strange female. Something else that you can wonder about is that there is not a single picture in the great expensive Swedish work of all newly described insects found during Eugenie's world sailing. It should not have been particularly difficult, at least in the case of the collected butterflies, to illustrate these with some simple but descriptive drawings.

Colias ponteni in the collection of BMNH. Where do they come from? Who have collected them and where and when?

In total, there are in the collections of the British Museum of Natural History, two males and one female from the so-called “Banksian cabinet” to which Butler gave the name "*imperialis*". However, in the British Museum's collections in London, there are three more specimens of the butterfly. The strange thing about these butterflies is that two of them carry the label "*Sandwitsch Inseln*", "Elwes coll. 1902-85 ". The third butterfly, a female, wears the label "Hono-lulu" with the addition "Felder collection" and "*Ponteni* Wallengr." This butterfly was found in Rothschild's private collection which is now also available at BMNH.

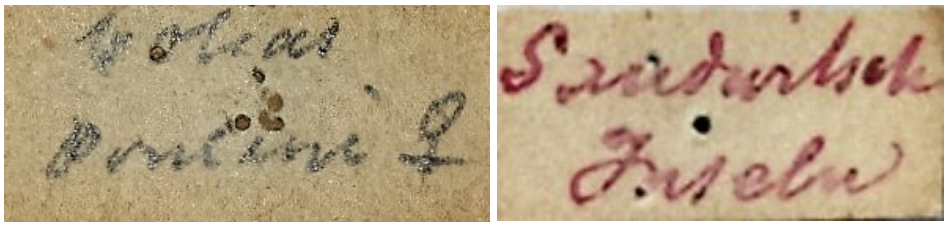
Taking into account that almost all "experts" on the *Colias* butterflies in unison claimed that the butterfly originates from Port Famine on the Strait of Magellan, these labels are more remarkable since these three specimens are all provided with labels showing that they would have been collected on the Hawaiian Islands and not on the Strait of Magellan! Whoever collected the above three specimens is as far as I can find unclear. However it should be clear that they can hardly have been found together with the specimens Butler described in 1871 from the herbarium specimens in the so-called Banksian cabinet. If so, Port Famine should also stand as a collection point for these labels. Then I return to the certain probability that at least Lord Rothschild's specimen originates from the frigate Eugenie's collection journey, either directly via Wallengren but probably more likely via Rudolf Felder, an Austrian entomologist very interested in butterflies. A very interesting detail here is also the label "Hono-lulu" on this specimen. It is exactly the same type of label that can be found on the syntype specimens of the Swedish Museum of Natural History in Stockholm!

The collection labels on Rothschild specimens from the Felder collection on the left, enlarged, and also the two labels on Wallengren´s syntype specimens in the middle and right, male and female. Compare with page 8.

The fact that Wallengren published his description of *Colias ponteni* in Vienna in 1860, where Rudolf Felder lived and also Rudolf, the year before returned to Austria, together with his father Cajetan, from his world sailing "*Reise der Österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859*" may not be a coincidence. That these gentlemen were acquainted with each other I believe to be likely but without having researched this closer. I therefore believe that this female comes from Samuel Pontén's collection. This "Feld's female" is similar to the one that Wallengren described as being now available in the Swedish Museum of Natural History in Stockholm.

Since the other two butterflies labeled "Elwes Coll" bear the label "*Sandwitsch Inseln*", i.e. the old name of the Hawaiian Islands it may possibly be that these two specimens also originate from the butterflies that were brought home by the frigate Eugenie. One of the most interesting things I see is how these two specimens have become added to the Elwes´ collection. Who has caught them and when? I have not been able to get or see any answer to this. Elwes, i.e. Henry John Elwes was a British botanist and entomologist with a very extensive collection of butterflies that he donated to the BMNH so that the specimens are still there today. We have a good explanation of these but unfortunately not how he himself got possession of the butterflies. The fact that he was born in 1846 may suggest that his specimens were not collected before the frigate Eugenie's world voyage in 1851-1853. Since the labels are written in German or Austrian languages which is the same language and Henry Elwes and young Mr. Felder, born in 1842, are rather equal in age, I do not see it as unlikely that these two gentlemen also knew each other well. Perhaps Henry Elwes, like Lord Rothschild, bought, swapped or got this pair of *Colias ponteni* from Rudolf Felder in Austria? It would be interesting to compare Rudolf Felder's handwriting with the handwriting of these butterflies' locality labels "*Sandwitsch Inseln*" handwritten in red ink. This could mean that the two specimens of BMNH donated by Elwes could also originate from Rudolf Felder. But how do you get hold of Rudolf Felder's writing?

As I sit and write this in June 2019, I look at the name tag for the female of *Colias ponteni* above, which was obviously written by Wallengren and I see something remarkable that I had not noticed before! The appearance of the letter "s" in the word "*Colias*" on his handwritten label and the word "*insel*" on the two local labels for the pair of *Colias ponteni* donated by Elwes to the British Museum Natural History, i.e. the words written in red ink "*Sandwitsch Inseln*", are very similar. When I look closer, I discovered the great similarity of this handwriting. The slope of the letters is the same, the written letter "s" on both labels is exactly the same. The dot over the letter "i" sits just as high, yes very high, above the letter itself.



The handwritten labels mentioned in the above paragraph.

Of course, it would be interesting to let a graphologist, i,e, a writing expert look at this. However, I cannot get away from the idea that there must be extremely few people who may have written these labels. As I see it, Wallengren is closest to the obvious when he is supposed to be the only one, except for Kinberg or Pontén, who had access to some extra specimens of this butterfly for exchange if they existed. That it is Wallengren and not Kinberg or Pontén who wrote the label on the pin for the "female type" should not be a daring guess. Wallengren also seems to be clearly the only one of these three gentlemen who had contact with concerned knowledgeable butterfly experts abroad, i.e. in this case Rudolf Felder and possibly Henry Elwes and who, perhaps in exchange for other interesting butterflies or information about them, could imagine making an exchange of specimens. For both Wallengren and Rudolf Felder, the German language was also natural, so the spelling "*Sandwitsch Inseln*" also becomes quite obvious.

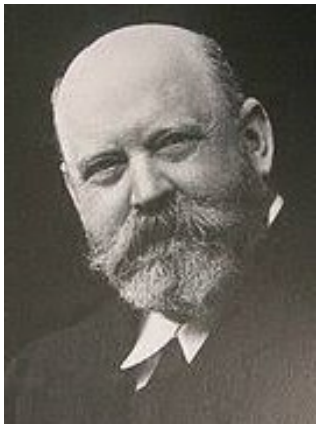
As far as I know, the one who gives away, sells or replaces a butterfly also usually sets the collecting place for the specimen and not the recipient himself. As I now see it all, the only thing that could question this scenario is that father and son Felder collected these specimens on their three year tour of the earth themselves, which, however, seems quite unlikely especially with regard to the label "Hono-lulu" on Rudolf Felder's own female which then arrived in Lord Rothschild's hand.

Perhaps my imagination is running away with me when I think of this scenario, but at the moment I cannot think of any better alternative. Anyway, Wallengren may well be involved in at least Rudolf Felder's specimens but probably also Elwe's specimens. We must also remember that Wallengren, with regard to its new descriptions, had good relations with Vienna and Austria. Wallengren probably also carefully studied father and son Felder's voyage and, in 1861, also learned to write his own book about the frigate Eugenie's journey: "*Lepidoptera nova (1861) in The Frigate Eugenies Journey Around the Earth 1851-53*", which I unfortunately did not succeed to get hold of.


Arthur Gardiner Butler.


Rudolf Felder.


Henry Elwes.


Lord Walter Rothschild.

Two new *Colias ponténi* and a pupa!

We had a lucky night on October 12, 2000, when I had a giant piece of very good “lucky flutter” (as one may say about a butterfly find), in a preview of the new Museum of Evolution in Uppsala, and discovered two more, so far quite unknown, males of *Colias ponteni*, but not only this, the best of everything so far, a pupa that with very high probability is a *Colias ponteni*!

This pupa discovery I hope may be another clue to help solve the mystery of where this butterfly comes from. The find at “Zootis” in Uppsala, the Museum of Evolution in Uppsala, also eliminates a great deal of the doubts we previously encountered whether the priest Samuel Benjamin Pontén really caught the butterflies himself. Why would he otherwise have kept this unique find in his own collection? See also my friend Jan Isidorsson´s picture from this lucky evening in **Appendix 6**, page 100 in this article.

Speaking of labels. The two butterflies and the pupa I found on this amazing evening in connection with the reopening of the newly renovated Evolutionary Museum in Uppsala, all bore the cryptic label: "*coll. Strängnäs High School. Cabinet 4, Drawer 'Tahiti'* ". However, this information should be given less weight. The explanation for this is, as I pointed out in the introduction to this article, that Samuel Pontén's brother Jonas Otto was a teacher at the said school in Strängnäs. Of all the butterflies Samuel Pontén brought home to his brother from the journey on Eugenie, a number of the labels "Tahiti" are worn. Other butterflies that Samuel brought home to his brother carry the labels "New Holland", "Ascension", "Manila", "Foua", "Chatam", "Galapagos" and the two most interesting labels "Honolulu" for some monarch butterflies, *Danaus plexippus* of both sexes and "Magellans Sund" (Strait of Magellan) for a male of the Nymphalidae *Phalanta phalanta*, probably the nominal *phalanta* that is common across much of Southeast Asia. On the basis of Pontén's specimens to exactly determine where this butterfly was collected is difficult, but so much is clear that along the Strait of Magellan it does not fly. In any case, Samuel Ponten had not collected that specimen as he, as far as I could find, was not even ashore during the frigate Eugenie's landings along this strait. **These labels, which were obviously written long after the brother Jonas Otto received the butterflies at his school from Samuel Pontén, we must take with great scepticism.**

Göran Sjöberg who had just discovered at the Museum of Evolution Uppsala, that there were two males and probably also a pupa of *Colias ponteni* which Samuel Pontén collected for his brother Jonas Otto Pontén, who was a teacher at Strängnäs High School and also a private naturalist collector. I am here with my retired friend, the curator Lars Hedström at this museum who showed me the greatest helpfulness and always accommodating my questions and ideas. Photo Jan Isidorsson.

Among the butterflies that, like the two *Colias ponteni*, carry the label "Tahiti" can be mentioned a number of *Hypolimnas bolina*. Probably the subspecies *nerina* that occurs in eastern Australia. Some examples of *Hypolimnas bolina* are also similar to the *montrouzieri* subspecies. However, these specimens lack collection labels. "Tahiti" also stands as a collection area for the Nymphalidae: *P. phalanta* and *Euploeaa* core and some *Melanitis leda*. The latter is also included among the species with the collection label "New Holland" which was the usual name for Australia at this time. Frigate Eugenie visited Sydney for 10 days at the end of October 1852. However, several of these species labelled "New Holland", for example *Junonia orithya* do not fly in South Australia where Sydney is located, which is why it is unlikely that Samuel Pontén himself collected all these butterflies. Among the butterflies with the collection label "New Holland" can also be mentioned *Vanessa itea*, *Hypocysta pseudirius*, *Heteronympha merope* and *Tisiphone abeona*. Some Pierids and Lycaenids carry the label "Manila" as well as the Satyrid *Ptychandra schadenberg*. Five "Blues" of the Galapagos Islands endemic *Leptotes parrhasioides* carry the label "Galapagos" I get the feeling that at least these Blues, Samuel Pontén should have collected himself. From "Galapagos" there are also two *Phoebos agarithe* in Pontén's own collection. Obviously, however, neither Samuel nor his brother Jonas Otto put particular emphasis on exactly specifying or worrying about where the respective butterfly was collected. For them it was probably enough that the butterflies came from the other side of the globe! This should in any case apply to the butterflies that priest Samuel Pontén had kept for his brother's own sake. I think we must remember that these two brothers, both amateurs, just collected butterflies mostly because the brightness of those insects and 170 years ago the exact localities were not so important!

I think it is a bit presumptuous that some researchers today amuse themselves about the fact that these travelers on this voyage 170 years ago were not as accurate as we are today with exact local details. After all, one wonders how these "experts" can say so confidently that Butler's statement about Port Famine would be correct. One only needs to go back 70 years from 1850, i.e. at the end of the 18th century, and there were regularly missing local details on exotic insects that were collected.

Of course, the fact that the two *Colias ponteni* butterflies in the Evolution Museum's collections could have been be collected in Tahiti, which neither of the fellow travelers claim, is of course completely excluded. Curator Lars Hedström has also personally told me that in 1968 the Department of Zoology at Uppsala University received this collection from Strängnäs High School.

Hawaii or Port Famine? Which locality is most likely to be an objective assessment?

The colour of the abdomen and the wings:

The abdomen of *Colias ponteni* is relatively bright as well as the inner parts of the hindwings. I have spoken to Claes Eliasson, a Swedish butterfly expert and successful breeder of different species of butterfly, and asked if one can draw conclusions about the species flying in cold or hot areas based on the appearance of the butterfly. Claes´ opinion is that butterflies in particularly cold areas such as in the mountains or, for example, along the Strait of Magellan should have a darker thorax and abdomen and also be darker at the wing root than specimens in hot areas. A darker body and dark wing root can absorb the necessary solar heat faster to enable the butterfly to move. This possibly suggests *Colias ponteni* on warm Hawaii rather than the cold and sun-deficient areas along the Strait of Magellan. Especially as the *Colias ponteni* females are relatively bright compared to, for example, the rather common *Colias vauhtierii* along the Strait of Magellan which has a darker body and is also darker at the wing roots on the upper sides of both wings.

Colias vautierii on the Brunswick Peninsula, Strait of Magellan. Photo Daniel Rosengren.

Colias ponteni - a sensitive "primitive species". Is it extinct?

Colias ponteni was attributed in 1986 by Lucien Berger to a special sub-genus *Palaeocolias* based on its genitalia which, by their "simplicity", differ from other species of the genus. That such an original species would have evolved in such a peripheral place as the areas around the Strait of Magellan or on Tierra del Fuego seems highly unlikely. Possibly, a more likely area would be in the vicinity of the sister genus *Zerene*, i.e. in Central America. That such a "relic" somehow managed to get to, and was able to adapt to, the conditions in the Hawaiian Islands, and then further developed into the completely unique form it exhibited when it was collected does not seem completely unlikely either. The unique development with extreme androconia and egg-shaped club-like antennae could then continue unrestrained until the island group, especially the small low-lying island of Oahu, was colonized in the early 1800s.

As I said, I do not see this scenario as unlikely. How the butterfly once arrived on the islands you can only speculate about but you can very well imagine that a lone female in some way has come over to Hawaii also from eastern Asia. The species that most closely resembles *Colias ponteni*, namely *Colias fieldii*,, see Footnotes on page 92, although smaller is nevertheless spotted with scent scales on the front edge of the hindwings. This is lacking in similar species in western North America. Whether most of the animals and plants of the Hawaiian Islands originate from America or Asia, I have not investigated, but perhaps the answer to this can also give an idea of the likelihood of *Colias ponteni´s* origin if we now assume that Hawaii is the site of the species.

Is there any evidence for the extinction of the species which could have been brought about through the new rapid exploitation of Oahu in the early 19th century, or can this only be regarded as an isolated hypothesis? In fact, there is something that suggests that cultivation and perhaps the introduction of foreign parasites can be precisely the deciding factor for the species' eradication, assuming that Hawaii was the place where the species was caught.

Cause of likely extinction

During my search for more specimens of the species in Swedish museums I found, as mentioned above, two males of the butterfly in connection with the reopening of the Museum of Evolution in Uppsala's new premises. Beside the two males of *Colias ponteni* there was also a pupa with the same label as the males. A careful study of the pupa, shows a girdle of the type that distinguishes the genus *Colias*, and the species *ponteni's* most distinctive character, the thick antennal clubs, are clearly visible as an imprint in the empty pupa shell. The strange thing about the pupa, however, is the fact that this pupa did not hatch naturally but that it pushed open at the head end. The pupa shows a clear round hole at the head end in a way that happens when a pupa has been parasitized and the parasite has drilled out of the unhatched pupa shell.

This pupal shell, with hopefully some remaining fragments of a tachinid fly or a parasitic Hymenoptera, I have not wanted to investigate more closely, as this, with the more advanced DNA technology of the future, could obviously be the ultimate clue that should be able to clarify why the species probably became extinct. The pupal case and the plant stem should also, with a bit of luck, give a clear clue as to where the pupa was collected. The pupal shell with attached girdle to the plant stem has therefore been left completely untouched by me. It has been reported recently, after careful examination, that an egg shell has been found on the pupa, which may also be linked to this parasite. It will be extremely exciting to see what future analysis of this can provide. If we are lucky, perhaps from these parasite remains we can now determine its identification with the help of DNA technology. This may give the definitive answer to the origin of *Colias ponteni* and its disappearance. However, the fact that the butterfly would have been eradicated through the collecting of Pontén and others is totally unlikely but it can of course not be ruled out that they here "managed" to collect eight or nine of the very last then still surviving specimens of this already probably extremely endangered unique butterfly. The question I ask myself is also at what stage was the species at the time of collection? Were they larvae, pupae or flying adults or possibly two of these three sages?

The finding of two more males of the species at the Museum of Evolution also suggest, as I pointed out above, that it really was Samuel Pontén who caught at least some of the five specimens of the species which are now in Sweden. Possibly Kinberg himself also collected some of the specimens as in Wallengren's description he is mentioned as a collector. Wallengren also writes that the collection of the butterflies took place during June and July.

The parasitized pupa found together with Samuel Pontén's two males of the adult butterfly *Colias ponteni*. Photo Göran Sjöberg.

The five Swedish specimens of *Colias ponteni* together with the parasitized pupa. Photo Göran Sjöberg.

To the left are the two syntypes, male and female, at the Natural History Museum in Stockholm. Below in the middle Wallengren´s own syntype at Lund University. Above in the middle and below to the right are the two males at the Museum of Evolution in Uppsala where the pupa also located. Since Wallengren probably did not know these two specimens, they should be designated as "Additional material" which may be good to have if the syntypes for some reason disappear. They can then be used to designate a lectotype for the species.

If the collection had taken place in July, this would have to have happened on July 1, as Eugenie left Honolulu on the afternoon of July 2nd. Probably Wallengren did not receive an exact collection day from Pontén or Kinberg before the new description of the species in 1860 in "*Weiner Entomologische Monatschrift*" why Wallengren simply stated the two months when the frigate Eugenie at its first visit had been at the Hawaiian islands but that he then in the book "*Royal Swedish FREGATTEN EUGENIES RESA Around the Earth - Scientific Observations II*" (**Appendix 1**) had been informed or convinced that the butterflies were collected in June: "Partia: Insula Oahu (Honolulu) mense Junii", ie. in June.

The two males, as well as a number of other butterflies from the voyage of Eugenie, were brought to the Zoological Museum at Uppsala University in 1968, according to curator Lars Hedström from Strängnäs High School. At the same time, the plants that Samuel Pontén, possibly together with Master Andersson, collected for his brother, who was a senior master at this school, were also transferred to the Swedish Museum of Natural History in Stockholm. That someone other than Samuel Pontén could have collected just these butterflies and then kept only two copies seems totally unlikely. Possibly, Pontén did not tell Wallengren about these butterflies as Wallengren in his description of the species only mentions the two type specimens that are currently present at the Natural History Museum in Stockholm but kept the third, a male, in his private museum. It can of course also be that Wallengren received the information about those butterflies only from Kinberg and he did not tell Wallegren that Pontén had kept two specimens for his brother? Wallensgren´s male today belongs to the Department of Zoology at Lund University.

According to curator Roy Danielsson, who put Wallengren's specimen at my disposal for this investigation, it is not entirely unlikely that Wallengren might also transferred the female which carries the label "Felder collection *Ponteni* Wallengr." to Lord Rothschild as this female was found in

Rothschild's own collection. If Felder here acted as an intermediary or if Wallengren first sold the female to Felder and he then sold or exchanged it with Rothschild, I have no idea. This female, as I have shown above, also has exactly the same local label "*Hono-lulu*" which can be found on the two type specimens in the Swedish Museum of Natural History in Stockholm. Interestingly, however, Wallengren's own specimen lacks this label. This could possibly indicate that Felder had received this specimen from the Swedish Academy of Sciences or from Kinberg, but hardly from Pontén.

If it were possible, it would of course be extremely interesting to find out via the C-14 method whether the three "*imperialis*-specimens" and also the other three specimens in BMNH are older than the five specimens we have in Sweden or if some of the specimens at the BMNH are of the same age or perhaps part of the same population as the specimens in Sweden. However, such an investigation is likely to be impossible partly because of the slight difference between the hypothetical dates the collection would have taken place, i.e. in the 1830s vis-à-vis 1852. However, the most crucial thing should be that too much of the specimens might be destroyed in such a hypothetical examination. Unfortunately, whether there is any correspondence between Wallengren and Lord Rothschild, Felder or Elwes, has not been possible for me to investigate. However, it should not be an impossible task to find the answer to this from the archives of these gentlemen. It might also be possible in the future to find out via future DNA-studies whether Pontén's five butterflies, that are probably derived from the same litter, differ from the butterflies Butler described as "*imperialis*", **but above all, whether Pontén's butterflies in the three Swedish museums originate from the same litter as Elwes´ butterflies from "Sandwtisch Inseln" and Rothschild's "Felders-specimen" with the label "Hono-lulu."?**

IRMS (Isotope Ratio Mass Spectrometer) isotope investigations

After more than 30 years of researching the sources that up until now have been available to me in order for me to find a solution to the question as to where these butterflies have been collected, the problem seemed insoluble. So one afternoon as I quickly looked through a newly published issue of the Swedish "*Entomologisk Tidskrift*" (Entomological Journal) I saw a call for help where Oskar Brattström talks about the work of using isotope studies, IRMS (Isotope Ratio Mass Spectrometer) of captured migrating butterflies like the Painted Lady and the Red Admiral, *Vanessa (Cynthia) cardui* and *Vanessa atalanta* to try to determine whether these migrants, in Sweden, come from Spain and North Africa or if they had flown to Sweden from south-eastern Europe or the Caucasus. Of course, my thoughts went directly to the question of *Colias ponteni's* descent. Perhaps one can get a clue about whether the butterflies are caught at the Strait of Magellan's or in the Hawaii archipelago using isotope investigations? The straight line distance between these places is almost 12000 km so it should be possible to see a significant difference. The bedrock is also quite different, although some volcanic activity also occurred at the Strait of Magellan, albeit of a completely different intensity than the Hawaiian Islands.

Oskar Brattström liked the idea and promised to investigate whether there was any possibility of doing these investigations. A major problem with this type of examination is that certain material must be taken from the butterfly itself. It was of course impossible to take any part of the syntypes at the Natural History Museum in Stockholm. After conversing with my friends at the Museum of Evolution, where I suggested the possibility that we might through this method be able to solve the question of the origin of this completely unique species, I was allowed to take an extremely small piece of the front edge of the hindwing which in both living and in normal set positions is under the inner margin of the forewing.

It then remained to find suitable comparative material, both from Hawaii and also from the Strait of Magellan. When it came to the Strait of Magellan, this was no problem as my Japanese friend and tireless collector Hiroshi Hara, sent me several specimens of *Colias vauthierii cunninghamii* which he had captured at the Strait of Magellan. When it came to Hawaii, of course, there are no *Colias*

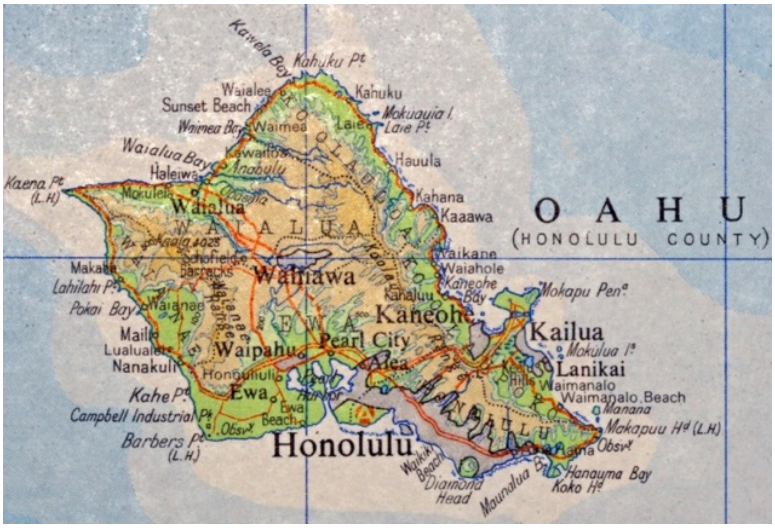
butterflies to compare with, so I had to take some other butterflies from my own world collection that came from the Hawaiian Islands. It had to be a Monarch butterfly, *Danaus plexippus* and a Long Tailed Blue, *Lampides boeticus*, both butterflies collected on the island of Oahu. The latter kindly donated to me for this purpose by Jack Harry in USA

After a long time at the laboratory in Canada we got the results from their isotope studies. These show a notable similarity between Ponten's and/or Kinberg's collected *Colias* butterflies and my butterflies collected in Hawaii while the difference between Pontén's and/or Kinberg's collected *Colias* butterflies and the *Colias* butterflies, *Colias vauthierii cunninghamii*, which Hiroshi Hara collected at Strait of Magellan is clear. The comparative figures with the butterflies from the Strait of Magellan show on average "-101" while for the butterflies that have been collected on the Hawaiian Islands lies on average "-65" and the samples we have taken on two of the *Colias ponteni* butterflies are on average "-74". I would also like to take this opportunity to thank Nicklas Wahlberg who now works as the Zoologist in Lund for his help in reconnecting with Oskar.

Both Oskar Brattström and I are, of course, aware that this isotope survey is not a comprehensive proof that the butterflies Pontén or Kinberg presented to Wallengren are really collected by those gentlemen on Oahu, which they have always declared. Along with previous discussion in this article, Hawaii rather than Port Famine on the Strait of Magellan, appears a much more likely place where this butterfly was collected. Oskar Brattström has long intended to publish this and his other isotope studies for more than 9 years, since the spring of 2010. I have been waiting to publish this long article about my soon 50-year study of the butterfly *Colias ponteni*, but when the newly started DNA study came to my knowledge a month ago, I felt that even though vague promises to Oskar about the opposite, I still want to publish my article that was mainly written so long ago for publication in our journal at the same time as Oskar publishes his article on his isotope studies. However, that now completely omits Oskar's company isotope survey, **which was de facto initiated by me**, which feels completely wrong which is why I made the decision to mention this isotope investigation, which in any case strongly points to Hawaii as the right place for *Colias ponteni*. During the course of publishing this article over the summer, I have also received permission from Oskar to publish the above related results of the isotope study, which of course I am very happy about.

What more can suggest that Samuel Pontén's butterflies really were taken in Hawaii?

An undeniable fact is that the only persons who, according to all available literature, say they have seen and collected the species are Samuel Pontén and Johan Kinberg. In his description of the butterfly, Wallengren writes that it was collected in June and July, which was later changed to June as I mentioned above. I can imagine the following scenario. Samuel Pontén found a newly hatched group of butterflies, among them the specimens he later gave to his brother and probably in connection with this find also a pupa. This collection probably took place a few days after Midsummer, when Pontén together with Master Andersson, made his walk in Honolulu's surroundings to the Nuuanu-valley and then over the Pali-pass to the plateau on the other side of the island's north-east. The excursion eventually ended with a party together with the son of the Hawaiian King. However, the collection may have also taken place in other areas around Honolulu, for example along the beaches. We unfortunately do not know.



Oahu in the Hawaii archipelago. Honolulu and Nuuanu-Valley with Pali-pass on the route to Kailua.

The fact that Samuel Pontén himself had to keep at least two specimens of this, the most spectacular of all insects collected on Sweden's first scientific voyage, tells us that he also collected or took care of at least some of the butterflies. The question one asks, especially after my discovery of the parasitized pupa, is whether the collection really took place as fully formed flying butterflies? The collection could very well have been done by a collection of larvae. Finding larvae was, by the way, much more common at that time than it is today.

On my special request, Christer Hägg, author of the great book "The Frigate Eugenie's World Navigation", published in 1999, (Appendix 3) made special investigations as to whether priest Samuel Pontén really did not leave the frigate Eugenie for a visit to Port Famine when the frigate visited there. According to a personal letter to me, Christer Hägg states, based on studies of logbooks and other material, that Samuel Pontén probably did not leave the ship during the days Eugenie passed the Strait of Magellan, neither at Port Famine nor during other stops along the strait. The exception could possibly be when one of the boatmen, who had become mortally wounded, was buried on this, as one experienced, miserable place. Incidentally, this boatman Löpare was buried next to a single cross marking Captain Stokes grave who was once the Commander of the famous Beagle. This was after Captain Stokes took his own life having endured the responsibility, the darkness and the storms during a whole winter along this miserable Strait of Magellan. That Samuel Pontén at this funeral ceremony would have collected these five *Colias* butterflies seems extremely unlikely." In all circumstances, Samuel Pontén was not on the expedition Kinberg made to Mt Tarn, where one might think that the butterfly could have been collected.

According to the books written about this trip, everything indicates that Samuel Pontén did not leave the ship on this short visit to Port Famine in 1852 which is why he could not have collected the butterflies there. See also some letters from Christer Hägg to me regarding Samuel Pontén's possible landings along the Strait of Magellan and other places along this voyage (Appendix 4).

Can Port Famine or the surrounding areas be the right place for *Colias ponteni*?

As a small note, it may be justified here to give a brief account of the small community or rather the garrison of Port Famine at this time. It was named after a ship that was wrecked near the site. However, most of the more than one hundred people on the ship managed to land ashore in the bay, but almost everyone had been starving to death before the next ship passed the place and saved a few survivors. In 1840, the Chilean government instituted a penal colony on the site. The year before Eugenie arrived at the site, i.e. in 1851 a revolution began in Chile, which had devastating consequences in the criminal colonies of both Port Famine and Punta Arenas. However, here it is too far too long to tell about this,

but I would like to recommend anyone interested to read more about this in Christer Hägg's fine book on "The Frigate Eugenie's World Navigation". The frigate Eugenie's Captain Virgin, however, was asked during the visit to Port Famine to temporarily lend twenty marines and boatmen to guard prisoners who were ordered to carry coal bags from the store in Port Famine to the English paddle boat Virago. The Virago had arrived the day after Eugenie had arrived with the convicts aboard.

Port Famine in the 1840s. Pictures from Christer Hägg's book on Eugenie's sailing around the World.

However, everything was obviously not just misery during the visit to Port Famine. Master Andersson sent a report, probably with Virago, which was later published in the paper "Aftonbladet" in Stockholm on May 7, 1852. I choose here to quote Andersson's text, which, however, must be taken with a large "pinch of salt". I know how it usually sounds when you write and receive postcards and letters from your friends around the world how amazing their collections have been!! Here it was for the expedition to show to the home front in Sweden that the voyage was successful and to show that Sweden was a nation to count on considering the natural sciences. Andersson wrote:

"*We stayed for three days, during which time the scientists made excursions, and other people enjoyed themselves with hunting and fishing. In any case, the catches would be satisfactory. On the battery there were stuffed birds and fishes to such a large number that if they were alive, they would have the power to join the frigate in combination with a very good breeze; Grasses and plants in gray paper are enough to thereby feed our life Stock for weeks; In addition, we have a large collection of insects on needles, and lots of small items in spirits.* "

Charles Darwin describes Port Famine, in his book with the Beagle: "*In Port Famine, we have rounded mountains hidden by impenetrable forests drenched by rain and endless storms". On a visit on June 1, Darwin continues: "We anchored in the fine bay of Port Famine. It was now the beginning of winter, and I never saw a more cheerless prospect; the dusky woods piebald with snow, could be only indistinctly seen through a drizzling hazy atmosphere. We were, however, lucky in getting two fine days. On one of these, Mount Sarmiento, a distant mountain 6800 feet high, presented a very noble spectacle. The temperature in Port Famine is considerably lower than in Dublin both summer and winter and that the difference between the seasons is not so great with a more even climate*".

A comment:
Mount Sarmiento belongs to the highest mountain range of the Tierra del Fuego, 2246 m, located on the island's southwestern cape approximately 100 km south of Port Famine. This area on the south-western cape of Tierra del Fuego consists of a mountain chain, Cordillera Darwin, with peaks of over 2000 m. The bedrock of clay-shale could possibly be a place for *Colias*. I don't know whether anyone has seriously investigated the insect fauna of this extremely inaccessible area. My friend Hiroshi Hara hasn't been there. The peak was first climbed as late as 1956. This stunningly beautiful mountain was named by Captain Phillip Parker King during his exploration of the coast of Tierra del Fuego in

1826–1830. He named this volcanic mountain “Sarmiento” in honour of the Spanish sailor Pedro Sarmiento de Gamboa, born in Spanish Galicia in 1532 and died in Lisbon in 1592, who first worked for the Spanish King and then, after many events, with Sir Francis Drake in the late 16th century for England's Queen Elisabeth the 1st. It was also Pedro Sarmiento who, before 1583, chose and built a fort at Port Famine in the fine bay on the Strait of Magellan.

Now when I am sitting here in my museum, thinking of the butterflies Butler is said to have found in a herbarium from this King's research trips around Tierra del Fuego, I think that perhaps the area at this south-westernmost part of Tierra del Fuego eventually could be the place where *Colias ponteni* existed if the coming DNA-investigations will not give any good alternative? Captain King visited the mountain and the surrounding areas so why should it not be unlikely that during these visits, plants were collected? We know that collecting plants occurred from the herbarium Butler found in 1870. The question you have to ask yourself is if there were any plants from Tierra del Fuego which Butler found in the herbarium or were the plants from Hawaii? If that were the case, would it not be quite likely that these three *Colias imperialis* were among these plants? Captain Phillip King during these research trips had Port Famine as a base so it is not at all certain that the plants in the herbarium where Butler found his "*imperialis* butterflies" were collected exactly at the garrison of Port Famine. Mount Sarmiento, as Darwin so lyrically described, is actually within sight of Port Famine!

However, in my opinion, the biggest doubt that Port Famine and the surrounding areas on the Strait of Magellan on the Bachelor's Peninsula would be the place where *Colias ponteni* was collected, is of course, that the species, despite intensive searching for more than 150 years, has not been found again - but have all collectors been looking in the right place? Dr. Gerardo Lamas expressed doubts that the area north of Port Famine was adequately investigated but **has anyone** examined the areas north of Mt. Sarmiento in the Tierra del Fuego? That the species, if it existed in Port Famine's surroundings or at Mt Tarn, would have been eradicated by the inhabitants or by the collecting that would have hypothetically taken place when the Frigate Eugenie's visited in 1852 seems totally unlikely.

However, what I wonder about is can *Colias ponteni* possibly be flying on the distant Mt. Sarmiento that Darwin so lyrically described. Whether or not someone explored this mountain I do not know but maybe some unknown person found these butterflies? In that case, the collection was made by someone else, one of the participants in the Swedish expedition who would arrange with Samuel Pontén or Kinberg to buy or exchange the butterflies during the visit to Port Famine. This is of course a possible hypothesis, albeit rather unlikely, but if the butterflies were to originate from any area of South America's southern tip and have not been found again over nearly 170 years, perhaps Mt. Sarmiento could be the right area? Has anyone explored for example, the northern slopes of the mountain or the areas below?

I would like to make a small addition to my first draft of this article that I sent to Hiroshi Hara for comments. Hiroshi then forwarded this to Alexander Kir’yanov for comments. We then initiated an intensive rewarding e-mail exchange. Alexander who is undoubtedly one of our greatest connoisseurs of the genus Colias was, as most people, doubtful of my hypotheses about Hawaii as origin of *Colias ponteni*, but became very interested in my hypothesis that the most inaccessible area at the southwestern Tierra del Fuego, about 200 km west about Ushuaia, when he read my note that Captain King during his research trips at South America's southern tip was also likely to ascend as well at Mt Sarmiento. It cannot be dismissed that during that expedition, among the plants that might have been collected there, Butler found the three specimens he described as *Colias imperialis* in 1871! Alexander had been halfway to Mt. Sarmiento but never made it to this inaccessible mountain area. However, Alexander has allowed me to see many photos from the areas nearby Ushuaia (Mts. Darwin and the Martial glacier) which seems to be extremely exciting! I would like to take this opportunity to extend warm thanks to Alexander for many rewarding comments and exciting ideas!

Near Ushuaia_view on glaciar Mortal, south Tierra del Fuego Photo: Alexander Kir´yanov

Darwin Mts, southwest Tierra del Fuego Photo: Alexander Kir´yanov

Collection on Oahu

I assume from this reasoning that the collection really took place on Oahu.

Wallengren states in his new description of *Colias ponteni* that the butterfly was collected by Kinberg and Pontén. We do not know how Wallengren got this information. The most likely would probably be that Kinberg, as the expedition's scientific leader, gave these tasks together with all other information about the collected butterflies that Wallengren had the responsibility to describe. Samuel Pontén, however, must have been mostly involved in the actual collection, since he was given the name of the butterfly. We have no information about when and where the collection took place or if they took the butterfly as imago, larva or pupa. Many, like me, have probably considered this but some definite answer is not likely to be obtained so we have to leave this question to speculation based on what is considered most likely with regard to location and time. The lack of information on the species' normal flight time in Hawaii is of course a great drawback. We know that the collection should have taken place during the last 10 days of June and that this was in Honolulu by Kinberg and Pontén. The task of collecting in Honolulu, however, hardly means that this happened in the town itself, but it was most probably in the outskirts of the town.

Personally, I am very doubtful that Kinberg really participated in the collecting as he was not an entomologist but among other things an expert on amphibians. Also we do not know whether any other entomologists were included in the scientists. However, I can observe that on Oahu they only collected two species of lepidoptera, *Colias ponteni*, and the moth *Omiodes kontinuatalis* out of the 81 newly described lepidoptera collected on this world voyage. The little Pyralidae of the Crambidae-family *Omiodes kontinuatalis* described by Wallengren 1860 was, as *Colias ponteni*, new to science and is rare and endemic on the archipelago of Hawaii.

Master Andersson, who was mainly responsible for collecting plants on this world voyage, has in his notes described the stay on Oahu. He mentions among other things that he, along with a number of boatmen and at least once with Samuel Pontén, went up through Nuuanu-Valley to the Pali Pass and further down to the plateau on the island's north-eastern side. Once, Andersson had accommodation with a canoe family and had to share their hut at a price that corresponded to a better hotel in Stockholm.

Anderson writes among other things "*The Kanakes, so commendably cheerful and really decent they otherwise, do not seem to have a great concept of the importance of money; at least they always took unreasonably for themselves and are in their claims exaggerated and unwilling*".

Andersson really had to experience this helpfulness, solely for cash payment, which was considered quite natural as with the help of the Kanakes he collected plants on the island. The Kanakes were very helpful and willing to collect plants for Andersson, but soon they stopped abruptly and held up two fingers in the air and said "Two dollars" This form of collection, however, quickly became too expensive for Master Andersson. When the Kanakes understood this, they quickly disappeared into their favourite occupation of lazing and eating.

Why do I add this little piece to this article? Well Andersson tells us that one day together with Pastor Pontén he made an excursion to collect plants. According to Christer Hägg's research, they would have passed the Pali pass to the plateau across the mountain ridge east of Honolulu. As far as I could find, this is the only excursion Pastor Pontén made on Oahu outside the city of Honolulu. It seems very likely that Pastor Pontén, who collected butterflies for his brother Jonas Otto at home in Strängnäs, during this excursion with Master Andersson, found the small population of the *Colias* butterfly that would later bear his name. Christer Hägg has also, as stated in his letter in Appendix 4, been given information that Master Johan Andersson also collected insects during this trip.

This excursion was certainly rewarding for the two gentlemen, although they apparently did not go too far from "civilized areas" because they suddenly heard well known Strauss waltzes among the trees.

The Swedes walked in the direction of the music and arrived at a small villa where the Kanakes had a big private party. Andersson and Pontén were cordially invited. The orchestra turned out to belong to the king and among the guests was the Crown Prince Alexander with his courtiers. According to Lieutenant Fries, the two gentlemen remained for a long time at this party at Midsummer. I don't know if the gentlemen from Eugenie met the Crown Prince's parents King Kamehameha III and Queen Kalama. However, when it comes to interesting butterflies in Hawaii, there is a reason to remember these royal names.

King Kamehameha III and Queen Kalama of Hawaii from watercolour by C. Skogman.

Perhaps the finest butterfly in the Hawaiian Islands is the Red Admiral like "Kamehameha Butterfly" *Vanessa tameamea*, an endemic and thus a unique species for the archipelago. As everyone can see, the Latin name also resembles the royal family name and that is of course no coincidence. This unique butterfly was named in 1821 by the Estonian/German doctor and entomologist Johan Friedrich von Eschscholtz. During a three-year long voyage around the world 1815-18 with one of the greatest seafarers, the Estonian/German Otto von Kotzeube, he visited the Hawaiian Islands in November-December 1816. With the ship Rurick, Otto von Kotzebue explored the North-West American coast during the following summer along the Bering Strait. These northern regions, i.e. the current Alaska belonged to Russia at that time, were these remote areas were the main goal of the Russian expedition? Could they possibly find the Northwest Passage? This was the same reason why James Cook was in this northern part of The Pacific Ocean 50 years earlier! When the second trip failed they returned to the Hawaiian Islands in October 1817 before returning home via the Cape of Good Hope.

I have included this butterfly because, in addition to *Colias ponteni*, it is one of the two, or three if we include *C. ponteni*, endemic butterflies in the Hawaiian Islands. The second, or possibly the third endemic butterfly on the islands, is the "Hawaiian Blue" or "Blackburn's Blue" *Udara blackburni*, described by Tuely in 1878.

I think it might be interesting to include these two endemic species from the Hawaiian Islands as these say something about how many entomologists really examined the islands' butterfly fauna before the frigate Eugenie's arrival in Oahu in Midsummer of 1852. As far as I can see Eschscholtz would probably be one of the extremely few entomologists who studied the islands' butterflies before. However, the fact that Eschscholtz did not discover *Colias ponteni* is easy to explain when, as stated above, he visited the islands from October to December, while the species' flight time, based on Pontén's and/or Kinberg's information to Wallengren, should be June / July or possibly August if the gentlemen found the butterfly as larvae. We can also note that it took just over 25 years after *Colias ponteni* was discovered on Oahu before the island's only indigenous Blue was discovered. During the 25 years that elapsed until the Blue *Udara blackburni* was discovered, *Colias ponteni* may well have been exterminated by the multitude of new colonizers and their activities on Oahu in the late 19th century.

There is also another thing that one can think about when comparing these two endemic butterflies from Hawaii with their closest relatives in the rest of the world. Namely that if one can possibly draw any conclusion from which areas these unique butterflies originated from and then based on this, also do the same with regard to *Colias ponteni's* descent. As for *Vanessa tameamea*, it is very easy to see that this Admiral originated from the Indian Admiral, *Vanessa indica*. The latter species is peculiar to its range as it has its main distribution from India to south-eastern Siberia - Japan - China - Indochina and the Philippines. The interesting thing is, however, that it also has a slightly darker and clearer coloured subspecies in the Canary Islands and Madeira as well as possibly introduced into Portugal and southern Spain. However, this previously described "sub-population" of *Vanessa indica* is now elevated to the status of a so-called "good species" with the name *Vanessa vulcanica*.

Vanessa indica has probably also been in northern Africa as well as the Middle East and Arabia, but has probably competed there with our common and extremely migratory "Red Admiral" *Vanessa atalanta*. In the Canary Islands and Madeira, *Vanessa atalanta* flies with *Vanessa vulcanica* However, there is no doubt about the lineage of *Vanessa vulcanica* since it is clearly similar to *Vanessa indica*. If we now compare *Vanessa indica* with *Vanessa tameamea*, we see a similar pattern. Here it is clear that *Vanessa tameamea* has similarities with *Vanessa indica* but that it, like *Vanessa vulcanica* in Madeira and the Canary Islands, has a much darker reddish colour.

Vanessa tameamea.

Vanessa indica.

Vanessa vulcanica.

An interesting detail highlighted by Bernard D´Abrera is that the antennae are longer with *Vanessa indica* and *vulcanica* than with *Vanessa atalanta*. The same also applies to *Vanessa tameamea*, which suggests that it should originate from *Vanessa indica*. Can one then draw any conclusion from all this? The conclusion that I see from this species is completely clear. It originates from the Indian Admiral and has thus come to Hawaii from eastern Asia - something that might also suggest that *Colias ponteni* could originate from the *Colias* species that are similar to *Colias ponteni*, namely *Colias fieldii*, which mainly flies in the same areas as *Vanessa indica*. About *Colias fieldii* see **Footnotes** page 92!

This pattern of origin for endemic species also applies to the island's other endemic butterfly noted, namely Hawaiian Blue *Udara (Vaga) blackburni*. The Udara genus covers some forty species all located along the East Coast of Asia from China and Indochina to New Guinea and Australia. The type-local for this species is supposed to be the mountain pass in Oahu. Why hasn't Pontén, Kinberg or Andersson found this relatively common species that occurs on the larger islands in the Hawaiian archipelago? The simplest explanation I can imagine is that this species, which is closest to our Holly Blue, *Celastrina argiolus*, had passed its flying stage when Eugenie visited Oahu. Like our Holly Blue, it flies in spring and early summer, i.e. mainly during the months of March to mid-June. It had then passed its flight time when these gentlemen visited Oahu. However, it has also a second generation that extends from late July to early October. According to the great butterfly book, "*The Butterflies* of North America" by James Scott, "*males seem to patrol the canopy of trees on hilltops to seek females*". The flight time in spring and autumn can explain why neither Eschscholtz nor the gentlemen from Eugenie found the species. Normally the blues belong to the butterflies that are the easiest to both see and catch.

Is there anything more that suggests that Samuel Pontén found his Colias butterflies during this excursion on Oahu near Honolulu?

The time: The end of June. The flight time seems to be correct according to the condition of the specimens at the time of capture. They are all apparently fairly newly hatched. Maybe Pontén and Andersson found the butterflies completely hatched but they also found the pupa that he brought home to his brother in Strängnäs?

Finding a parasitized pupa in the wild is rather unusual. For me it seems to be more probably that Samuel Pontén found a larval colony or some larvae and some pupae which then pupated and hatched under his charge in his cabin on the frigate Eugenie. The two males I found at the Museum of Evolution in Uppsala are both probably recently hatched since they are both very fresh. This may, possibly also explain why we could not find any pollen on the butterflies' feet, legs or body.

More about this later. Unfortunately, Ponténs two males have both later been attacked by the Museum beetle, *Anthrenus museorum*. If Kinberg or Pontén had found the species as larvae all the butterflies would have been hatched in Ponténs cabin. The male holotype at the Natural History Museum in Stockholm shows clear marks on the tip of the right front wing from net damage, which of course may have arisen even if the butterflies hatched in captivity. This whole hypothesis seems to be quite unlikely at first but the more one thinks about this scenario, many uncertainties actually fall into place. Would Pontén, Andersson or possibly Kinberg have found up to eight fully formed butterflies and a pupa? The pupa itself, if it really turns out to be the same species as the butterflies, is the big question mark in all the hypotheses and gets a natural explanation only with the option that the butterflies were found as larvae. Otherwise, the alternative would be that the gentlemen found these five or perhaps even eight butterflies simultaneously with the parasitized pupa. Pontén and Kinberg can hardly find both larvae and fully-formed flying butterflies at the same time.

The place:
The likely place for this butterfly should be the lowland. This assumption is based on the fact that the butterfly apparently did not exist on the other much more mountainous Hawaiin islands only on the lowland in the Nuuanu-valley on the Oahu south coast near Honolulu or the lowland plateau below the Pali Pass north of the island's eastern cape to the east of Honolulu. It was here that the settlers settled down and began to cultivate this lowland, something which could have been devastating for this obviously highly specialized species with very likely an extremely small population which had not been able to spread to other places. This is the typical scenario for extinct island life forms.

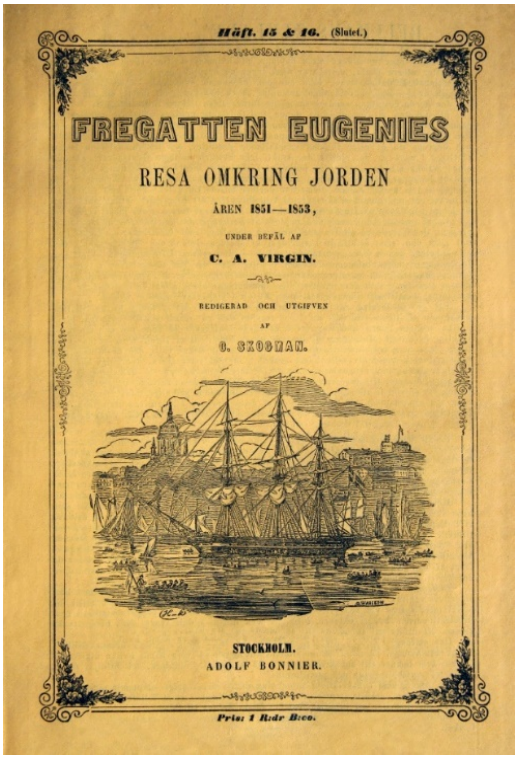
Pontén himself: Samuel Pontén was, after all, the expedition's priest and not attached to the scientific department. The fact that he had to keep these butterflies and that Wallengren gave them his name suggests that he captured these butterflies and that they obviously were not automatically counted in the expedition's material as was that of the accompanying sciences. As a priest, Samuel Pontén should have had the status that allowed him to claim the insects and plants that did not accede to the Academy of Science and which are now available at the Swedish Museum of Natural History in Stockholm. One can speculate that he kept the two most beautiful males on his brother's behalf and the most worn specimen went to Wallengren for the work on the description of the butterfly.

The background to my studies

I was obsessed with the idea of finding the collection site for this amazing butterfly when I learned from Bernard D´Abrera's first book about South America's butterflies that *Colias ponteni* and *Colias imperialis* were really the same species. On my visit to Argentina in the winter of 1979/1980, visiting the areas around the Strait of Magellan and Tierra del Fuego naturally was in my mind and plans but the extremely unstable situation between the military juntas in Chile and Argentina at that time made a visit there impossible.

For many years I had wondered about the remarkable holotype of *Colias ponteni* which I saw at the Natural History Museum in Stockholm together with a female beside the male under the label *Colias imperialis*. These two great butterflies I discovered during a visit in the autumn of 1972 with my mentor Yngve Christiernsson when we, with great help from curator Bert Gustafsson in the Natural History Museum of Stockholm, managed to find the type species of the yellow aberration described by Lampa of *Colias tyche werdandi christiernssoni*. This butterfly, a male, was captured by Yngve's uncle, who in the mid-1800s was Sweden's last professional collector of rare birds and eggs, small animals and butterflies as a specialty.

The strange thing about the National Museum's collection was, as mentioned above, that the male of *Colias ponteni* was placed under a label "*ponteni*" while the female was placed under a label "*imperialis*". The latter despite Wallengren's text on the pin label for the female as "*Colias ponteni*".


Häft. 15 & 16. (Slutet.)

FREGATTEN EUGENIES

RESA OMKRING JORDEN

ÅREN 1851—1853,

UNDER BEFÄL AF

C. A. VIRGIN.

REDIGERAD OCH UTGIFVEN

AF

O. SKOGMAN.

STOCKHOLM.
ADOLF BONNIER.

Pris: 1 Rdr Bco.

On repeated visits to the Swedish Museum of Natural History in Stockholm, the interest in this butterfly and its history was increasingly deepened. Curator Kronstedt showed me Skogman's book about Eugenie's world sailing. "FREGATTEN EUGENIES RESA OMKRING JORDEN" There Carl Johan Skogman describes, as I mentioned earlier, that Kinberg and Andersson visited Mt. Tarn during the Frigate Eugenie's stop at Port Famine. It then seemed quite clear that the butterfly was collected during this excursion to Mt Tarn, which could also explain the labels of Butler's "*imperialis*" specimens" which, after all, carry the local label "Port Famine", which is in walking distance to Mt Tarn.

Carl Johan Skogman's book:
The Frigate Eugenie's Sailing Around the Wold under command by C.A. Virgin.

Is there something that argues against Port Famine as a collection site for *Colias ponteni*?

Something that could possibly speak against Port Famine as a collection site for the butterfly is the date when the butterflies would have been caught, within a day or two of February 1st. This seems quite late in the "summer" in these areas. When you look at the five specimens of *Colias ponteni* we have in Sweden you can do some thinking. Four of the specimens are in surprisingly good condition. They are not very worn or "shabby" as we entomologists usually say about butterflies that have flown for a long time after hatching and thus collected at the end of their lives. Those of the butterflies examined more closely looking for any pollen from the plants visited showed that no pollen was found on the feet or wings of these specimens. All in all, this suggests that the specimens were collected at the beginning of their flight period. The exception is possibly the one in Wallengren´s own museum. However, the damage to this specimen is such that the damage was connected and caused by the handling of the butterfly after its capture.

Eugenie's logbook states that if they were collected on Eugenie's visit to Port Famine, this would have happened on February 1st, 1852. As we are in the southern hemisphere, this corresponds to August 1st in the northern hemisphere. The southern latitude of the Strait of Magellan corresponds climatically to central or northern Germany. Southernmost South America lacks both a warm ocean current like our Gulf Stream and the predominantly warm south-westerly winds that are constantly pumping up warm air from the Atlantic to north-western Europe. However, as I see it, the late summer climate in February at the Strait of Magellan and our August/September climate in northern Scandinavia, correspond in any case. Based on such a comparison, with regard to the condition of the butterflies, and a collection time of February 1st, i.e. about August 1st in the northern hemisphere, slightly late or even too late! My own Arctic *Colias* butterflies, both from Lapland in northern Sweden and from the locals at Novaya Semlja, Tajmyr peninsula and Wrangel-island in northern Siberia, as well as the specimens from Alaska and eastern Greenland, optimally all fly in early July. If you find any butterflies in August, these are usually worn and "shabby". At the Natural History Museum in Stockholm there is a faded, almost white *Colias vauthierii cunninghamii* which was collected at Tierra del Fuego on January 1, 1896, in other words a month earlier that year than when Kinberg and Andersson visited Mt Tarn.

Of course, we know nothing at all about how this strange relic butterfly lives. It may even have a two-year life cycle, something that might explain the late flight time? An interesting fact is that the very careful observer Charles Darwin, during his visit to the Port Famine areas in February 1834, i.e. the same month as Kinberg and Andersson visited Mt Tarn, no *Colias ponteni* were observed. Darwin collected butterflies during his visit and would certainly have observed this very eye-catching butterfly if there was indeed a specimen to see.

The "*imperialis* butterflies" that are found in the British Museum seem somewhat more worn than the syntype at the National Museum in Stockholm and also Samuel Pontén's own specimens now in the Evolutionary Museum in Uppsala. This may perhaps be explained to some extent by the fact that they have long been kept in a herbarium in the Bank's cabinet, but probably should be explained by the fact that they could have been taken during a later part of the butterfly's flight-time than the butterflies Wallengren described as *Colias ponteni*.

Is it likely that the butterflies exist or may have been on Mt. Tarn just south of Port Famine on the Strait of Magellan?

The question is, of course, of great importance as Kinberg and Andersson actually visited the mountain during Eugenie's stop at the garrison station Port Famine. The specimens in the so-called Banksian cabinet carry the label "Port Famine" based on Butler's assumption that the three butterflies were collected during Captain King's visit there during the expedition with *HMS Adventurae*.

Because, as I mentioned above, during my visit to Argentina in the winter of 1979/1980 that due to the tensions prevailing in the area between Argentina's and Chile's rulers, I could not visit the area. It was initially difficult for me to form an impression of whether Mt Tarn could be the place where this relic butterfly could possibly have been collected. From the Chilean Embassy I later got a nice map of the area but unfortunately no pictures. However, the only description of the mountain that was available at this time, before Google and the time of computers, was an extremely detailed one by Charles Darwin. In his famous book "Travel around the Earth", Darwin describes in his exquisite way his visit to this mountain in February 1834. Charles Darwin writes:

"*On a former occasion, when the Beagle was here in the month of February, I started one morning at four o'clock to ascend Mount Tarn, which is 2600 feet high, and is the most elevated point in this immediate neighborhood. We went in a boat to the foot of the mountain (but not to the best part), and then began our ascent. The forest commences at the line of high-water mark, and during the two first hours I gave over all hopes of reaching the summit. So thick was the wood, that it was necessary to have constant recourse to the compass; for every landmark, though in a mountainous country, was completely shut out. In the deep ravines, the death-like scene of desolation exceeded all description; outside it was blowing a gale, but in these hollows, not even a breath of wind stirred the leaves of the tallest trees. So gloomy, cold, and wet was every part, that not even the fungi, mosses, or ferns, could flourish. In the valleys it was scarcely possible to crawl along, they were so completely barricaded by the great mouldering trunks, which had fallen down in every direction. When passing over these natural bridges, one's course was often arrested by sinking knee deep into the rotten wood; at other times, when attempting to lean against a firm tree, one was startled by finding a mass of decayed matter ready to fall at the slightest touch. We at last found ourselves among the stunted trees, and then soon reached the bare ridge, which conducted us to the summit. Here was a view characteristic of Tierra del Fuego; irregular chains of hills, mottled with patches of snow, deep yellowish-green valleys, and arms of the sea intersecting the land in many directions. The strong wind was piercingly cold, and the atmosphere rather hazy, so that we did not stay.*"

Daniel Rosengren's photo of Mt Tarn from a whale safari boat on Strait of Magellan.

Regarding the vegetation itself on Tierra del Fuego, Darwin writes:

"*Above the forest boundary there are many alpine plants that all sprout out of the peat cover on the ground and contribute to this. Remarkably, these plants are reminiscent of those occurring in similar places in Europe. The middle part of Tierra del Fuego, where the bedrock consists of clay slate, is most beneficial to the tree plant while on the outer coast, the lean granite ground and the strong winds, the trees prevent more substantial size.*"

From these observations by Darwin, one might conclude that it seems doubtful that this not very large peak region above the cloud forest could really accommodate a viable population of a *Colias* butterfly. From Darwin's description and the picture above, the bare rock seems to start directly above where the forest is no longer able to grow. These circumstances are quite common in places like this with very large quantity of rain. My thoughts are that this is similar to the granite top of Borneo's highest mountain, Mt Kinabalu, with several meters of rain every year.

Based on the conditions described by Darwin, Mt Tarn hardly seems to be an ideal place for a *Colias* butterfly. The clayey-slaty mountains at Tierra del Fuego´s central areas should be a more suitable environment for this relic species. Since no one has seen the butterfly there and none of Eugenie's scientists have even landed on Tierra del Fuego, then Tierra del Fuego should hardly be a possible alternative. What remains then are the grass cliffs northwest of Port Famine if the butterflies were collected at all in the region of the Strait of Magellan. This may surely be an option, although it also seems unlikely that the butterflies here would have been eradicated, or collected by any of Eugenie's scientists. This area has also been visited by so many people that it seems quite unlikely that no one, during nearly 170 years since the frigate Eugenie's visit to Port Famine, would have found the butterfly if it had been present.

Are there any other possibilities to find out where the butterfly has been collected? Pollen Studies?

Here I want to thank my namesake Fredrik Sjöberg of Runmarö in the Stockholm archipelago when he told me that they used to check for pollen on the legs of flower flies to see which flowers they visited! Yes, this information then became a research task! If we could find any pollen grains on the butterflies' feet or legs, we should be able to derive from which plant these belonged and see if this plant was either only in Hawaii or from along the Strait of Magellan. So it should be worth a try. I contacted the Academy of Sciences and presented my hypotheses and wishes for their help. Professor Sivert Nilson thought the idea was interesting and promised to help me with this. I also got in touch with the experts at BMNH but got an almost shocked surprised response when they talked a bit vaguely about "we had probably thought about this" and that "we should check this too". Well Well!!

At a very nice meeting at the Academy of Sciences, we examined the feet and the wing underside of some of the *ponteni*-specimens. See a photo under "Footnotes"

But oh! - this was too good to be true. We unfortunately did not find a single pollen grain! This then felt like a big failure, but now many years later, this, together with some other hypotheses, has made me question whether Samuel Pontén actually collected these butterflies as adults, but more about this below.

Professor Sivert Nilsson and his assistant investigating pollen on *Colias ponteni's* feet.

San Francisco Area in Western California

The very large area of the androconia, along with the enormously large egg-shaped antennal clubs make one wonder and to speculate on where *Colias ponteni´s* closest relatives fly and who these are. This, as well as an investigation of Kinberg's notes, or rather the shortage of these, Pontén's collection, and Master Andersson's notes together with the butterfly's appearance, point in several aspects in the same direction: Hawaii? Or maybe eastern California? However, can it really been found in California? When talking to Arne Anderberg and Bertil Nordenstam at the National Museum's Botanical Department, it has been shown that a large amount of plant material was collected during the visit to San Francisco in 1852. Unfortunately, this material has been brought to the National Museum in Stockholm and divided up on the basis of classification etc. which made the material difficult for me to investigate. There are probably also plants collected by Samuel Pontén perhaps even also from Oahu, because he also collected plants for his brother's school in many places along the Eugenie's journey. The plants at Pontén's school in Strängnäs have also been transferred to the Natural History Museum in Stockholm.

Personally, I increasingly question this practice of splitting special collections from different places especially now with the digitization and modern computer technology it is so easy to still look for special copies of different collections even though these are preserved in their original collections. Think how much easier it would have been to get a grip on Ponten´s private collection of butterflies and plants if they had all been preserved together. It should have been enough to photograph them and digitize them. Here I can't help but think of my old friend Eric von Mentzer's hugely fine and almost complete European Heterocera collection, which now unfortunately has been completely divided when the Swedish Museum of Natural History took over his collection. Imagine if it had been intact as I saw it some year before his death. I, very much because of what happened with von Mentzer's collection, chose not to bequeath my nearly 2000 drawers of butterflies and moths from all over the world to the Natural History Museum in Stockholm.

Can the San Francisco area be *Colias ponteni* source? It could be so. The area has many unique species, but I still have to doubt that this spectacular species had existed there and that the inexperienced Samuel Pontén or Kinberg, who was not an entomologist at all, could have collected at least five, but perhaps as many as eight specimens of such a butterfly on a single visit and that the species has then never had been found since. No, the San Francisco area can with all certainty be dismissed as a possible locality for *Colias ponteni* because of the many entomologists who in the mid nineteenth century investigated the area around San Francisco.

DNA studies?

In 1997 I was wondering whether one could do DNA analysis of *Colias ponteni*. I then wrote in our magazine "*Insectifera*":

"*If one could do a DNA analysis of the butterflies, this would of course also be extremely interesting. Hopefully, such an analysis might clarify how close the relative "imperialis specimens" are to the "ponteni specimens". Maybe it would even be able to get an idea of how large the population of the species could be, but above all it would be extremely interesting to see if it was possible to form a family tree with the other Colias species in the world. Then one might perhaps get an idea of where this isolated population in Hawaii originated*."

A few years after the article was written, I received a letter from Professor Omoto in Japan who was doing just that kind of study. I sent him a small fragment of a leg of Wallengren's specimen of *Colias ponteni*.

Unfortunately, however, it proved impossible to obtain any useful material from this 150-year-old *ponteni* leg. Since this analysis took place more than 20 years ago and the technology has developed a lot since then, it would of course be very interesting to try again with this method, not least in order to find out more about *Colias ponteni's* relationship with the other American *Colias* species.

New DNA-studies

Hopefully the time has finally come when it is planned that during this year, 2019, this kind of DNA study will be carried out because the technology has developed considerably over the past twenty years. Now, as this is written, I can only hope that we can get answers to the questions where *Colias ponteni* was actually found and where it ends up in a *Colias* family tree! Perhaps the pupa I found at the Evolutionary Museum in Uppsala might also give the crucial answer to the question of Port Famine or Honolulu?

Quite soon after I found the pupa, I consulted retired researcher Roland Moberg at the Botanical Department in Uppsala to see if it would be possible to do a DNA analysis of the stalk on which the pupa was attached. It could be a decisive proof if one could determine which species the stalk belonged to. He then replied that it was unfortunately impossible to get any useful information out of that 150 years old dry plant stalk.

More about Port Famine

Can the areas around Port Famine be the place for the collection of *Colias ponteni* and how did it look from the beach when the frigate Eugenie arrived in 1852 and also later? An interesting insight into this can be found in a note in the Swedish research traveler Carl Skottberg's book "Båtfärder" (Boat Voyages) which deals with his expedition for example to Tierra del Fuego. He describes the conditions around the Punta Arena, which is only about 30 miles north of Port Famine along the Strait of Magellan, around 50 years after the frigate Eugenie arrived at Port Famine.

Skottberg writes:

"*In front of us lies a low yellow sandy beach, from which here and there narrow bridges go out into the strait, and beyond the beach the country rises to forested hills and ridges, where the fire burned black fields in the rich greenery. And between the sea and the forest lies Punta Arenas, the town at the Strait of Magelhães' type for the settler city and the upstart community, with an astoundingly rapid development behind it. In ten years, it has multiplied its population, and 12,000 people now have their home there - Chileans and Spaniards, Germans and Englishmen, French and Italian, Swedes, Norwegians, Danes, Russians Austrians. . . a language blunder, against which Babels almost fades. Stone palace among the metal houses, myriads of hotels and taverns, large storefronts and dirty windows, howling gramophones, slurries of "cocktails", which are brewed - see the first impression. We settle down on the traditional Swedish-traveling place, the hotel cosmos, whose low, white building rests on the sandy beach.*"

Based on this description, it seems quite unlikely to me that nobody from any country for almost 170 years would have succeeded in finding this extremely eye-catching orange *Colias* butterfly. Which in that case of Kinberg and Andersson, who were not even entomologists, on a single day when they were probably completely concentrating on birds and plants, would have collected at least five specimens. Based on this, there is hardly any reason to suggest that the area south of Port Famine down towards Mt Tarn would be the place where *Colias ponteni* was collected. I have already mentioned the same thing about Mt Tarn based on Charles Darwin's description of the mountain in his book about the voyage on the Beagle.

Dr. Gerardo Lamas, who by many is considered to possess the greatest knowledge of South America's butterflies, wrote in 1981: "*Obviously, no one has seen Colias ponteni alive for over 137 years. Hardly anyone, however, has visited the supposed localities and looked for it*". I have no idea how big the research was that actually happened in the area. However, based on Lama's suggestion, I read Skogman's book about which other landings were made on Eugenie's voyage through the Strait of Magellan. At that time, the beach-landing at the mouth of the Bachelor River appeared as the only possible alternative to Port Famine and Mt Tarn.

My friends go out to find *Colias ponteni*!

Since I wrote my article in *Insectifera* in 1997, the area around Punta Arenas as well as Mt Tarn and the area at the Bachelor River as well as Tierra del Fuego south of the strait have all been searched by my friends Hiroshi Hara and Daniel Rosengren. In all probability, a number of other collectors have also visited Mt Tarn and the areas around Port Famine and certainly also Tierra del Fuego. The fact that no one has seen even a glimpse of this great and eye-catching butterfly but only seen the similar *Colias vautierii cunninghamii* suggests that Port Famine can hardly be the place where *Colias ponteni*, or its later described synonym *Colias imperialis*, have been collected. It seems to me also quite unlikely that this butterfly in this large area of relatively similar habitat, would have had its spread limited to such an extremely small local place that as a result it could have been eradicated over a period of twenty to thirty years. Especially, as in the middle of the 19th century, the area around Port Famine, apart from the colony itself consisted of mostly unaffected natural habitat.

An alternative hypothesis that could suggest Port Famine

However, it may be appropriate to come up with a different opinion here, which was also partly discussed in my correspondence with researchers in Punta Arena.

One might imagine the following scenario when considering the parasitized pupa, if it is really a *Colias ponteni*. This I hope we can get full clarity on assuming forthcoming DNA analyses succeed.

Finding a parasitized pupa in the wild is rather unusual. How many butterfly collectors have done this? More likely, it should have been that a caterpillar colony was found where the caterpillar was parasitized. Of course, speculation goes that Kinberg or Andersson during their excursion to Mt Tarn found a larval colony that then pupated and eventually hatched with Samuel Pontén who certainly had better conditions than any other on board the frigate Eugenie. The two males that I found at the Museum of Evolution in Uppsala are both probably recently hatched since they are both very fresh and as we have seen from the pollen study completely devoid of pollen on legs, body and wings. Unfortunately, the latter have both been attacked by Museum beetle, *Anthrenus museorum*. The fact that they may have been killed shortly after hatching also explains why we could not find any pollen on the butterflies' feet, legs or body. If one had found the species as larvae, however, all the butterflies should be hatched. The male syntype at the Swedish Museum of Natural History in Stockholm shows, as I mentioned earlier, clear marks on the right front wing tip probably caused by net damage, which may of course also have happened if it hatched in captivity.

What also supports this hypothesis is that the larvae are likely to have pupated quite soon after they were found and would have been able to hatch when Eugenie arrived in Hawaii with its much warmer climate 5 months later. This could possibly also explain the local statement Hawaii and Honolulu. This hypothesis is not entirely unlikely, but several factors still contradict it. The most important is our isotope study that shows a weak correlation with the Strait of Magellan but much better with Hawaii. The second that argues against Port Famine is that no one has found the butterfly in this area. Despite what Dr. G Lamas writes that very few collectors sought the butterfly here, the area has recently been visited by many collectors in search of this particular butterfly.

However, this hypothesis is interesting. If it is realistic the answer should be obtainable from forthcoming DNA studies especially from the parasite fragments in the pupa and the stalk on which the pupa was attached. The hypothesis would also be able to explain the occurrence of the parasitized pupal shell. If the pupa remained unsaved, perhaps Samuel Pontén kept it until the hymenopteran came out? Since the pupa then remained largely "intact", there was certainly a motive for Pontén to save this particular pupa case in contrast to the other five that hatched.

However, it has recently been shown that during an even more thorough examination of the pupa, an empty eggshell has been found on the pupa. This eggshell could possibly be derived from the parasite which obviously caused the death of the pupa. To assume that Kinberg found a larval colony during his trip to Mt Tarn, I do not consider unlikely. However, that he would have found five pupae as late as February is unlikely. The question to ask if you assume that Kinberg found a larval colony is where did the *Hymenoptera* that laid an egg on the pupa come from and parasitize it? You also have to ask the question how likely is it that the *Hymenoptera* really put its egg on the pupa? It should probably be much more likely that the parasitized pupa was already parasitized as a larva? However, both options could be possible, so we have to wait for what a DNA analysis can provide as an answer. However, I note that the more people examine this, the more questions arise!

If we now accept the hypothesis that the butterflies have been found as larvae, the question remains, **whether or not the larvae could have been found on Oahu or at Port Famine?** Samuel Pontén states that he found the butterfly on Oahu but he does not tell Wallengren that he found the butterflies as larvae. Or that it was either Kinberg who found the larvae or that they together, on some excursion in Honolulu's surroundings, found a larval colony and then Samuel Pontén himself had taken the responsibility for them in his cabin on Eugenie until they eventually hatched.

As I see it with the knowledge we currently have when this was written in May 2019, reached a “Catch 22" situation. Both hypotheses are possible but still quite unlikely. The hypothesis that the larvae were found on Oahu and perhaps hatched when Eugenie was on its way to Tahiti which Eugenie reached just over two months later could possibly explain why the butterflies carry the local label "Tahiti" in the collection of Samuel Pontén's brother at the high school in Strängnäs. Unfortunately, I can only reiterate that the questions are piling up as more and more hypotheses pop up!

Could there be any other alternatives to the Strait of Magellan or Hawaii?

In order to answer this question, two factors should be considered. What places were visited during the trip and where did the genus *Colias* fly? The first question is easy to answer. We just follow the logbook. The second question is also not very difficult to answer since the species *Colias* is one of the most well-known butterflies we have on our earth because they are so easy to spot, are so incredibly beautiful and diverse. Ever since the end of the 18th century when studies of butterflies became popular, they are among the most sought after butterflies by all butterfly collectors.

Frigate Eugenie's Route

During the almost two-year long voyage, a total of just over thirty stops were made. Usually some kind of collection took place. In chronological order, the itinerary showing arrival and departure dates was:

Departure: Karlskrona, south Sweden 30 sept. 1851
Farsund, sw Norway, October 8–17, 1851
Portsmouth, s England 25 October–4 November 1851
Funchal, Madeira, November 12–13
Rio de Janeiro, se Brazil, December 12–21, 1851
Montevideo, s Uruguay, December 29–January 2, 1852

Buenos Aires, ne Argentina, January 4–12, 1852
Port Famine, s Chile, January 31–February 2, 1852
York Bay, west Brunnswick Peninsula, Bachelor River, s Chile, February 8–9, 1852
Valparaiso, w Chile, February 23–March 5, 1852
Chinchaeos islands (guano) w. Peru, March 12, 1852
Callao, (Limas port city) of Peru, v Peru, 15–18 March 1852
San Lorenso Island, w Peru, March 18, 1852
Puna and Guayaquil w Equador, March 26–April 4, 1852
Panama, April 16–20, 1852
San José, Pearl Island, w Panama, April 22–28, 1852
The Galapagos Islands, w. Equador, May 11–20, 1852
Chatham Island (Isla San Christobal) May 11, 1852
Charles Island (Isla Santa Maria) May 14–16, 1852
James Island (Isla San Salvador) - May 20, 1852
Indefatigable (Isla anta Cruz)
Albermarle (Isla Isa Bela)

Another very interesting note from the clearest researcher on this journey, Master of Philosophy Nils Johan Andersson, later professor at the Swedish Museum of Natural History in Stockholm, is his reflection on the fact that several of the species on the Galapagos were unique while others corresponded to those on the mainland. His own opinion was then that these unique species simply arose there through which he writes as nature's "temperament". He writes, something that is strange in that this is written by Andersson long before Darwin finally published his famous book on "The species' emergence" in 1859. Anderson wrote six years earlier, ie. in 1853 in "A world sailing depicted in letter part I – III"

"*It thus seems that, if the nature here wanted to repeat its elsewhere shown ability, but did not want or could (?) get the products quite similar. We find such analogies throughout the creations of nature, but hardly anywhere as obvious as here.*" (Comment: Very old Swedish – no perfect English)

It is interesting that here he uses "the ability power of nature" as the creator of the various species and not God as the creator of the species once and for all. The process of how this generating ability went, which is Darwin's great contribution to our knowledge of nature, Andersson lacked insight about

It may also be worth pointing out in this context that the only Blue butterfly noted on the Galapagos Islands, *Leptotes parrhasioides*, was collected by Kinberg on St. Joseph Island during Frigate Eugenie's visit there. That Blue was previously unknown and was thus described by Wallengren as a new species to science. Neither Darwin nor any of the countless visitors who previously studied nature on the islands had discovered this Blue which even in modern times is not particularly unusual. Kinberg was attributed with this discovery, but I believe with good reason that it was Samuel Pontén who collected this Blues on the Galapagos Islands. In the collection of butterflies that Samuel Pontén handed over to his brother Jonas Otto there are five paratypes of *Leptotes parrhasioides*. The type specimens should be present in the Swedish Museum of Natural History in Stockholm, since after being described by Wallengren, they came home to the Academy of Sciences that staged this expedition. However, it seems unlikely that Pontén would have received five specimens of this new species for science unless he had also collected them.

Four of the five *Leptotes parrhasioides* that Samuel Pontén gave to his brother in Strängnäs.

Frigate Eugenie's continued journey after the visit to the Galapagos Islands:

Honolulu, Oahu, Hawaii, June 22–July 2, 1852
San Francisco, w USA, July 29–August 9, 1852
Honolulu, Oahu, Hawaii, 25–26 August 1852
Papeete, Tahiti, 15–20 September 1852
Eimeo Island, Tahiti, September 20, 1852
Savage Island (Inui) September 27, 1852
Foa Island Tonga, October 1, 1852
Sidney, se Australia, October 21–30, 1852
Mokil Atoll, November 22 (Andersson)
Ascension (Ponape), November 22, 1852
Guam, Mariana Islands 27–28 November 1852
Hong Kong, December 7, 1852
Wampoa, Bamboo Town, - Canton, 9–26 December 1852
Hong Kong, 27–29 December 1852
Manila, Philippines, January 4–14, 1853
Singapore, Malacca, 26-29 January 1853
Batavia, (Jakarta), Java, February 5–12, 1853
Cocos Islands (Keeling Isl.) 24–25 February 1853
Mauritius, 14–16 March 1853
Cape Town, South Africa, 10–19 April 1853
St. Helena, 2–4 May 1853
Plymoth, s England, June 8–12, 1853
Cherbourg, nv France, 13–16 June 1853
Gothenburg, sw Sweden, 25–28 June 1853
Stockholm, e Sweden, July 4–14, 1853
Karlskrona, s Sweden, July 18, 1853

From the above itinerary it appears that the stops at Madeira, at Rio de Janeiro, Montevideo and Buenos Aires on the way to Magellan's Sound are completely excluded as the butterfly fauna in these places at this time (more than 150 years ago) was already very well known. The same applies to all places after the second visit to Oahu in August 1852, i.e. visits to the South Sea, Australia, Southeast Asia, Mauritius and South Africa.

How can I safely exclude all these places? A small reflection may perhaps be in place here?

The three *Colias* species that most closely resemble *Colias ponteni* can be found all over the "Old World", ie. Africa, Europe and the northern part of Asia that we call the Palearctic region. These often migrating species are sometimes referred as the "*Croceus* group" of the "sub-genus" *Eriocolias*. In Central and Southern Africa, in Europe, Asia Minor and North Africa the common migratory *Colias croceus*, is replaced by its African relative, *Colias electo*. In appearance, these two species, along with their closest Asian relative, *Colias fieldii*, are quite similar to *Colias ponteni* in view of their colour as well as their relatively broad dark border. We cannot also avoid the question whether migration within these species is something that "has been in the genes". Then the possibility that the species *Colias ponteni*, in the past, somehow left the mainland and ended up on the Hawaiian Islands. There it remained while the other species of the genus developed further through the spread over most of the earth's continents. All of this, of course, is just a speculative hypothesis that one can cogitate over in the bedroom at night! I have in my computer systems and in my museum placed *Colias ponteni* just after *Colias fieldii*. I see that even Joseph Verhulst in his two great books on the worlds *Colias* butterflies placed *Colias ponteni* after these, to some extent, migratory *Colias* butterflies.

Something that can speak for a distant relationship between the species of the "*Croceus* group" and *Colias ponteni* is that these three species all have clear androconia on the front edge of the hindwings while all the similar *Colias* butterflies in western North America lack these male scales which are so incredibly prominent in *Colias ponteni*. This may mean that the *Colias* butterfly, *Colias fieldii*, which flies closest to the Hawaiian Islands, namely in eastern Asia, is also the one of these three species in the "*Croceus* group" that could prove to be *Colias ponteni's* closest relative.

Here one can only hope that the DNA studies that now appear to be on their way, as the research methods have developed significantly since I sent the first sample for DNA analysis to Japan twenty years ago, can provide adequate answers to the question of *Colias ponteni's* relationships. It will be extremely exciting to see what these new DNA analyses can provide. I can only hope that, with regard to my current health, I can experience this since I have been thinking about it for forty seven years since my first visit to the Swedish Museum of Natural History in 1972.

Back to other places visited during the frigate Eugenie's Voyage where the butterfly could have possibly been collected

Given the great number of scientists and collectors who, since the mid-18th century, when natural history collecting became fashionable, visited the areas around **Cape Town** in South Africa, it seems completely unlikely that in the mid-19th century there could be a *Colias* butterfly that no one had previously discovered and noted. The same applies to the island of **Mauritius**, which are also constantly visited by natural history collectors, including myself. Here the island's largest rarity, the large black and blue Swallowtail *Papilio manlius* was described by Linnaeus's disciple Fabricius as early as 1798. On the neighbouring island, Reunion, the related species *Papilio phorbanta* was described by Linnaeus in 1771! These examples show us that the butterfly fauna, at least in the case of colourful larger species on remote islands along the sailing routes of that period between the

continents, were known well before Eugenie's world sailing. The same can also be said about **Hong Kong** which, together with the neighbouring city of Canton, was the very goal of most Eastindia Man ships to China. Of course, in the case of **Singapore** and **Jakarta**, these cities are also very frequently visited by a number of scientists from the 18th century, but since the genus is not found at all in the Southeast Asian archipelago, all these cities are completely excluded. The same applies to **Manila** in the Philippines, although one might think that the species like the "xuthus relict" *Papilio benguelana* on the island of Luzon could have remained there. On the other hand, of course, the lowland at Manila, visited by the frigate Eugenie, is completely excluded as a place for *Colias ponteni*. The same should also apply to the islands visited in the **South Pacific Ocean** and the visit to **Sydney**. That any relic of the *Colias* family could exist in these areas must be regarded as completely excluded. The same applies of course as everyone also understands is **St. Helena** in the South Atlantic.

This leaves Valparaiso in central Chile, Guano Islands, Callao, Lima, San Lorens Island in Peru, Puna Island and Guayaquil off mainland Ecuador and the Galapagos Islands 100 miles out into the Pacific Ocean. Several of these sites as well as the Pearl Islands in Panama and also San Francisco could be hypothetical places where one might have found *Colias ponteni*.

However, of these I only see **Valparaiso** as the only possible one. Hypothetically, however, based on what we know about the *Colias* family itself, San Francisco should, as I mentioned earlier, be the most likely place. However the number of researchers who, by this time in the mid-19th century, had thoroughly explored the city's surroundings makes this hypothesis probably completely wrong. Someone should have, long before Eugenie's visit, found such a spectacular butterfly as the orange black-banded *Colias ponteni*. California, however, still houses many very rare endemic butterflies so theoretically any area in any part of Southern California's valleys or mountain slopes could be a good environment for such a special species. I still agree, despite what I have written elsewhere in this article about the likelihood of the *Colias* genus being along the Central American west coast, that it is absolutely incredible that Samuel Pontén, Kinberg or Andersson could have found this butterfly here, even though we know that both Kinberg and Andersson and probably also Pontén eagerly collected animals and plants during their visit to San Francisco.

By contrast, California could well be the original area where *Colias ponteni's* predecessors developed but then were overcome by competition from other species within the genus but not before a wind-driven female in some way had earlier reached the Hawaiian Islands. Once there surviving as a relic without competing species until the islands were populated by first, an increasing domestic Polynesian population, and second the death blow of the white settlers' immigration from Europe and the United States with their cultivation mainly of Oahu with the help of a large Asian population.

The North American species that it would be interesting to compare with *Colias ponteni* are *Colias eurytheme*, *C. occidentalis*, *C. krauthi*, and *C. christina*. All of these exhibit some similarities to *Colias ponteni* in terms of colour and relatively heavy black border. However, what differs in all these species is that they lack androconia that are so powerful in *Colias ponteni*.

Valparaiso

Why I see the "paradise valley", i.e. Valparaiso, as the only possible alternative to the Strait of Magellan and Hawaii, is the fact that here a relatively long break was made and that many butterflies were collected here, several of which were also new to science. Nor should it be unlikely that Captain King with HMS Adventure also visited during his long expedition in South America's southernmost waters 1821-1830 but also had contact with other ships that visited Valparaiso. What speaks against Valparaiso is, of course, the same factors that apply to all other places, namely that such a spectacular

butterfly should later have been discovered if it existed in this dry valley that Virgin and Andersson did not find as a paradise. Another point that this could be the place for the collection is that other butterflies, the grass butterflies *Neomaenas servilla* and *N. ambiorix* and the Blue *Polyommatus atahualpa* are obviously collected by Kinberg and Andersson. If Pontén, during any hike, found the five *Colias* butterflies and the pupa, should Kinberg and Andersson have remembered this too?

Any reader might also see the Galapagos Islands as a serious alternative. This could of course be the case if many researchers had not visited the islands both before and after Eugenie's visit without finding the butterfly there. Of course, the visit I have in mind is Darwin's relatively short stay on the islands in 1835, where he, if he had seen the slightest glimpse of this orange rarity, should have noted this and also collected some specimens. However, against this assumption is the fact that he did not discover the Blue collected on the Galapagos Islands during the Frigate Eugenie's visit and which was later described by Wallengren as *Lycaena parhassioides* (*Leptotes parhassioides*). The Galapagos Islands, lowlands and desert areas, also hardly have a climate that suits the genus *Colias* species. Only 8 species of butterflies have so far been found on the islands. A large orange butterfly like *Colias ponteni* should definitely have been noted by someone on all the ships that during the 18th and 19th centuries visited the islands if the species had been there.

Back to the question of The Strait of Magellan - could Samuel Pontén have bought the butterflies?

Before the above-mentioned isotope analyses could be made, despite the many clear objections, the areas around the Strait of Magellan appeared to be the most likely place for *Colias ponteni*. The area around the small community of Port Famine, however, did not feel really good in any way. At an early stage, I thought that several indications spoke against Port Famine. Above all, it was the fact that the butterfly was not found for almost 150 years, at this time in the mid-1990s. To this comes the climate and vegetation as well as the point that Kinberg and Andersson should have remembered that they caught these butterflies at Port Famine if they really did.

I therefore speculated if Samuel Pontén could have acquired these butterflies in any other way than through a direct collection. The most likely place for an acquisition should indeed be during the visit to Port Famine even though he probably himself did not leave the frigate Eugenie. Maybe it could be someone who simply sold the butterflies to the priest Samuel Pontén or gave them to him as a service in return? Of course it sounds highly unlikely, but of course cannot be completely excluded. That Samuel Pontén was a man with a great collector's interest is not least evident in the fact that he, among other things, on the visit to Tahiti's neighbour island, Savage Island, September 27, 1852, swapped a beautiful spear with a native. This hypothesis could explain why no one remembers, or remembers incorrectly, where all the *Colias ponteni*-butterflies were taken and how it can happen that they are so fresh even though the visit took place so late in the summer as in February. Perhaps someone in Port Famine had been told that the priest Pontén on the frigate Eugenie could pay well for fine butterflies for his brother's collection? Kinberg and Andersson, who were sent to collect and document in the name of science, were probably less likely to bargain for specimens of dubious origin. This hypothetical theory could then be an explanation for why no one found the species in the area of Port Famine. The explanation is then so simple that the specimens were simply collected at some other place, perhaps on the Tierra del Fuego or further west or north from Port Famine? This would then also be a link to the "*imperialis*-specimens" in the "Banksian cabinet". Shapiro or Lamas have hinted that the butterflies could well have originated from districts north of Port Famine.

Other options along the Strait of Magellan

The theory that Samuel Pontén bought the butterflies, however, is, to say the least, far-fetched and not very likely. For me, it felt like I was stuck in a hopeless dead end. I therefore returned to Skogman's book and read the chapter about the section between Buenos Aires and Valparaiso. As an axiom, among the researchers who thought about where these *Colias* butterflies were collected, it has always been stated that the only place at all that these butterflies could have been collected was the day when Kinberg and Andersson visited Mt Tarn, in spite of not reaching the area above the cloud forest. But was this really the only time they were ashore during the passage through the Strait of Magellan?

No! Skogman writes that on the frigate Eugenie, after fighting against the weather and wind for five days just west of the southernmost cape of the South American mainland, the mythical Cap Froward, and in beautiful weather, made a visit to the westernmost part of the Brunswick Peninsula in a place that apparently appealed to Skogman.

The above fantastic painting by Christer Hägg's grandfather's father Jacob Hägg shows Eugenie during a difficult passage through the Strait of Magellan when she just rounded the steep cliff of Cap Froward on February 7, 1852. The picture from Christer Hägg's fantastic book about this world voyage.

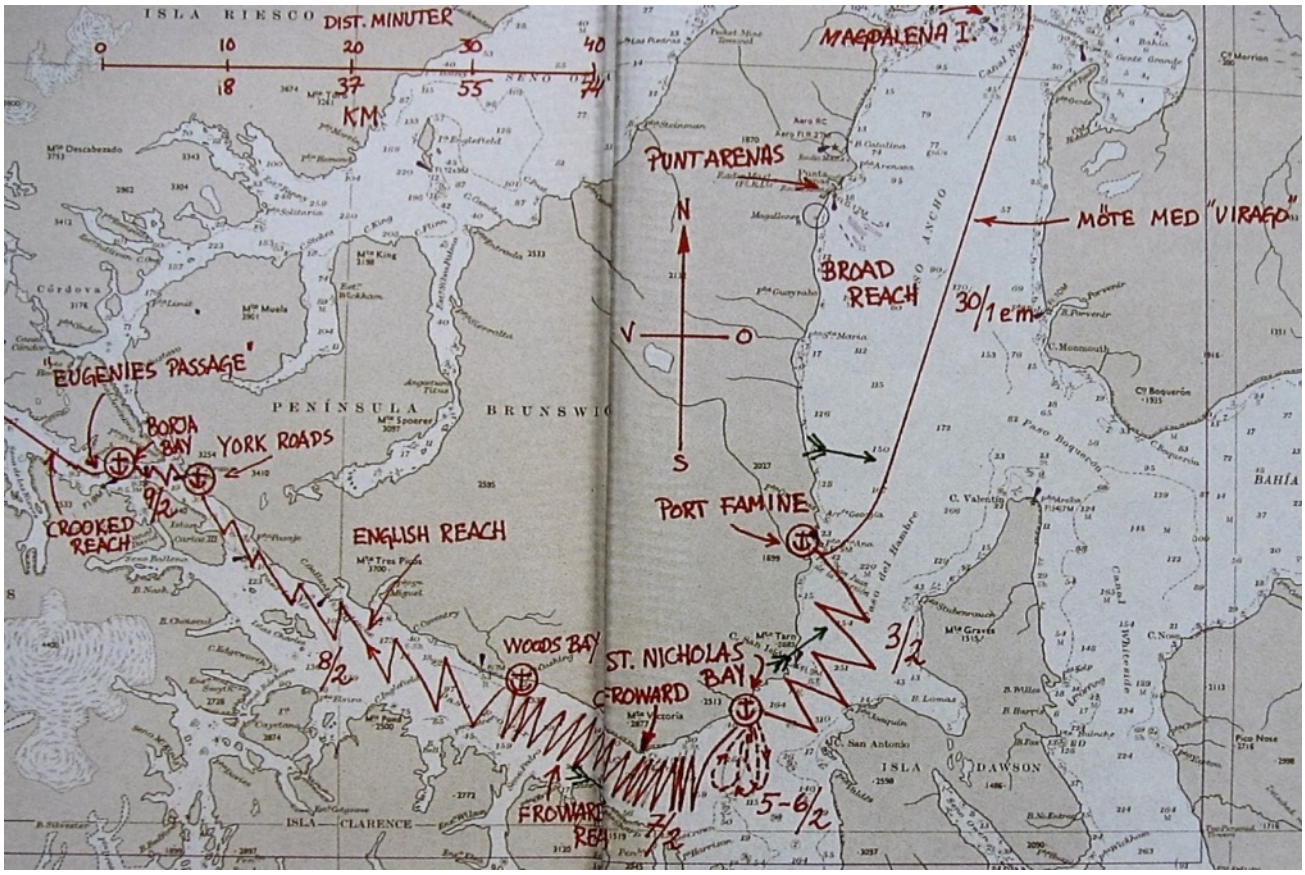
When I see this picture I think, did anyone have the *Colias ponteni* butterflies on board here?

The frigate anchored at Borja Bay just outside the mouth of the Bachelor River at half past four in the afternoon Monday, February 9, with Carl III's island on the other side of the frigate. Probably that afternoon, reconnaissance beach visits were made, but it was probably the next day before more extensive scientific studies of this area at the mouth of the Bachelor River were planned.

Skogman writes in his book about this place:

"*The night before, they had anchored on the rescue between the island of Carl the III and the Brunswick peninsula, Just west of the mouth of the small Bachelor River that runs up at the split Bachelor peak one mile into the country.*"

Based on the above assumptions, in my article in our magazine *Insectifera* in 1997 I launched a new theory where perhaps this particular place at the mouth of the Bachelor River could be the collection site for *Colias ponteni*.



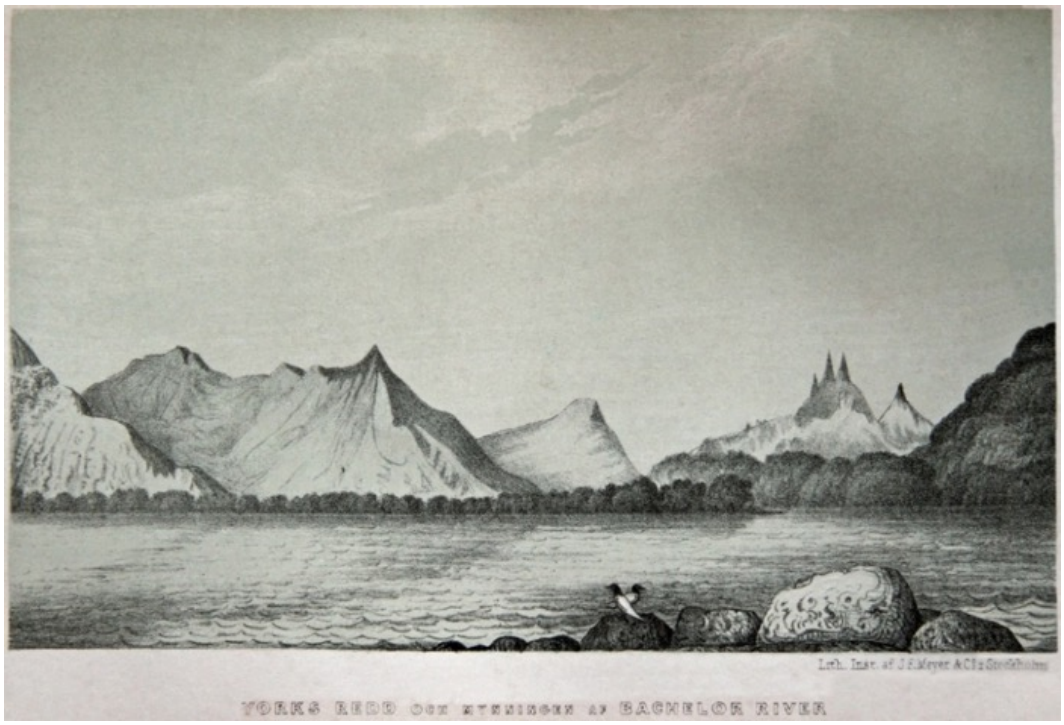
Frigate Eugenie's route through the Strait of Magellan and tacks when rounding Cap Froward. Also note Eugenie's anchorage on 9/2 at Borja Bay. The picture taken from Christer Hägg's book.

My new "theory" in *Insectifera* in 1997, which is partly reproduced below, would have completely unplanned consequences for me, which I would like to describe in more detail. However, I would like to point out that in this "summary" I have changed some time indications based on the information I have now received from Christer Hägg's investigations and reports in his fantastic book about this voyage that came out in 1999 (see Appendixes 4 and 5).

New theory (Excerpt from *Insectifera* in 1997)

I therefore want to launch a completely new theory. I think that the three butterflies that Wallengren called *Colias ponteni* are captured on the 9th or 10th of February 1852 next to the mouth of the Bachelor River. In his book on Eugenie's voyage, C. Skogman describes this beautiful place in almost lyrical terms. I think that Skogman also reaches the pinnacle of his nature descriptions from this voyage. Probably he liked it here. I can really feel that even a "relict" *Colias* would enjoy it here!

"*The view from the anchorage was no less remarkable than they, which we enjoyed during today's sailing. To the south behind Carl the third island, mountains over mountains and snow fields at snow fields, to the north quite close to us the pointed split Bachelor peak, around whose foot the river winds in one of lush trees and bushes adorned valley. In the distance bare and snow-clad mountains of the most alternating forms, and in the northwest the mouth of the ioronymi channel (Jerome Channel), through which you enter into those in the vast bays Otway Water and Skyring Water, of which the former only through a isthmus of moderate width separates from the Strait of Magellan at Cap Negro and later through such a depth from a deep inland Pacific Ocean*."



As far as I can understand, they arrived ashore rather late in the afternoon that day and stopped for the evening. Even if no scientific discoveries were made, one should have had some *Colias* butterflies if any of them existed, which we must assume with this theory. On the morning of Tuesday, the 10th of February, they went back ashore. Skogman writes:

"*We landed at the mouth of the Bachelor River and walked a bit along its shore. This river valley is a true paradise for these areas; one should not expect anything so covered and smiling. The clear and contagious waters of the river flow between lush forests and small green fields, where large bushes of Fuchsia, covered with flowers, seem to prefer their place and thrive. But the lack of living creatures gave everything a character of desolation. We saw only a few ducks that did not let themselves be approached within a shotgun. On the right bank of the river, a short distance from its mouth, we found some abandoned huts. They were in the shape of an upwardly rounded hood, a pair of arms in the cross-line and built of ground-cast rods, whose upper ends were bent together and joined, and in the interstices other rods interleaved. They probably also have been covered with sealskin or the like. It was immediately seen that they had been abandoned for a long time and are probably the same huts that FitzRoy describes as having been seen in 1829, and even then without the inhabitants. Highs of half-weathered seashells and sea urchins lay there beside as well with parts of a whale skeleton. It was really missing we at dusk left the beautiful place to return on board. A journey into the boat raising the river would surely offer much to both the scientist and the lover of picturesque nature, but time did not allow any such.*"

Large fuschia shrubs thrive in this place. Photo Daniel Rosengren.

Abandoned huts photographed in Skottberg´s book from the fields around the Strait of Magellan.

After a short landing the following morning Eugenie sailed under Captain Virgin's command further west towards the Pacific Ocean. Although it has not been stated that no collection was made at this place, but considering how nice the place is, and judging from the description, it seems highly unlikely that no collection had taken place here. This after nearly a week struggling against tidewater and winds in the south parts of the Strait of Magellan they got the chance to once again land on the southernmost point of South America's mainland.

A further suggestion for this place is that, as Skogman writes, Captain FitzRoy, in 1829 had also been here when he explored the area together with Captain King. The *imperialis*-butterflies, which are supposedly brought home by Captain Phillip King, would also have been possibly caught in this place.

Captain Robert FitzRoy.

Captain Phillip King.

Commander Christian Adolf Virgin.

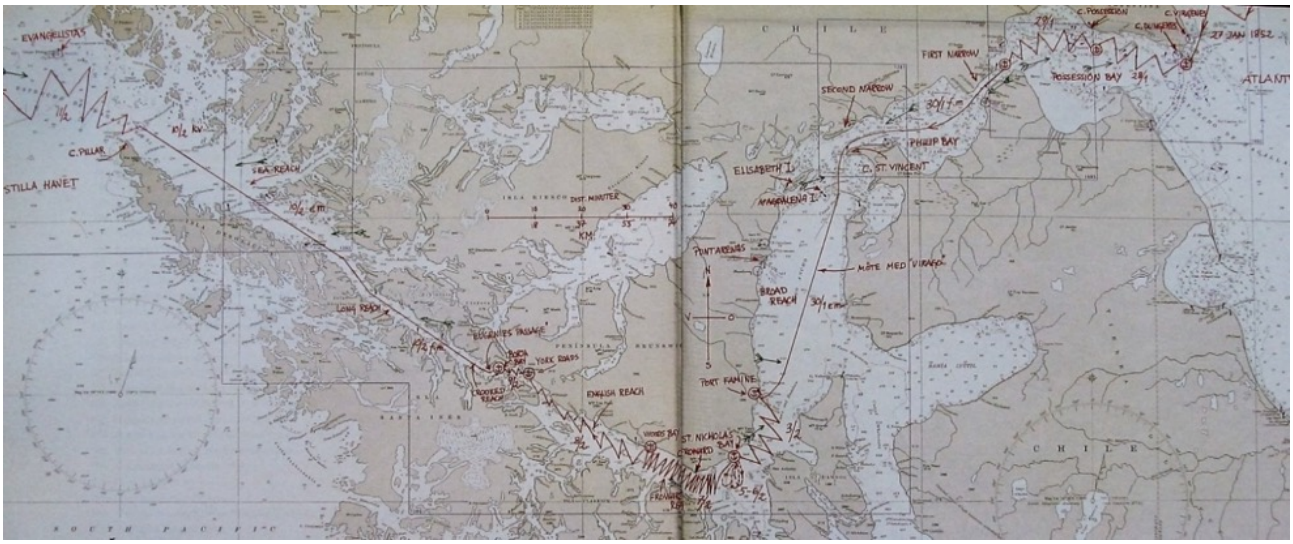
The location is certainly not so many miles from Port Famine but nevertheless on the other side of the southernmost peninsula in South America. Skogman, Skottberg and many with them describe the climate on this western side of the Brunswick peninsula as quite different compared to what prevails in Port Famine. The climate should be more typical for an "arctic" *Colias*-butterfly.

One might wonder why on this long voyage of almost three years, they did not get enough time to investigate, based on Skogman's report, this apparently fantastic estuary? After the short landing in the morning, Eugenie raised anchor and sailed, as I wrote above, towards the Pacific Ocean. However, there is a very good explanation and reason for this. Sailing through the narrow Strait of Magellan at this time was a real test of strength for the captain, officers and all the crew of that sailing ship. Strong tides combined with difficult westerly winds along the rocky beaches were often a nightmare for all sailing ships. A transit could often take weeks of constant tacks against hard winds and often ending

up being driven back to the starting point of the day's attempt to sail through. Sailing at night was nothing to even think about.

Based on studies of frigate Eugenie's logbooks under Captain Adolf Virgin's command, Christer Hägg, in his fantastic book (Appendix 3) on this voyage, published in 1999, describes what happened then:

"*On the morning of February 10, the Eugenia Day after the calendar of that time, a bram-sledge-shot from ONO blew up. The Weather-Gods thus gave Eugenie the very best gift you could imagine! The opportunity must be used immediately. The boats that were landed to fill water or on fishing and hunting trips with the scientists and officers, were recalled and they made it easy to go to sails.*"



The sudden and most unexpected weather change early on the morning of February 10th with a strong east to south-east wind that would allow a passage through the 150 km long narrow channel that led out to the Pacific gave Captain Virgin a chance to run through this very long, narrow and dangerous passage out to the Pacific Ocean. It was ordered to make the ship ready for immediate departure. If the passage succeeded, perhaps up to a month's awkward cruising under difficult conditions would be avoided. Through successful manoeuvring with sailing through an only slightly wider than twenty-meter narrow channel which is called "Eugenie's passage" northwest of Carl III's island, they managed to sail through the entire 150 km long channel in one single day (February 10th) without a single tack! This, of course, was very tempting for Captain Virgin, who was responsible for the expedition, but it was a pity for all the scientists that the area at Bachelor River could not be explored more closely.

My map of the prospective catch site for *Colias ponteni* in "*Insectifera*" of 1997.

Could this be the place where *Colias* ponténi was collected? Note Isla Carlos III beside which they anchored when they landed at the mouth of the Bachelor River late in the afternoon of February 9th and the morning of February 10th, 1852.

Based on the contacts I had, nobody seems to have noticed this place, which with its extremely isolated location could be the location where they found this strange butterfly. The fact that Captain FitzRoy actually visited this place in 1829 does not make the place less interesting either. But why has no one noted this place? About that one can only speculate. If the butterflies were caught in this place, why did Oahu be listed as the locality for collection? I can possibly think of some reasons even though each seems unlikely. It is often easier to remember the first specimens you collect on an expedition. The natural resources one collects at the end of an expedition often tend to be more stubbornly treated, as it often happens that too many impressions can fight for space in the brain as well as the note pad. The fact that all on board the frigate, including the scientists, abruptly had to interrupt all their work and completely concentrate on the passage through "Eugenie's passage" on the morning of February 10th may perhaps also be a contributing explanation?

Whether Samuel Pontén himself landed at the Bachelor River we have no information about. In any case, we know that he probably did not leave the frigate Eugenie during the days outside Port Famine. The butterflies could also have been captured by some people other than Samuel Pontén, Johan Kinberg or Master Andersson during the short visit to the mouth of the Bachelor River. There were more than 300 men on the frigate Eugenie. This might also explain why none of these three gentlemen later remembered, or perhaps just guessed wrong, about where the butterflies were collected once they came back to Sweden and one or some of them met Wallengren many years later? Wallengren´s description of *Colias ponteni* 1860, was eight years after the visit to the Strait of Magellan 1852.

When departing from the anchorage at the island of Carl III, I can also imagine that the voyage out through the Strait of Magellan to the Pacific Ocean filled the participants with so many impressions that a catch of five butterflies, or possibly larvae or pupae, as in the report eight years later, in 1860, fell into oblivion. We also know that this has obviously happened to butterfly number three in Wallengren's description of newly discovered species. Here Wallengren has described a small Pierid under the new name *Terias angulata*. Most likely, this is about the species *Eurema arbela* described by Warren in 1897. The species flies along the west coast of Central America from Colombia to Mexico. Even butterfly number two, *Terias eugenia*, in Wallengren's descriptions is unlikely to be here based on Kinberg's, Pontén's or Andersson's details who described this species from Insula St. Joseph among the Galapagos Islands. This species does not exist on the Galapagos Islands and it would be extremely unlikely that this particular specimen of this South American species had flown out to these islands and caught by someone from Eugenie. Probably the butterfly has been caught on the visits to Peru or Panama.

One can of course also speculate on how much Pontén remembered about the capture of these five butterflies if several years later he presented them to Wallengren, especially if it was perhaps not even he who made the catch. It may also have been Kinberg who met Wallengren and told him about the capture of these butterflies? Did they, or one of them, speculate that it was in Oahu that these five butterflies were collected? They must have been caught in some place and Wallengren, who must have realized the potential of these fantastic *Colias* butterflies, of course demanded an exact location for the catch. For these extremely beautiful and interesting butterflies, Pontén could not just confess that he had forgotten where he had taken the specimens. As Wallengren writes that the butterflies were collected by Kinberg and Pontén then Pontén or Kinberg obviously wanted say they had collected the butterflies together. Kinberg, who was the expedition's zoologist, but mainly an expert on amphibians and other aquatic animals, has obviously met quite a lot of criticism for his inadequate documentation of the journeys collected animals. He might, by standing as a co-collector of this exclusive butterfly,

absorb some of the honour of this exquisite find. Note, however, that all this is just my own thoughts and speculation if one questions the accuracy of these men's information to Wallengren that the butterflies were really collected on Oahu!

But if Pontén had forgotten where he got hold of these butterflies, the name "*ponteni*" would also be a much better name than a name related to any specific place such as "oahua", "tarna" or any other place they visited during the trip around the world. All of this is, of course, just pure speculation, but I still cannot find any better answer to the question if they forgot the right collecting place. One can also imagine that Skogman had a great deal to do with his notes at this stage of the trip when so much happened in a few days. It probably wouldn't be unlikely that his writing omitted such a small detail that someone on the short visit to the mouth of the Bachelor River had caught five yellow butterflies, Or less likely a number of larvae or pupae of a butterfly they, at that time, could not imagine was the last time this fantastic insect was found. Even more sensational was that they were the only known persons on earth who had collected this species!?

Because the butterflies were so exceptional and beautiful and probably completely unknown, Kinberg could not throw them away or "lose face", something that might have come in handy if it was about mosquitoes or some other less interesting beast. The only way was therefore to "make up" a suitable locality where the butterflies had been collected. They had been twice to Hawaii and also stayed there for quite some time on the first visit, which ran from June 22 to July 2. "It was good enough that we caught these specimens". How many of us remember where we might have taken some butterflies eight years ago during a worldwide voyage?

Well, if you were a butterfly collector you would have remembered this. Here one cannot avoid thinking about the many stories you read about how some exceptional butterfly finds were unforgettable memories of the discoverers. My thoughts go first to the very sympathetic Alfred Russel Wallace when he saw a female of a new and so far undescribed bird-wing butterfly during his first forest walk on his visit to the island of Bachan. It took him two months before he managed to see and also capture a male of this extremely spectacular butterfly, *Ornithoptera croceus*, named by him in 1859. the only red bird-wing we have in the world. His own description of what happened to him is unforgettable as well as his beautiful English.

"*The beauty and brilliance of this insect are indescribable and none but a naturalist can understand the intense excitement I experienced when I captured length. My heart began to beat violently, the blood rushing to my head, and I felt more like having done when in apprehension of immediate death. I had the rest of the day, so great was the excitement produced by what will appear to most people a very inadequate cause*."

Ornithioptera croceus.

Pehr Kalm's own ex of "Papilio Glaucus" the first described American butterfly! Butterfly number 9 in Linnaeus´ SYSTEMA NATURAE 1758.

When I sit and write this and think of unforgettable butterfly finds, I cannot forget Linnaeus´ disciple Pehr Kalm's finding the North American Swallowtail that Linnaeus named *Papilio glaucus*. Unfortunately, this butterfly was so damaged that Queen Lovisa Ulrika obviously did not consider adding the specimen in her great butterfly collection. She still bought the butterfly along with the other animals and plants Kalm brought home from North America to help him financially. However,

Linnaeus apparently thought the butterfly was worth describing despite the miserable conditions. I have had the privilege of looking closer at this specimen and can state that this is actually the first butterfly described from North America in Linnaeus new system! Only this should be something to sigh for, but this unique specimen is also in safety at the great Museum of Evolution in Uppsala. What you would like to know, however, is how it happened and when Kalm caught this magnificent swallowtail and what he then thought. As Kalm was first a botanist he has not, as far as I have found out, ever written anything about his finding of this great American butterfly.

But as Pontén, Kinberg or Andersson were not entomologists, and in any case not butterfly collectors, it would probably be likely that the memory could have failed. This can also be the reason why several of Pontén's collected butterflies from this voyage that he handed over to his brother at Strängnäs High School carry the label "Tahiti". Tahiti at that time was probably the most exotic place to their relatives at home. It was also on Tahiti's southwestern neighbouring island, Savage Island, that Samuel Pontén got to exchange a fancy spear that is actually still in the Pontén family's possession. This exchange business has also been immortalized in a beautiful and rich watercolour by Skogman.

The savages of Savage Island on board the frigate Eugenie on September 27th, 1852. To the right of the capstan is Commander Virgin and to his right lieutenant Skogman with the sketch book under his arm. To the left you see Pastor Pontén swapping a few weapons and in the background several natives. Watercolour by C. Skogman.

The name "*ponteni*" as Wallengren gave the butterflies in his description 1860 suggests that Samuel Pontén was to a great extent involved in the collection of these specimens. There is no doubt about this. The question, on the other hand, is not clear as to whether he has captured the butterflies or whether he has somehow exchanged them or possibly even bred them? The fact that he devoted himself to barter and purchase on his brother's account is evident from the previous paragraph and the image

with the spear from Savage Island. Samuel Pontén's relative, Anders Pontén, told me about the barter with the spear that he still has in his possession, I was also told that Samuel brought home from China a Ginkgo tree, Gingko biloba, which today, after nearly 170 years, grows and appears healthy next to the cathedral in Pontén´s hometown, Strängnäs, in central Sweden.

I cannot possibly believe that none of the scientists or anyone with an interest in nature didn´t cross on the landing boat on this occasion. With so many nature enthusiasts on this voyage, someone must have brought back some kind of animals or plants from this visit although they, like Skogman, had no time for a journey up the Bachelor River:

"*A boat ride up the river would certainly have offered much to both the scientist and the lover of picturesque nature, but time did not allow such a thing.*"

I finished this piece in my article in "*Insectifera*" in 1997 with the words: "A dream".

A dream would be to go to this area to search for this "*ponteni*-butterfly". When I was in South America for three months in their summer of 1979-1980 to collected butterflies for my museum, the political situation was not the best between Argentina and Chile that the border regions at the Strait of Magellan and on Tierra del Fuego were unfortunately not available to tourists. We spent most of our time in the nice Misiones. Today, almost 40 years later, I realise that the above dream has unfortunately not been met. The article I wrote in "*Insectifera*" in 1997, however, as I have indicated above, has dramatically and very positively influenced my life during these years through all the contacts made the world over that this article has given rise to!

Hiroshi Hara

Some years after our magazine *Insectifera*, Volume 5 in 1997 was published, to me a completely unknown Japanese butterfly collector, Hiroshi Hara, bought Dr Adolf Schulte´s remaining *Colias* collection. This purchase also included the above number of the magazine *Insectifera* which I previously had given to my friend Dr Adolf Schulte in Germany. At that time Dr Adolf Schulte had one of the most complete private collections of *Colias* butterflies. It was basically just *Colias ponteni* that was missing. Before his death he sold off his collection. In connection with this, until his death, we had a rewarding correspondence for a long time about, among other things, *Colias ponteni* and exchange business. As a footnote, it may now be mentioned that I have bequeathed my entire own world butterfly collection including the *Colias* from Dr. Adolf Schulte in my Avellaneda Museum to The Museum of Evolution in Uppsala. This is where I discovered the two specimens of *Colias ponteni* which Samuel Pontén gave to his brother at the school in Strängnäs when he returned from the trip with the frigate Eugenie.

Now back again to Hiroshi Hara. He obviously became very interested and translated my entire article in *Insectifera* about *Colias ponteni* into Japanese! He then wrote to me and a more than twenty-year cooperation began with, among other things a visit by Hiroshi to Sweden in 2013. Based on my article with speculation about the collecting place for *Colias ponteni* being at the Bachelor River, Hiroshi began a series of research trips to the Tierra del Fuego and the areas around the Strait of Magellan to try to find the *Colias ponteni* butterfly.

Of course, Hiroshi visited Mt Tarn and, on his 2nd or 3rd journey, he also managed to get to the very inaccessible Bachelor River mouth where I, based on Skogman's lyrical description of the place, wondered if it was where they found this amazing butterfly. Hiroshi Hara's observations on the place suggest that the area would hardly be a suitable place for *Colias* butterflies. Since Hiroshi is one of the collectors who has visited most areas for different *Colias* species, especially South American species, there is hardly any reason to doubt his judgment here.

Hiroshi himself has described some of his trips to the areas around the Strait of Magellan in the venerable magazine "WALLACE", Volume 8 in 2003. Below I show some of the pictures Daniel Rosengren and Hiroshi Hara took on Mt Tarn just south of Port Famine at the Strait of Magellan.

Southeast side of Mt Tarn. Photo Daniel Rosengren.

Hiroshi Hara during the ascent of Mt Tarn at the Strait of Magellan.

The summit of Mt. Tarn at 825 m.
Photo Daniel Rosengren.

Unfortunately, Hiroshi Hara's many trips to South America in the search for *Colias ponteni* did not result in any trace of the elusive butterfly. However, Hiroshi, who is an incredibly talented and energetic collector and observer, found most of the other butterflies noted in the area including several specimens of the small, but also strongly questioned "form" of *Colias vauthierii cunninghamii* from the Strait of Magellan and Tierra del Fuego *f. minuscula* described by Butler 1881. Moreover, I have used these specimens for the previously mentioned isotope study, where these butterflies were compared to some of the *Colias ponteni* butterflies.

Daniel Rosengren is hired

Since 2008 I had not seen any breakthrough in the surveys where *Colias ponteni* could be collected. The subject of the Bachelor River again raised my interest as my very good friend Daniel Rosengren who lives in Gävle of all places, planned to complete a bike ride around the Atlantic Ocean.

I met Daniel Rosengren and his sister Marie along the first "Butterfly-road" in Sweden which I initiated a few years earlier. A long-standing enriching friendship was thus initiated. In the picture to the right: Göran and Gun-Britt with Daniel and Marie at home on the porch outside our Avellaneda Museum.

A few years earlier, Daniel had, more or less alone, cycled from the North Cape of north Norway to the Cape of Good Hope in South Africa. He now planned to continue the journey on his bike northwards from Tierra del Fuego up through South America, after a visit to Antarctica. I of course became very interested when I heard about his plans and asked if he could make a detour to the mouth of the Bachelor River when he arrived in Punta Arenas. Daniel immediately snatched the idea of trying to reach this remote place without a road link. I became of course very happy as I knew that Daniel is also one of Sweden's very best nature photographers, which would result in a nice and interesting documentation of his visit.

After a few days exploring Punta Arenas, Daniel managed to find a whale watching trip whose route would round the southernmost cape of the South American mainland, Cape Froward, and then further west through the Strait of Magellan out to the Pacific Ocean. They would pass the mouth of the Bachelor River! Daniel was promised to be landed at this extremely inaccessible place, which the

organizers considered to be one of the most inaccessible places in the world with only a few visitors a year. Daniel was landed on the beach with a small rubber boat and was promised to be picked up after four days. I had previously sent him Skogman's wonderful picture from the estuary with the three peaks of Bachelor Point in the background.

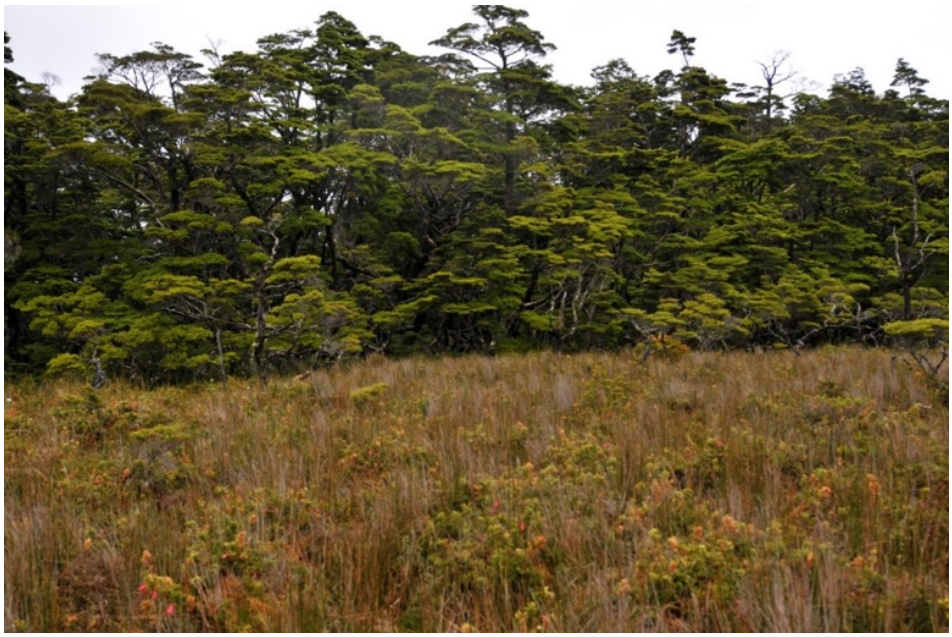
I would like to enrich this article with some of Daniel Rosengren's fantastic pictures from this place that would be one of the least visited and most remote mainland places on our entire earth. It was fantastic to see and compare Daniel's photo with Skogman's drawing from the Eugenie's anchorage in the channel between Carl III's island and the Brunswick peninsula, just west of the estuary of the little Bachelor River that runs from the three peak Bachelor Point some miles into the country. That Daniel was in the same place as Skogman at the frigate Eugenie's visit there is easy to see!

Daniel experienced some wonderful days after arriving on January 14th. During the days he stayed there and walked up along the Bachelor River, he of course did not see a human being, but unfortunately neither *Colias ponteni* nor any other butterflies. Daniel, however, had the pleasure of seeing the extremely rare and endangered native deer, the Patagonian Huemule, *Hippocamelus bisulcus* and also made good contact with a curious kingfisher who fished beside the shed that served

as his "hotel" during his stay. One of the few insects he did manage to see during these days was an extremely beautiful assiduous working bumblebee but no butterflies. However, the bumblebee turned out to be very special. It was a queen of the world's southernmost bumblebee, *Bombus dahlbomii*. It has now become increasingly rare and threatened by introduced European species.

Below are some of Daniel's pictures from this extreme place on our earth. However, the place should not be the place where *Colias ponteni* was previously found. If the species had existed on this site, at least either Hiroshi or Daniel, both extremely talented nature observers and butterfly experts, should have found the butterfly when they each visited the site. However, both were highly sceptical that the butterfly could really be found in these areas as the kind of vegetation that existed, although extremely luxuriant, was not the type that would be attractive to the *Colias* family. The vegetation down there with constant rain is almost the same as at a temperate rainforest. All photos Daniel Rosengren.

The beach at the mouth of the Bachelor River with the three peaks of Bachelor's Peak to the right.



The "beach-meadows" seem to me more similar to wet forest marshes with wild rosemary.

I think it is great to read what Charles Darwin writes about his experiences during his stay in the forests of the Strait of Magellan. Especially as a few lines where he tells about his observations on some smaller forest birds fit well with what Daniel told and documented with his many fine photos while hunting there for the butterfly *Colias ponteni*. Darwin writes, among other things: "*A small dark-coloured hedgehog, Scytalopus magellanicus jumps sneaking around among the felled tree trunks*".

The small dark-coloured Magellanic Tapaculo: *Scytalopus magellanicus*.

Darwin continues:
"*The most common bird, however, is a tree crawler. It is found everywhere in the beech forests. This little bird certainly seems to be more common than it actually is because of its habit of curiously following every one who penetrates into the silent forests. Hereby, it flutteres with a rough twitter from tree to tree at a distance of only a few meters from the hiker's face. This bird does not conceal itself modestly as the real tree crawler, nor does it spring up the tree trunks, but jumping around like a scar and looking for insects everywhere on branches and twigs.*"

As far as we can understand, Charles Darwin is referring to *Pygarrhichas albogularis*, which in English is very suitably called White Throated Treerunner. This tree jumper followed Daniel as well as the former followed Darwin!

The lush vegetation can be called a temperate rainforest in this extremely rainy area.

I'm happy to quote Skogman when I see Daniel's pictures:

This river valley is a true paradise for these areas; one should not expect anything so covered and smiling. The clear and contagious waters of the river flow between lush forests and small green fields, where large bushes of Fuchsia, covered with flowers, seem to prefer their place and thrive.

The extremely rare and endangered Patagonian Huemul, *Hippocamelus bisulcus*, looks out of the dense vegetation which is dominated by all red Fuchsias. Possibly *F. magellanica*.

One of the area's very few insects found, the southernmost bumblebee on Earth, the rare Patagonian bumblebee or the “Flying Mouse”, *Bombus dahlbomi*. It is now unfortunately endangered by introduced European domestic bumble bees. The picture shows a queen of this rarity.

View of the Bachelor River mouth with Islas Carlos III in the background. It was here at the Borja Bay frigate Eugenie anchored on February 9, 1852 and landed several small boats with both scientists and officers to partly hunt and partly fill up with fresh water. However, the stay on shore in the evening as well as next morning, the 10th, became cut short because it suddenly blew an east to north-east wind during the morning that would enable Eugenie to quickly sail through the long narrow channel Long Reach. It became a wonderfully successful sailing day as the frigate Eugenie, under Captain Virgin, on a single day sailed almost a third of the entire route through the Strait of Magellan out to the Pacific Ocean. Unfortunately, because of this the scientists got no possibility to carry out the planned expedition up the Bachelor River on the 10th of February. So, as far as I can see, it would take 156 years before any Swedish naturalist got the chance to investigate the place again and all because of this short visit in 1852!

The beach at the mouth of the Bachelor River.

Daniel Rosengren´s "hotel" at the Bachelor River.

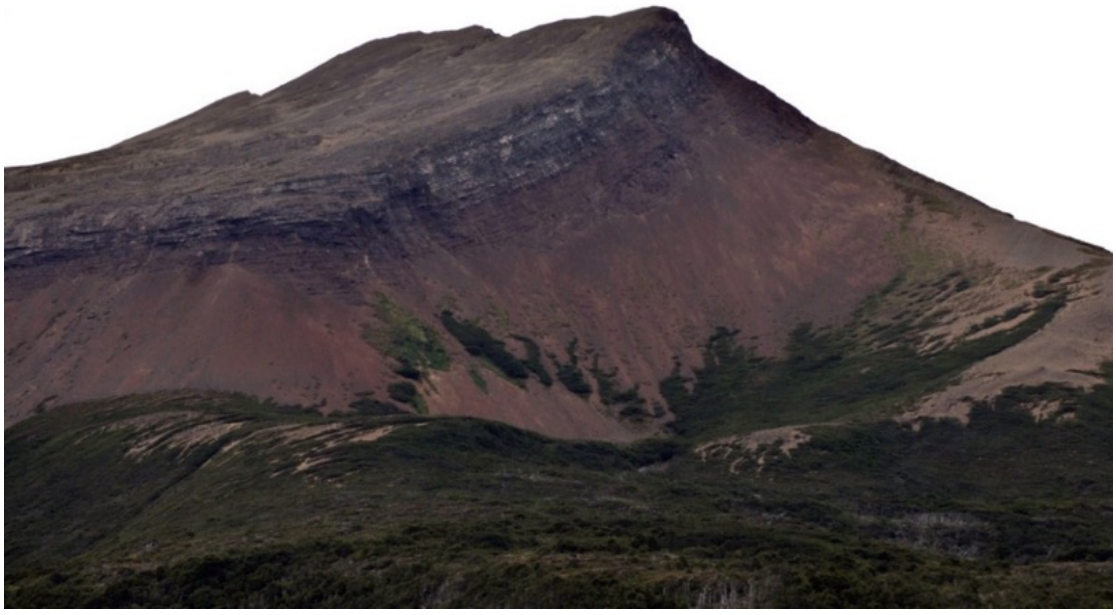
The sociable Ringed Kingfisher, *Megaceryle torquata*, at Daniel's "hotel".

Daniel was fortunately picked up by the whale watching boat and returned to Punta Arenas. He could during that voyage enjoy the rich wildlife along the Strait of Magellan but unfortunately no glimpse of any *Colias ponteni*.

Magellanic Penguin, *Spheniscus magellanicus*, in hesitation waiting to pass the resting South American fur seals, *Arctocephalus australis* just west of Cap Froward.

Cap Froward, the southernmost cape of the American continent.

South side of Mt. Tarn (825 m). from the Strait of Magellan. Note the dense and inaccessible forest which, according to Charles Darwin, began directly at the high-water mark and stretched up to the dwarf trees before bare rock appears near the top. Darwin climbed the mountain in February 1834 and described the forest as so wet, cold, dark and inhospitable that even mushrooms, mosses or ferns could not thrive! Daniel Rosengren's picture of Mt. Tarn photographed from the whale watching boat on the Strait of Magellan verifies, with desirable clarity, Charles Darwin's description of the mountain's south side.



The rather bare top of Mt. Tarn photographed from the whale watching boat on the Strait of Magellan.

Jan Isidorsson, another member of our *Entomological Society of Gästrikland*, organised a trip to the area looking for *Colias ponteni* and he got his boy's dream fulfilled when, in connection with his visit, he also got the opportunity to have a quiet and beautiful day at the wheel with a rented sailboat around Cape Horn! However, no clarity of *Colias ponteni's* origins resulted from his journey if one do not, as I see it, see any "failure" in not finding the butterfly along the Strait of Magellan as a sign that my theories that the Hawaiian Islands after all is the right place for *Colias ponteni*.

Nowadays, starting from some signs and new information, I increasingly question the accepted hypothesis that the butterflies Butler described as *Colias imperialis* 1871, which he is said to have found in the so called Banksian cabinet, really existed there from the beginning, i.e. that they should have come from Captain King's voyages to Tierra del Fuego in the early 1800s. Some conditions indicate that the butterflies may well have been introduced at a later time, i.e. sometime between 1830 and 1871 when they were found and described by Butler. However, this new information hardly contributes to any solution to the question of the origin of the butterflies. I wonder if one can't as well assume that the three butterflies described by Butler 1871 could not have been placed in the Banksian cabinet before the plants from King's trip were deposited there? Nearly 50 years have passed between Cooks death and Kings voyage to the Strait of Magellan.

The butterflies themselves may well have been collected before Captain King's research voyage in 1830, but nothing says that this collection would have taken place along the Strait of Magellan at, for example, Port Famine. We must remember that this was long before the arrival of the Panama Canal. For example, all ships that visited the Hawaii Islands had two choices home to England. Either you sail around South Africa or around South America. The majority of ships that visited Hawaii and perhaps made smaller collections also returned to England via the Strait of Magellan and they certainly visited Port Famine for stocking up with water and supplies. It is not at all unlikely that these butterflies, if they were collected in Hawaii, during the home trip or even more likely at their return to England, were confused with material from Tierra del Fuego or other areas along the Strait of Magellan.

We must also remember that at this time, they were not as accurate with the local collection details as we are today. I am completely open to the fact that the butterflies may have been collected in Hawaii before the plants were collected during Captain King's exploration of the fields around the Strait of Magellan, but someone during King's visit to Port Famine has come across these butterflies and placed them in the herbarium prepared for the plants collected on his research travels and which Butler found more than 40 years later in the Bank's Cabinet. The name of this cabinet comes, as everyone understands, from the great traveler and botanist Joseph Banks who together with James Cook was involved in exploring especially the Southern Pacific and Australia during Cook's first big voyage in 1768-1771 when also one of Linné´s disciples Daniel Solander participated.

The zoological findings during the expedition has been questioned by "experts"

How much confidence can be devoted to the zoological findings made during the frigate Eugenie's world sailing? Early on, many people perceived that the condition of collected material was not always the best. This view has since become an accepted truth. Thus, for example, Zimmerman in 1958 writes in his books "*Insects of Hawaii. Vol 7 Macrolepidoptera*" about the statement that *Colias ponteni* should have been collected in Hawaii:

"*Like so many species collected on the expedition of the "Eugenie", the series of this striking and beautiful butterfly has been mislabelled as to locality. The types are in Stockholm; a pair is in the B.M.N.H. (!), and these are labelled "Sandwich Island" in red ink. Wallengren said that the species was taken at Honolulu in June and July by Kinberg. This species is either the same as Colias imperialis, or imperialis is a race of it. Colias imperialis comes from Port Famine in the Straits of Magellan and it is allied to Colias minuscula from Chile" Evidently Colias ponteni is one of the rarest butterflies in collections.*"

Elwood Curtin Zimmerman, an American entomologist, is mostly known for his two volumes of Hawaiian insects published by the University of Hawaii Press. During my investigations I have

unfortunately not contacted any institutions in Hawaii. On the other hand, these institutions have not shown any interest in my studies even though they should have known of my interest in the butterfly and my studies of them. Amongst others Lama's stolen images from *Insectifera* over 20 years ago of the syntypes at the Natural History Museum in Stockholm and also the picture of me and Lars Hedström in the journal "Wallace" in 2003 when I found two new *Colias ponteni* and a pupa. Perhaps this is due to my lack of interest in the fact that I am not, or never have been, affiliated with any known institution, but merely a happy amateur? I have certainly not found Zimmerman's and the other "experts" attitude to this journey worthwhile, such that an exchange of views with them would have added anything important or new to what I had already found during my studies of the species over such a long time. But I can of course be wrong. Then it is only a matter of time. As an amateur, one also has an important civilian job to take into account.

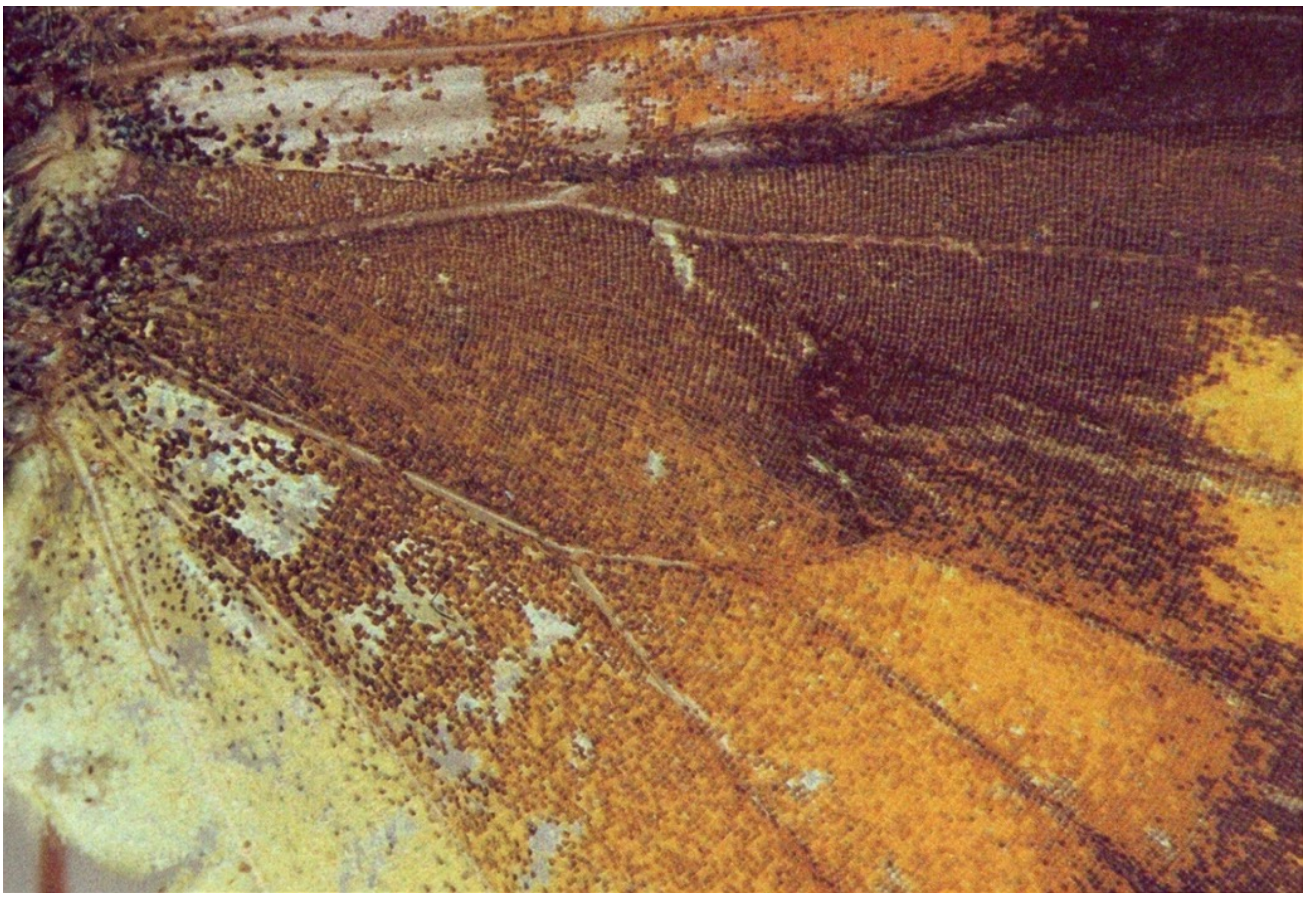
But back again to the question of the collecting of insects during Eugenie's world voyage and Zimmerman's condescending comments. It is certainly true that a great deal has to be said about the order of collected material during this scientific expedition, which at any rate did not have the collection of insects as their primary target. Some comments regarding Zimmerman's bantering words on at least three incorrect descriptions in this short piece of text must nevertheless be answered, as he must have been considered an expert on the Hawaiian archipelago's butterflies.

Wallengren's description shows that Kinberg and Pontén together collected these strange *Colias* butterflies in Honolulu on the island of Oahu and not Kinberg alone. The archipelago of Hawaii was still called by many at the time, as I previously pointed out, by the old name Sandwich Islands. However, Zimmerman's work above that a pair of *Colias imperialis* are "labelled" with red ink "Sandwich Island" is incorrect. It is of course true why anyone understands which islands he means, but the German spelling of the islands when written as "Sandwitsch Inseln" shows that the butterflies have a German connection, which is very interesting. The claim that *Colias ponteni* would be "allied to *Colias minuscula*" is also very strange. From careful studies of these two species, I cannot find any connection whatsoever between them! Please dear reader, see below and form your own opinion!
The only would possibly be that *Colias wauthierii* also has androconial patches, but very small.

Male and female of *Colia's ponteni* to the left. To the right of *C. ponteni*: *Colias vauthierii vauthierii*, *C. vauthierii cunninghamii* and *Colias vauthierii cunninghamii* f. *minuscula*. Photo Göran Sjöberg.

Colias vauthierii butterflies were collected by Hiroshi Hara apart from the female of *C. vauthierii cunninghamii* which was captured by my friend James Stewart during his visit to El Calafate a bit north of the Bachelor Peninsula. The butterflies are all depicted with correct size relationships.
Now maybe someone will point out that Zimmerman cannot defend himself since he is deceased, but also Kinberg, Wallengren and Pontén were attacked by Zimmerman, so I easily take this attitude.

The claim that the butterflies are mis-labeled may, of course, stand for Zimmerman. There is no information from anyone that Pontén or Kinberg would have collected this remarkable butterfly at Port Famine. It is therefore rather surprising that Zimmerman could be so sure that Port Famine must be the correct locality for the species! Zimmerman further claims that *Colias ponteni* would be related to *Colias minuscula*. This is also most surprising! ***Colias minuscula*** is a small doubtful "form" of the much larger *Colias vauthierii* found in southern Chile. The differences between *Colias ponteni* and *Colias vauthierii* are, as all can easily see, very significant between the respective sexes of the species and considering a number of morphological details. Here I can only briefly mention the antennal clubs, the genitalia, the extension of the borders that in *Colias ponteni* run along the entire front edge of the front wing down towards the wing base. We also have the large dark spot in the hind-wing's pale area and the extremely strange structure of what should be the predecessors of the more modern androconia near the costal-area of the upperside of the hindwings. As I see it, it is quite astounding that Zimmerman can say that they are related, especially with the small form "*minuscula*". I wonder if he had actually seen any of the species? Zimmerman's statement in the debate about *Colias ponteni's* origin and relationship must almost be classified as something completely meaningless.



Detail of discal cell and the adjacent sector just below the costa on the upperside of the hind-wing of a male of *Colias ponteni*. Photo Göran Sjöberg.

From all these differences, claiming that *Colias ponteni* is related to *Colias (vautierii) minuscula* must of course be up to Zimmerman but it seems to me that, based on a predetermined position on the question where the specimens were collected, he seeks arguments for his own opinions. *Colias vauthierii minuscula* is only half as large and also its female is yellow-white in colour in comparison to the orange-brown female of *Colias ponteni*. Zimmerman's question about "*imperialis*" possibly being a race, i.e. a subspecies of "*ponteni*" also seems very far-fetched. In that case, this would mean that both of these populations would probably have been eradicated after they were discovered, and in different places for why would they otherwise be concerned with two races? The term "race", now a

politically incorrect expression, was often used in the past instead of the now more accurate concept "subspecies", with which we mean a population in a specific delineated geographical area that shows consistent morphological differences, which means that the subspecies should be able to be determined even if one does not know its exact collection place. Zimmerman then thinks with his statement about different races that one can see such differences between Wallengren's "*ponteni*" butterflies and Butler's "*imperialis*" butterflies. If so, he would probably be alone in that. Based on the images of the specimens at BMNH in Verhulst's fine books, it is also not possible to see any significant difference between Lord Rothschild's own butterfly and the three that Butler described as "*imperialis*". In this context I also cannot refrain from quoting my old mentor Forester Yngve Christiernsson whose statement about so-called experts "who are happy to talk at great length about all sorts of things they hardly even know the name of". I think Yngve, after all Zimmerman's negative writings about this voyage, would think that here his laconic phrase was quite right. I may well be, because I write this dangerously close to "throwing stones in glass houses" especially as we, if we are lucky, may be able to get answers to all our questions about where this butterfly was collected within a few months if the DNA analysis answers adequately the questions so many asked as to where *Colias ponteni* originated. But I take the risk **as I find it so simple to be a hard critic about what other people under quite different conditions nearly one hundred years earlier have done** (1860 to 1958).

Considering the number of expeditions that visited the islands since they were discovered by James Cook, it is not particularly remarkable that Lord Rothschild also received a specimen of *Colias ponteni* for his extensive natural collections. For me, however, it seems more likely that Rothschild in some way, perhaps via Felder, which I speculated on earlier, received this specimen from the population collected on the Eugenie expedition. Whether this happened directly from Wallengren, which he proved to have exchanged with, or probably more likely via Felder, who certainly also had contacts with Wallengren, I have had no opportunity to investigate more closely, but this question is very interesting. However, the fact that Felder had been involved in this transfer seems quite clear from the label on the pin to this specimen: "*Felder collection Ponteni Wallengr.*"

Another butterfly expert who obviously over a long time thought about where *Colias ponteni* could have been collected is Professor Arthur M. Shapiro of the University of California. Shapiro has in several articles and books described the butterflies in the Andes and especially in Chile. He has also written about the mysterious *Colias ponteni*. In 1993 he wrote:

"*The true type-locality of Colias imperialis Butler and its senior synonym C. ponteni Wall remain unknown. Butler supposed it came from Port Famine, based on the type-series being housed in the British Museum with material collected there by the Adventure expedition. Wallengren gave the type-locality of C. ponteni as Honolulu, which is very improbable, but the Eugenie expedition had also stopped briefly at Port Famine and G. Lamas inferred that the types were probably collected by that ship´s naturalists on an expedition to Cerro Tarn. However, neither the vegetation nor the climatology, nor the published narratives of both expeditions, supports these inferences. If this is true a Magellanic insect it probably was taken in steppe habitat father north, perhaps at the classical"Cabo Negro" locality or near Punta Delgada. This species is so important for phylogeny reconstruction that every effort should be made to rediscover it.*"

Summary

Did Kinberg collect various plants during their short walking tour halfway to Mt. Tarn and then bring along a number of larvae or pupae of *Colias ponteni* which he then let the priest Samuel Pontén take care of? Something similar to this theory has, as pointed out earlier in this article, been presented to me by researchers at the University of Punta Arenas based on the fact that I found a parasitized pupa of *Colias ponteni* in the Museum of Evolution in Uppsala. This highly interesting hypothesis is of course possible but still highly incredible. In that case, this would mean that these larvae or pupae almost had immediately hatched on the frigate Eugenie after Kinberg returned from his walking tour to Mt Tarn. Perhaps in Samuel Pontén's cabin on the frigate Eugenie? This scenario also assumes that *Colias ponteni* has a much later flight time than the other *Colias* butterflies which, given the many unique properties of the species, cannot be ruled out even though it would be a remarkable adaptation to the weather-conditions at the Strait of Magellan. The fact that the butterflies would have been taken as young larvae, which then pupated and hatched on arrival in Oahu six months later, during the Patagonian winter would however be highly unlikely. How would Samuel Pontén get hold of suitable plants to feed these larvae on board Eugenie during the voyage from the Strait of Magellan to Hawaii and could it be possible that the larvae did not go into diapause during the Patagonian winter? I cannot believe in this hypothesis. If Pontén were to have managed these larvae for such a long time, this should also have deposited some traces in his memory. The biggest shortcoming of the hypothesis is that if Kinberg really managed to find at least five butterflies and a pupa, or six pupae or six larvae of *Colias ponteni* during his only walking tour a few miles south of Port Famine is, as I see it under the circumstances, that the species during the next 165 years should have been found by others as well. No, the hypothesis that Kinberg found larvae or pupae on the way to or on Mt Tarn hardly holds. It should also be highly unlikely that the species in 1852 had been so common in this area that Kinberg, who was not even an entomologist, would have found an entire colony of this species and then the species had become extinct. If the "*imperialis*" specimens now in BMNH had really been caught at Port Famine, they would have been collected about 20 years earlier.

Professor Shapiro's assumptions that the butterfly could have been taken in the steppe region north of Punta Arenas in the "Cabo Negro" area or near Punta Delgada hardly holds as the species, if it really existed there, should have been found by many other collectors rather than by only the two completely unknown persons who would have collected both the *imperialis* specimens and the *ponteni* specimens. Nobody from the frigate Eugenie visited this interesting place with its steppe vegetation.

What bothers me most with the hypothesis that Kinberg found larvae which then pupated and hatched **is the time** when these larvae would have been found, i.e. February 1st, which corresponds to around August 1st in the northern hemisphere. This would mean that the butterflies hatched late in the autumn, i.e. at least a month later than when, for example, *Colias vauthierii cunninghamii* flies in the area. Such a late flight time for a *Colias* butterfly at this southern latitude with its cold climate, one must question. The specimens Hiroshi Hara collected of *Colias vauthierii cunninghamii* the first few days in February were all already quite worn and had certainly been on the wing for at least a couple of weeks. I also note that, for example, Joseph Verhulst in his fine book depicted a male of *Colias vauthierii cunninghamii* taken by him in Tierra del Fuego on December 10, 1988!

Of course, one can state the argument that Oahu would be the place for the capture of *Colias ponteni*. However, this scenario on Oahu seems, at least to me, clearly much more credible, since in that case, the larvae would have been found in June, which would not be a particularly unlikely time.

At least for me the plausibility that a relic of the *Colias*-genus had become extinct must be infinitely larger in Oahu than at the Strait of Magellan, especially with the new colonists and their new cultivation methods and crops with possibly accompanying diseases or parasites. It is easy to imagine that this

just became the tipping point for a small, very sensitive population of this butterfly. It is possible that all the specimens collected could originate from the same population as siblings.

In the northern hemisphere, *Colias*-butterflies spend the winter in the larval stage. Of course, I do not know if this would also apply to a hypothetical occurrence of *Colias ponteni* at the Strait of Magellan, but if that were the case, it would almost presuppose that the butterfly wintered as eggs or very small larvae. If the butterflies were to hatch in late February, i.e. no earlier than a couple of weeks after they had pupated then after mating, egg laying would take place a few weeks later ie in March!

Many years ago Professor Shapiro asked about which pins the type-specimens at the Swedish Museum of Natural History in Stockholm were set on. The question at that time was considered to be irrelevant to the primary question whether these species were collected at Port Famine or at Oahu. Notably, Shapiro, in his article above, where he describes the butterfly from Butler's name "*imperialis*", insists on stating "*ponteni*" as a senior synonym. Wallengren's "*ponteni*" is in itself an older synonym of "*imperialis*" but at least I get the impression that Shapiro believes that Wallen-gren's name "*ponteni*" should be considered a base and that the butterfly should be called *Colias imperialis*. As far as I can find, both Dr. Lamas and Shapiro, as well as Zimmermann earlier in their articles, assume that Wallengren's information about Honolulu as the place where the butterfly was collected is completely wrong **without having studied in more detail what source material exists about this expedition**. Verhulst, who published the extensive work on the worlds *Colias* butterflies in 2 volumes "*Les Colias du Globe*", also quotes Zimmerman's teasing judgment of Hawaii as the collection site for *Colias ponteni*. Neither Verhulst, Lamas, Zimmerman or Shapiro seem to have endeavoured to make any closer investigations into the expedition during which, perhaps the most interesting of all the worlds *Colias* species, was found. **Despite this, they undoubtedly state that Hawaii is inaccurate based on the fact that Butler found some unknown butterflies in a herbarium 50 years after they were collected by someone completely unknown to him!** I can also easily see that neither William H. Howe nor James A Scott, who have both written two large volumes each named "The Butterflies of North America", do not mention anywhere in these books on a total of 1,200 pages, the species *Colias ponteni* despite James Scott on a special page carefully list the butterflies found in Hawaii!

But there are exceptions! Luis Peña Guzmán has written a very nice and handsome book about the Butterflies of Chile, "*Las mariposas de Chile*" where he describes all the butterflies in Chile. But in his book he has not mentioned any *Colias ponteni* or *Colias imperialis* so I cannot understand this in other way than he has accepted that *Colias ponteni* come from Hawaii! I would also like to take this opportunity to recommend this little book where Louis also, in a very nice way, presents the South American butterfly that warms my heart most of all, the extremely adorable, rare, probably very primitive and unique *Eroessa chilensis*. That this butterfly also was one of the first South American butterflies I could incorporate into my world collection very long time ago through my friend Chris Samson also remains a nice memory.

Considering the book by Joseph Verhulst, *Les Colias du Globe*, regarding the species I know and can judge, it is affected by some questionable conclusions and wrong geographical localities. I can only deeply regret that Jan Haugum was not allowed to live longer. In that case he probably had been able write a book about the worlds *Colias*-butterflies with the same excellent basic facts as his book, together with A.M. Low, on the Birdwings. Jan Haugum personally let me see some of the drafts he wrote about several *Colias* species. There were texts of a completely different dignity than we find in Verhulst's book. It is therefore very gratifying that the three young gentlemen" Josef Greishuber, Bob Worthy and Gerardo Lamas compiled much of Jan Haugum's collected material on the old world *Colias* species in the book "*The Genus Colias Fabricius, 1807*". A great honour that they have taken on this work!

But back to Joseph Verhulst's book. It is a very valuable book in two volumes with many qualities and good and informative photos! I would like to emphasize this very much and to recommend his two volumes to all people interested in the genus *Colias*! The best, as I see it, is that he compiled a considerable amount of descriptions from various authors regarding the majority of the worlds *Colias*-butterflies which would otherwise take much effort to find. I have not had any personal contact with Joseph Verhulst about this article. Therefore, I have not included the nice pictures he has in his book of the six "*Colias imperialis*" that are now in the collections of BMNH, but I am glad I actually own several very interesting *Colias* butterflies he has collected.

However, I have to admit that the conclusion to Shapiro's question about the pins of Wallengren's type-specimens was irrelevant and unfortunately hasty from what I know today in 2019. However, I still do not know why Shapiro wondered about the pins, but with what I know now when I compared the labels on Elwes´ and Felder's butterflies it would be interesting to compare their pins with the pins Wallengren's type-specimens were sitting on. Perhaps Ponten's or possibly Kinberg's or the Science Academy's pins were the same as Felder´s and Elwes´? Based on the pictures available, it is not possible to see if the pins are of the same type. If Shapiro really made this inquiry based on the fact that he wanted to compare the pins on Pontén's specimen with Elwes´ and Felder's specimens, I also do not know. One might think that he might have stated the reason for his request for the pins in April 1997. But then one also cannot be sure if the pins on Elwes´ or Felder´s specimens were different to the type-specimens or possibly from the same collection as we do not know if they received the butterflies set? They could also have received the specimens papered by post.

As far as I can remember, however, the pins on "Pontén's butterflies" did not draw any particular attention from my side, but if they had been very special and Elwes´ and Felder's specimens were of the same kind, that would suggest these gentlemen´s specimens of *Colias ponteni* originated from Samuel Pontén's collected butterflies during Eugenie's world voyage. When I borrowed, the five *Colias ponteni* specimens and had them in my museum around 15 years ago and when at that time I took the picture of them together with the pupa shown earlier in this article, I did not imagine the idea that the three specimens of *Colias ponteni* at BMNH, not described by Butler, could also be collected by Pontén. Roy Danielsson had admittedly suggested that Lord Rothschild had probably exchanged letters with Wallengren and perhaps received a specimen from him, but I unfortunately had no opportunity to continue researching this. At that time when I spoke with Roy, about 25 years ago, I had not found these two specimens of *Colias ponteni*. The three specimens that Wallengren mentioned in his specification were the only *Colias ponteni* known to me beside those in BMNH in London.

Considering recent literature on *Colias ponteni*, I can only find that Bernard D´Abrera, in his revised edition of the first part of his Butterflies of the World, Neotropical Part 1, under the description of *Colias ponteni* wrote that the species probably originated from Hawaii. Unfortunately, he does not clare state why he made this assumption. He refers to Lamas´ "Butterflies of America" i.e. the site where “this one”, i.e. Gerardo Lamas, has stolen my photos from *Insectifera* 1997 without even mentioning from where he got the pictures but writes that he himself has photographed them! See Appendix 7!

About 8 years ago I sent Bernard D´Abrera a letter with parts of my research (this article) and the results of our isotope studies together with pictures of the five *Colias ponteni* butterflies we have in Sweden (page 25 in this article) where I informed Bernard that Hawaii must be a more likely place for *Colias ponteni* than Port Famine. Unfortunately, I never received a response from Bernard D´Abrera so it is possible or rather likely that he did not receive this letter from me. I am, as I have already mentioned before, very grateful for the incredible work Bernard made to open the eyes of all of us to the amazing butterfly fauna of our world and it is of course extremely sad that he is no longer with us.

Back to the question of how much confidence we can place in Kinberg's and Pontén's locality information about the butterflies collected during the trip. Wallengren reports in the big book on the scientific findings during the trip ”*Kungliga Svenska FREGATTEN EUGENIES RESA omkring jorden - Vetenskapliga Iakttagelser II*” = "*The Royal Swedish FREGAT EUGENIE´S VOYAGE around the Earth - Scientific Observations II*", a total of 81 species of Lepidoptera (butterflies and moths).

The local data for virtually all of these is obviously true. Many, described as new species, have since been reduced to subspecies or synonyms, but it would be too easy to claim that confusion between different places where butterflies were collected would be the normal. The newly described butterflies among others are from Manila in the Philippines, from Sydney and Valparaiso, the Galapagos, and one each from Buenos Aires, Mauritius, Malacca and Oahu. From Oahu in Hawaii there is also a new Pyralid noted, indicating that some time has been devoted to studies also of the insect fauna, although the bird fauna, the people and the culture probably occupied the expedition participants' greatest interest during this visit.

In addition to the 19 butterflies, Wallengren has described just over 20 hawkmoths and saturnids, 14 noctuids, 5 geometrid moths, 5 pyralids and 10 tienids. However, the main interest in insects seems to have focused on groups other than butterflies during the voyage. So for example C H Boheman has described 455 Coleoptera of which 19 are from Oahu. The status of these I have not had the opportunity to more closely to check as well as the other insects described. From the trip, C Steel has described 239 Hemiptera and 114 Orthoptera. A E Holmgren has described 103 species of Hymenoptera and CG Thomson 319 species of Diptera.

The small Blue *Leptotes parrhasioides*, which the expedition found on the Galapagos Islands, the only Blue on the islands, was captured on St. Joseph Island and was new to science. The latter seems to me somewhat strange as Charles Darwin, who was an avid butterfly collector and sharp observer as everyone knows, did not discover this relatively common Blue on his much longer visit to the islands than the expedition participants on Eugenie 20 years later. In Valparaiso, in February 1852, the Eugenie expedition found a grass butterfly that Wallengren named as *Neomaenas servilla*. Some years later, in the same area, another species was discovered in this genus that Butler 1881 honoured Wallengren with by giving it the name *Neomaenas wallengreni*. Therefore, no rivalry or dispute between these two authors seems to have been at hand.

The reason why Butler described his “*imperialis*” specimens as new to science was, of course, the fact that, from Wallengren's description in 1860, he could not possibly connect his butterflies found in the Banksian Cabinet to the *Colias ponteni* specimens Wallengren described from Hawaii. The *Colias ponteni* female that Lord Rothschild may have received as a gift from Wallengren, possibly via Felder, with the label "Hono-lulu" was of course not available to Butler when he, in 1871, described his butterflies found in the herbarium as *Colias imperialis*. Rothschild was born in 1868 and Elwes, whose butterflies were donated by him to BMNH, died in 1922.

Hawaii or Port Famine? What factors speak for and against these sites?

For Port Famine on the Strait of Magellan:

1. That the *Colias imperialis* butterflies, described by Butler 1871, are said to have been found in the Banksian cabinet, among collected material from Captain King's expedition to the area at South America's southern tip 40 years earlier. However, there is great doubt about this "accepted truth"

2. The obvious disarray that was at hand regarding many of the collected specimens on the expedition (animals and plants). The statement of Oahu as a capture site could then also be incorrect.

3. That Kinberg really found 5 but maybe even 8 fully-educated for the science so far unknown *Colias* butterflies and also a parasitized pupa during his walk towards Mt Tarn together with Andersson on February 1, 1852. This is the accepted "truth" of virtually all "experts" who pronounced on the issue. However, this presumptive scenario seems quite incredible as neither Kinberg nor Andersson were any entomologists and no one after nearly 170 years found the butterfly in this area. The fact that they found a parasitized pupa during this excursion also seems extremely unlikely.

4. The hypothesis that Kinberg could have found a larval-colony on the way to Mount Tarn during his excursion there with Master Andersson on February 1st 1852 has been launched based on my find of the parasitized pupa in Uppsala. Kinberg had then probably left the care of these caterpillars or pupae to Samuel Pontén who had them in his cabin where they pupated, and then when the frigate Eugenie arrived at Hawaii in midsummer of 1852, at least five butterflies would have hatched from the pupae while one pupa had been parasitized. They were all taken care of by Samuel Pontén. This and two of the newly hatched males Samuel Pontén gave to his brother in Strängnäs while a male and a female were handed over to the Academy of Sciences and are now available as syntypes for *Colias ponteni* at the Swedish Royal Museum of Natural History in Stockholm. The fifth specimen was given to Wallengren in connection with describing the butterfly in 1860. That Samuel Pontén was commissioned to take care of a larval colony is probably not so strange since he being the ship's priest had a strong position on the frigate with probably a better cabin and better opportunities to be able to take care of the larvae than anyone else on the frigate, and that he also had a personal interest in trying to see what these larvae could do on his brothers behalf. This could also explain why both Kinberg and Pontén in Wallengren's description of the species stand as collectors of the butterfly. It could also explain why Wallengren gave the butterfly this name as recognition of his efforts.

I thought this hypothesis was very farfetched but the more I think about it, it does not seem quite so incredible. A problem with this hypothesis is that now one has found an egg-shell on the empty parasitized pupa which should suggest that Kinberg found all the specimens as pupae, is something that must be considered very unlikely! One possibility, however, might be that the pupa had been attacked by a parasite fly aboard the frigate Eugenie. With that scenario the question will be from where did the parasite fly come from? The same hypothesis, however, could be even more credible for Oahu as the butterfly's source. In that case, the hypothesis would be even more credible!

The most important argument against this hypothesis, however, is the time when the larvae were found, namely February 1st, which means late summer. That these larvae were then so developed that they were able to pupate and then hatch in Pontén's cabin seems totally unlikely. It must also be considered quite unlikely that Pontén could for some time have been able to breed the larvae in his cabin with fresh plants. That he would have been able to find suitable food for these larvae near the beach since Eugenie left Port Famine also appears completely unlikely.

The only possibility to safely solve this question as I see it now would probably be if it could be possible to find out which plant the pupa is attached to. However, in order to safely get a comprehensive answer to this question, it would have to be that this plant would either only be found along the Strait of Magellan or only on the Hawaiian Islands.

5. That Pontén, who was an enterprising person, in some way, has obtained these five butterflies from someone in Port Famine during his visit there but that he himself did not have anything to do with the actual collection. This seems extremely far-fetched but cannot be completely excluded and in that case would support Shapiro's hypothesis that the butterflies were collected further north as follows: "*in steppe habitat father north, perhaps at the classical 'Cabo Negro' or near 'Punta Delgada'*". I can very well imagine that Samuel Pontén would have been able to pay a lot to get these butterflies if he was offered to buy them from someone during his visit to Port Famine. But the question that you have to ask yourself in that case is, who had made this collection and how did this unknown man have knowledge that on the frigate there was a ship's priest with an interest in a purchase?

For Hawaii, Oahu and Honolulu:

1. That Pontén, possibly together with Kinberg, are the only people who actually say they have seen the butterfly alive and claim to have collected the butterflies and that this happened on Oahu on Honolulu. Did Wallengren receive this information from both or only one of these gentlemen?

2. That Pontén, who was obviously somehow involved in the gathering of the butterflies, was probably not even ashore during the visit to Port Famine, so this possibility should be excluded. See the letter from Christer Hägg (Appendix 4).

3. A relatively strong correlation between isotope-examined butterflies from Hawaii and Samuel Pontén's collected *Colias ponteni*. Significantly lower correlation with the *Colias* butterflies, *Colias vautherii cunninghamii*, collected near the Strait of Magellan by Hiroshi Hara.

4. *Colias ponteni's* relatively bright abdomen and the relatively bright areas of the hindwings at the inner edge towards the abdomen. This is something that is often common in butterflies in warm areas where it is not so important to use solar heat to warm the abdomen. The abdomen of *Colias vauthierii cunninghamii*, flying at the Strait of Magellan, is somewhat darker.

5. The most closely related *Colias* species in appearance with androconial patches on the hindwings, *Colias fieldii*, can be found in northeastern Asia from Ussuri to northern Vietnam. This species is part of the migratory "croesus group" which would also possibly speak for *Colias ponteni* coming from Asia. The males of the North American *Colias* butterflies all lack the androconial patches so typical for *Colias ponteni*. But here I have to note that the *Colias vauthierii* which fly in South Chile and on Tierra del Fuego also has small androconial patches. The two other endemic butterflies on Hawaii, *Vanessa tameamea* och *Udara (Vaga) blackburni* has also their closest relatives from the same area in East Asia as *Colias fieldii*.

6. The butterfly is now most likely extinct. The likelihood of rapid eradication due to human activity must be much larger in Oahu than along the Strait of Magellan.

7. In the BMNH, there are 3 *Colias ponteni*, two of which carry labels "*Sandwitsch Inseln*" and the third "*Hono-lulu*". Only three of the total of eleven existing specimens of *Colias ponteni* carry the "Port Famine" label. These three labels have been written by Butler based on pure assumptions when he himself lacked knowledge of where the butterflies he found in the Banksian cabinet were collected and also by whom. Butler, in the description of "*Colias imperialis*", even put a question mark (?) after the locality declaration "*Port Famine*".

One might wonder if Joseph Banks knew about these three butterflies. Perhaps Joseph Banks, as an old friend of James Cook, could have obtained the plants and among these the accompanying butterflies from the natural wild collected material that may have been made in Hawaii during the visits before Cook was later unfortunately murdered on his third visit. I suppose Joseph Banks met James Cook's ship *Resolution* when it returned to England in late 1779. This could also explain why these butterflies were in Joseph Bank's cabinet when Butler found them there ninety years later! Joseph Banks, who himself was a very dedicated and great natural collector, was in fact on Cook's first world tour with *HMS Endeavour* 1768 - 1771 and of course he knew Cook very well. The fact that the *Colias imperialis* butterflies could come from James Cook's third Pacific voyage is just my own speculation **as I try to cover all possiblities** when and where these three specimens were collected and **how it might be that they were** in the so-called Banksian cabinet.

However, there is a big snag with this hypothesis! James Cook did indeed visit the Hawaiian Islands for quite some time, from the time he discovered the islands on January 18, 1778, until he was murdered on February 14, 1779. However, James Cook did not remain in Hawaii during this entire time. Cook's main task with this long voyage on his ship *Resolution* was to try to find the Northwest Passage north of North America, which is why, as soon as the weather was judged to be more favorable, he set off for the Bering Strait via the North American coast from California to Alaska in the spring of 1778. He first returned to the Hawaiian Islands on January 17, 1779 when he was welcomed as a God. What happened next, until he was murdered just a month later on February 14, those interested in James Cook and his travels will know, but it is too much to describe here.

The question is, however, what do we know about any plants collected on the Hawaiian Islands during the winter months Cook was there in 1778 and 1779, but above all did any collection occur during the summer months was Cook was on the *Resolution?* Maybe some natives engaged in collecting plants during this time? Everyone has obviously accepted that these plants, where the butterflies were found, were really collected at Port Famine. I ask myself, where are these plants now? I can ask the same question to the Natural History Museum in Stockholm, which emptied Strängnäs´ High School of all the plants that Samuel Pontén collected for his brother at this school. Is there a species list of these plants at the National Museum? Are any of these Pontén´s plants collected in Hawaii or at Port Famine? The latter question I have often asked myself but unfortunately could not get an answer to. As for the plants among which the butterflies were located, Butler probably had found some sort of label with the information: "Port Famine (King) Coll Banks". In any case, these labels may not have been written by Banks himself. Captain King first visited the Strait of Magellan in 1821, i.e. a year after Joseph Bank's death in 1820. However, do we really know that the plants were collected during Captain King's visit to Port Famine?

However, what mainly suggests the fact that these three "*imperialis* butterflies" would come from Cook's visit is the time, i.e. “winter months” January and February which is when James Cook visited the islands. Currently I see that the biggest snag with this hypothesis is that *Colias ponteni* can hardly have flown both in January / February and during the high summer of June / July when *Eugenie* visited the islands. However, **I cannot free myself from the fact that something in Butler's text in his appendix to the species description is incorrect**. What does it mean that he writes that he found them: “*From the supplementary cases in the Banksian cabinet in company with a collection from Port Famine presented by Capt. King*.” However, I note that there is nothing to say that the "collection" would be about plants, although I also find it most likely.

If we now assume that the butterflies originate from Hawaii, then something must be wrong in Butler's conclusion that the butterflies originate from Captain King and Port Famine. Why were these plants and butterflies at all in the Banksian cabinet? Banks had been dead for 50 years before Butler found the butterflies and described them. One would very much like to know which other friends of Joseph Banks who, after Cook's tragic death in 1779 and up to Bank's death in 1821, i.e. visited Hawaii during these forty years. There is something suspect about these three locality labels "*Port Famine (King) Coll Banks*" I definitely think there is!

I have included the above doubts regarding the three butterflies Butler found in Bank's old collections under this heading 7 "For Hawaii" because even Butler himself wrote a question mark (?) regarding the local name: *Port Famine*. This could possibly also speak for Hawaii.

8. We have a statement by Skogman that Samuel Pontén and Master Andersson made an excursion to Honolulu's surroundings where Pontén may well have collected his "*ponteni*-butterflies".

9. That the butterfly has not been found in the area around the Strait of Magellan despite intensive searching for over more than 165 years. Although these searches have taken place in recent years, why would this butterfly have been eradicated earlier?

10. That Mt Tarn, which many people considered to be the most likely place for "*Colias imperialis*", considering both Charles Darwin's and Hiroshi Hara's descriptions and analysis and also Daniel Rosengren's pictures, with its cloud-forest and bare mountain slopes above, should not constitute a place where this relic could exist and survive for very long.

11. It is not at all unlikely that the "*imperialis*-butterflies", even though they were found among materials brought back from Commander King's expedition to Port Famine, could have been collected on Oahu. The sailing ships that sailed home to England from Hawaii using the shortest route around South America nearly always passed through the Strait of Magellan and anchored at Port Famine or Punta Arenas. If we now assume that Butler's described "*imperialis*-butterflies" come from Hawaii these can, as I see it, easily have been confused with material from Port Famine or Punta Arenas when the ship arrived to those places but more probably when the ship arrived to England. ***Given that nobody knows who had collected the "imperialis butterflies" that Butler found, it seems to me extremely strange that his assumption by most members of the "collective science" for more than 100 years was considered more credible than Kinberg and Pontén's statements to Wallengren that the two themselves had collected their Colias ponteni specimens in Hawaii!***

12. The analysis I made of the labels found on the three butterflies at the BMNH that were not described by Butler shows that the handwriting on the labels "Sandwitsch Inseln" corresponds well with the label "*Colias ponteni*" Wallengren had written on the name-label for the female he described as *Colias ponteni*. Added to this is that the female that was in the Rothschild's private collection, that originates from Felder's collection, carries exactly the same type of label "Hono-lulu" as Wallengren's syntypes of *Colias ponteni* at the Royal Swedish Museum of Natural History in Stockholm. All of this suggests that it is quite possible that all these three specimens originate from the collecting that took place on Eugenie's voyage! All these specimens are also in much better condition than the "*imperialis*-specimens" except Wallengren´s own example but that I am rather sure depends on the handling of that specimen.

13. If we now assume that during this trip, at the same time, eight examples of this special butterfly were collected and, in addition, a parasitized pupa, the hypothesis that the collection of specimens took place at the end of the larval stage appears. This would also fit well with the time, Midsummer, when the visit was made to Honolulu in 1852. The caterpillars should then have been ready to pupate If now Kinberg or Pontén found these larvae or pupae, it would be most likely that Pontén had been given responsibility for them and later during the voyage to Tahiti seen them hatched to adult butter-flies. All these specimens are relatively fresh, unlike the butterflies Butler found in the herbarium in the Banksian cabinet. The localization "Tahiti" would then be able to get an explanation. Besides, there is nothing in Wallengren's description that Kinberg and Pontén found the butterfly near Honolulu on Oahu as adult butterflies, although of course everyone including myself took this as being obvious.

A comment:

I can of course see a scenario that Kinberg found these larvae or pupae, a total of nine examples in Honolulu and then let Samuel Pontén take care of them and that he then managed to hatch eight fresh adults on the frigate Eugenie - quite hypothetical - almost too good to be true - But how else could we explain that on this single visit to Honolulu, that no less than eight fine specimens and a pupa of this butterfly had been found which no one had previously recorded or ever found? Does anyone have a better theory?

If we now assume that Kinberg or Pontén found this larval colony, then the distribution between the sexes is quite acceptable. We must assume that these gentlemen took with them all the larvae or pupae they saw why 5 or maybe 6 males and 3 or 4 females would be a reasonable distribution between the sexes. As I write this, myself and no one else knows the sex of the parasitized pupa. Maybe the DNA studies can also answer that?

Conclusion – Most likely scenario

Based on the above reported points for and against Hawaii vs. Port Famine it appears to me that Hawaii is by far the most likely option. Unfortunately, an absolutely positive answer to the question as to where the butterfly had its habitual residence, even after my 47 years of thinking, I still do not have. I can only hope that forthcoming DNA-analyses can answer this question. The most interesting one should then be if one can determine which plant the pupa is adhered to and which parasitic *Hymenoptera* or likely, considering the egg shell found on the pupa, which parasite fly parasitized the pupa. It would be a lot of fun if my find of the parasitized pupa could help solve this mystery! However, on the basis of what I now know in June 2019, I want to present the most probable scenario how it might have gone when these at least five butterflies and the pupa we now have in our three Swedish museums were collected and where this also probably happened.

I think Pontén and Andersson, possibly together with Kinberg, found these butterflies as living larvae or pupae in the process of hatching, in a small unexploited local glade outside Honolulu, perhaps along the road to or over the Pali Pass some days after Midsummer 1852 or on the hikes they most likely took along the beaches around Honolulu. Samuel Pontén then probably got the responsibility for these larvae or pupae in his cabin on the frigate Eugenie where they then hatched on Eugenie's way to Tahiti. Since Samuel Pontén was given the responsibility for the larvae or the pupae during the voyage, Kinberg probably considered, when he as I think presented the butterflies to Wallengren, that Pontén should be honoured to give his name to this fantastic butterfly, the finest insect find on this whole world-wide Swedish scientific expedition!

If I had been a member of this expedition I think that the passage through the Strait of Magellan aboard the magnificent frigate Eugenie had been the most memorable event of this expedition - possibly with except for experiencing a hatching *Colias ponteni*! But if I at that moment had known that this hatching butterfly was the last of this species I am sure I had been very sad and felt the same as I do now when I see how we *Homo sapiens* act against all other species on not only our world but also all other species´ world.

Finally, in these times when young people around the world are protesting how we older people are taking advantage of the world and destroying the living opportunities for future generations, and also the biodiversity of our planet, I make the following bad reflection. It is very sad to think that this unique *Colias ponteni* which Samuel Pontén might have found on some plants as a collection of larvae in the area around Honolulu in midsummer 1852 must be one of the first butterflies that we *Homo sapiens* exterminated. Perhaps even the first, at least this the one we know when it probably happened!

Thanks!

Finally, I would like to thank a number of people, often also very personal friends, who during more than 45 years I have occasionally worked with during this study have helped me with information about *Colias ponteni* / *imperialis* and its relatives. Unfortunately, however, many of these friends, Bengt Sjöström, Erik von Mentzer, Yngve Christiernsson, Adolf Schulte, Jan Haugum and Sten Jonsson have left this earthly life during the time I have been working with this investigation, something I can of course only deeply regret. That my own health also feels like being on the slope downwards is why I feel that if my investigation will be told at all it is good to do it now in June 2019.

Arne Anderberg The Swedish Royal Museum of Natural History, Stockholm
Oskar Brattström, Sweden
Dr. Diego Jose Carpinteri, Buenos Aires, Argentina
Bernard D´Abrera, Melbourne, Australia
Forstmästare Yngve Christiernsson, Gävle, Sweden
Dr. Ariel Camousseight, Museo Nacional de Historia Natural. Santiago de Chile
Dr. Roy Danielsson, Zoologiska museet, Lund, Sweden
Head of department Mats Eriksson, Museum of Evolution Uppsala, Sweden
Curator Hans Meilon, Museum of Evolution Uppsala, Sweden
Intendent Lars Hedström, Museum of Evolution Uppsala, Sweden
Intendent Bert Gustafsson, The Swedish Royal Museum of Natural History, Stockholm
Hiroshi Hara, Japan
Sheila & David Howell, England
Christer Hägg, Sweden
James Stewart, England
Jan Isidorsson, Trollhättan, Sweden
C. M. Jimenes, Chilenska Ambassaden, Stockholm
Sten Jonsson, Zoologiska Institutionen, Uppsala, Sweden
Torbjörn Kronstedt, The Swedish Royal Museum of Natural History, Stockholm
Erik von Mentzer, Stockholm, Sweden
Roland Moberg, Museum of Evolution Uppsala, Sweden
Professor Sivert Nilsson Vetenskapsakademien, Stockholm
Bertil Nordenstam The Swedish Royal Museum of Natural History, Stockholm
Fredrik Sjöberg, Runmarö, Stockholm
Professor Keiichi Omoto Tokyo, Japan
Pavel Bína, Uppsala och Tjeckien
Jack Harry, Salt Lake City, USA
Chris Samson, England
Dr. Adolf Schulte, Tyskland
Jan Haugum, Vejle, Denmark
Bengt Sjöström, Studiefrämjandet Gävle, Sweden
Markus Franzén, Öland
Björn Cederberg, Sweden
Professor Nicklas Wahlberg, Lunds Universitet, Sweden
Bengt-Åke Bengtsson, Öland Sweden
Dr. Gerardo Lamas, Lima, Peru
Nick Garding, BOA (Butterflies of America) USA
Alexander Kiryanov Moskva, Ryssland
Clas Källander, Roslagen
Daniel Rosengren, Gävle, Sweden, www.danielrosengren.se Instagram: @naturebydanielrosengren

To some of these gentlemen I want to pay particular attention. Unfortunately, however, I have to say that many of these have died during the many years I worked with this project.

Bernard D´Abrera, who in letters encouraged me in this work but not least through his pictures of almost all the worlds butterflies and especially his first part about South America's butterflies. He opened my eyes to the fact that *Colias ponteni* and *Colias imperialis* were the same species. His great work, during a 40-year period, in extremely beautiful and content-rich books for everyone and anyone, shows virtually all the butterflies we still have on our planet today, is of course absolutely outstanding. Only that he has the power to complete his outstanding project of depicting virtually all known butterflies is astonishing. I think back to Butler who unfortunately missed Wallengren's description because of the lack of a picture. Of course, it is with great grief that I have recently been told that he has left us now, but whose life-work he left behind for all of us who are fascinated by the earth's butterflies!

Speaking of D´Abrera's photos: A very interesting example of what a picture can show is a small Hairstreak from South America that Linnaeus probably saw in the mid-1750s in Queen Lovisa Ulrika's priceless “Natural-Cabinet” and apparently thought to be the same species as our Purple Hairstreak, *Favonius (Querqusia) quercus* because in his book on The Queen's Natural Collection, "Museum Ludovicae Ulricae" he mentions precisely this specimen under the species “Papilio Querqus”! Our Swedish authority on tropical butterflies, Professor Aurivillius apparently considered that this butterfly, no. 132 in the museum book, was the same species as Cramer described in 1775 as Thecla cyllarus. From D´Abreras: “Butterflies of the Neotropical Region Part VII, Lycaenidae”, I could see that Linnaeus and Queen Lovisa Ulrika's South American Hairstreak is actually a "*Thecla occidentalis*" described by Lathy only in 1926! This butterfly is also available at The Museum of Evolution in Uppsala.

Yngve Christiernsson was for me during his last 20 years in life as a father I never had before. With his tremendous enthusiasm and his great knowledge of most things in our nature, he became my mentor. It was also through him that I first discovered *Colias ponteni* at the Natural History Museum in Stockholm 47 years ago, which started my studies of this butterfly.

Curator **Bert Gustafsson** at The Swedish Royal Museum of Natural History, who during my schooling had always been accommodating and helped me with all kinds of questions about butterflies and who also lent me the type animals for closer studies as well as the big book "The Royal Swedish Frigate EUGENIE'S TRAVEL Around The Earth" - "Scientific observations II” Where all 1311 species described are reported. **Erik von Mentzer** who with his great language skills helped me with the translation of the older Latin descriptions.

Bengt Sjöström who paid for the publication of our magazine *Insectifera*, which became crucial for my continued studies of this butterfly. The same also applies to Dr. Adolf Schulte who, with his letters about the *Colias* family of butterflies, opened my eyes to these amazing butterflies around our earth. The same also applies of course to **Jan Haugum**, who unfortunately never ended his work on the *Colias* family and how it went when many of the spectacular species were discovered, something he so painfully described in his letters to me.

Among my friends who, unfortunately, are no longer with us, I also want to mention **Sten Jonsson**, chairman of *Uppland´s Entomological Society* who has always been a positive influence to my various ideas. Especially regarding both our association and journal as well as my studies of Linnaeus and his works as well as opening my eyes to the treasures The Museum of Evolution in Uppsala has, above all, Queen Lovisa's Ulrikas completely unique Butterfly collection, described by Linnaeus with his upcoming binary nomenclature system several years before the same was presented in 1758 in his *Systema Naturae*.

Oskar Brattström, who through the isotope studies he contributed to, meant that for the first time since the butterflies were collected, we could carry out any investigation that could really show where the butterflies were collected. In this context, I would also like to mention **Jack Harry** who kindly gave me one of his butterflies collected on Oahu to enable the comparisons necessary for this isotope survey. Unfortunately, Jack is no longer with us anymore.

Finally, I would also particularly like to thank my friends **Hiroshi Hara** and **Daniel Rosengren** who, on their own on separate journeys, based on my speculation, travelled to one of the most inaccessible places on our planet but did not find the butterfly which, on my advice, they could possibly find there. I am immensely grateful and cannot possibly show my appreciation enough for this because without their investigations on this site on the Strait of Magellan, at the only alternative site to Pontén's own local description of "his" butterfly, this whole examination would be meaningless. The same applies to **Christer Hägg**, who together with the frigate Eugenie's Captain´s son-son-son Ivar Virgin with The Swedish ship HMS Carlskrona in connection with the 150th anniversary of the world voyage when Eugenie visited Punta Arenas and Port Famine on the Strait of Magellan and even at that time kept eyes open for any *Colias ponteni* butterflies! Christer Hägg's absolutely fantastic book has of course also helped me a lot with facts and pictures to this article.

However, the person who has meant the most to me for this study is doubtless **Hiroshi Hara**, with four trips to the Strait of Magellan and Tierra del Fuego and another six trips to other places in western South America, a total of four hundred and ten days between 1998 and 2005. He is also the person who made me most clearly to question Butler's assumption that Port Famine would be the place where *Colias ponteni* (C *imperialis*) was collected, although he perhaps still has some doubts about Hawaii as the origin of *Colias ponteni*. Unfortunately, the political situation in Argentina did not allow a visit for me to the Strait of Magellan during the three months in 1979 - 1980 that I spent with my friend **Diego José Carpintero** and his family in Argentina, but this wonderful "winter" without snow and cold in this amazing country became an unforgettable memory with a December with a temperature on + 40 C in Misiones, more than 70 degrees Celsius, warmer than 1978-1979 at my home in our house outside Gävle (-31 C) and without any electricity for seven days between Christmas and New Year!

Speaking of my South American contacts, I would also like to thank **Dr. Gerardo Lamas** for his e-mail to me after reading my first version of this article where I regretted stealing my pictures on the type specimens. Now that BOA, "Butterflies of America" by **Nick Garding**, has taken on all the blame for this fad and Gerardo has declared himself completely innocent of this and I have accepted this, I also would like to thank Gerardo for pointing out the wrong concepts such as holotype and allotype I have used for Wallengen's described new sp. of the butterfly and that the correct name should be the syntype. Here I would also like to thank my friend **Bengt-Åke Bengtsson** for his clarification of the conceptual confusion that can easily hit us who is not a specialist in the very naming of newly found plants and animals.

In order for this article to come about at all, I would also like to thank some, who through their encouragement and general support have made me publish, despite great concern, which is what I have come to expect during 47 years of thinking about this butterfly. Especially **Jan Isidorsson** who was there when we rediscovered the two *Colias ponteni* butterflies and the pupa in the Museum of Evolution in Uppsala and who took the picture of me and Lars Hedström and also the enclosed photo on Appendix 6 from that amazing evening!

My old friend **James Stewart** in England who for more than 25 years has helped me with my African collection including the *ponteni*-like *Colias electo* but above all with my English translation of this article and also made many valuable comments and corrections. James has also visited just north of the Bachelor Peninsula and at El Calafate but only found *Colias vauthierii cunninghamii*.

Pavel Bína who for many years handled the publication of our magazine "*Insectifera*" and also made sure that this article was published online. My friends and I, during the 47 years we have been working on this investigation, have never sought or received any contribution from any institution or similar but have chosen to pay for everything ourselves, which is why I have chosen to publish this article in our own magazine "*Insectifera*". Since my schooldays I have chosen to have an interest in the worlds butterflies as a pure hobby alongside my civilian job. This includes responsibility for the property valuation of Sweden's largest process industries.

Some others I would also like to mention in this context are curator **Hans Mejlon** at The Museum of Evolution in Uppsala and of course also the always accommodating head of that museum **Mats Eriksson**. Finally, my dear friend **Markus Franzén**, who in the last few years, since my heart attack and retirement, made me see that butterflies are my source of inspiration and have been since adolescence. I also feel that in this enumeration of people who meant a lot to this article's appearance, I could not exclude my oldest friend **Clas Källander**, who aroused my interest in butterflies when at school almost 60 years ago. He was certainly among the very first to introduce catches of tropical night-flying moths in Ecuador using a 400 w UV-lamp with the result that I was completely overwhelmed and sold on the huge variety of species the tropics offer. Before that it had only been plants and birds in my life. A big thanks also to my dear Gun-Britt who has stood by me all these years despite the fact that almost all the spaces in our house were cluttered with books, butterflies and moths from all corners of the earth.

Literature

Boulet, J-C. Extinct Species of the World.
Bridges, C.A. 1988. Catalogue of Papilionidae & Pieridae.
Butler, A.G. 1871. Mr. A. G. Butler on new butterflies. Proc. Zool. Soc. London March 7, pl. XIX.
D´Abrera, B. 1981. Butterflies of The Neotropical Region, part 1.
D´Abrera, B. 2016. Butterflies of The Neotropical Region, part 1. NEW and REVISED EDITION
Darwin, Ch. Resa kring jorden.
Danielsson & Burenhult, I. James Cooks Kölvatten.
Ekbohrn C.M. P.A. 18--. Loggboksanteckningar under En Jordomsegling med Fregatten Eugenie. Huldbergs Bokhandel.
Peña Guzmán L.E. & Ugarte P.A.J. 1997. Editorial Univeritaria, Las Mariposas de Chile.
Hara, H. 1999. *Colias imperialis – Colias ponteni*.
Hara, H. 2003. The Specimens of Legendary butterfly *Colias ponteni* and its (?) pupa discovered in Sweden. In: Wallace, Vol. 8 2003.
Hara, H. 2003. There are more 3 specimens of *Colias ponteni/imperialis* in BMNH!? In: Wallace, Vol. 8 2003.
Herera, G.J. & Perez, V. 1989. Hallazgo en Chile de *Stuardosatyrus wiliamsianus*. Acta Ent. Chilena, Vol. 15: 171-196.
Hickin, N. 1979. Animal Life of the Galapagos.
Hägg, Ch. & Ullman, M. 1999. Fregatten Eugenies Världsomsegling.
Hägg, Ch. 2001. Personligt brev med utdrag ur Eugenies Loggbok.
Persson, P.I. 1971. Eugenies resa "Localities, dates and labels of insects during the vouage around the world". Ent. Tidskrift 92: 164–172.
Peterson, B. 1963. The male genitalia of some *Colias* species. J. Res. Lepid. 1: 135-156.
Shapiro, A.M. 1993. The proposed Magellanic type-locality of *Colias imperialis*. Acta Ent. Chilena, Vol. 18.
Sjöberg, G. 1997. *Colias ponteni*, Wallengren 1860 Bredbandad Höfjäril. *Insectifera*, Vol. 5: 68–102.
Sjöberg, G. 2000. *Colias ponteni* – har något nytt framkommit? *Insectifera*, Vol. 8: 3–4.
Sjöberg, G. 2001. *Colias ponteni* – Pontens Höfjäril. *Insectifera*, Vol. 9: 3–5.
Skogman, C. 1855. Fregatten Eugenies Resa Omkring Jorden åren 1851–1853. Bonniers.
Skottberg, C. 1909. Båtfärder och Vildmarksridter. Minnen från en forskningsfärd genom Patagonien och Eldslandet. Iduns Tryckeri.
Verhulst, J T. 2000. Les *Colias* du Globe. Goecke & Evers.

Wallengren, H.D.J. 1860. Lepidopterologische Mittheilunen. Ent. Monatsschrift, Wien, 4: 33-46.
Wallengren, H.D.J. 1868. Kongliga FREGATTEN EUGENIES RESA omkring jorden 1858–1868. Vetenskapliga iakttagelser II.
Zimmerman, E.C. 1958. Insects of Hawaii. Vol. 7 Macrolepidoptera.

Footnotes

Androconia
Specialized scales in the male that carry chemical messages to females; they may occur as scattered scales, diffuse patches of specialized scales, strongly defined patches, or hair-tufts (from: Torben B. Larsen: Butterflies of West Africa).
Now we normally use “androconial patches” in the scientific text.

Eugenie
The name Eugenie of the very well-built frigate was determined in 1837 by the then 74-year-old King Carl XIV Johan after his grandson Crown Prince Oskar and Crown Princess Josephine's fourth child Princess Eugenie who was then 7 years old.

Sandwich Islands
The old name of the Hawaiian Islands is Sandwich Islands.
James Cook, who discovered the Hawaiian Archipelago in 1778,
honoured his great benefactor John Montagu, 4th Earl of Sandwich,
(November 13, 1718 - April 30, 1792) by naming the islands to his glory.

Colias vauthierii cunninghamii
Some conflicts exist regarding the spelling of this *Colias* species that flies most southernmost in South America. The species was described in 1830 by Guérin-Méneville as *Colias vauthierii*. The southern subspecies of the species "*cunninghamii*" were described by Butler 1881. The even smaller "form" flying along the Strait of Magellan and on Tierra del Fuego, Butler, the same year, gave the name "*minuscula*". However, whether this is a "good form" is very doubtful. What confuses the whole thing is that Blanchard in 1852 "simplified" the spelling of Guérin-Ménevilles *Colias vauthierii* to *Colias* "*vautieri*". This erroneous "simplified" spelling has then been used by most authors, including Verhulst, who also simplified Butler's *cunninghamii* to *cunninghami* in his great work "*Les Colias du Globe*" where it is described as *Colias vautieri cunninghami*.

Colias fieldii* - the closest related species to *Colias ponteni ?

Male and female of *Colias fieldii* from North Vietnam collected by Markus Franzén
Foto: Göran Sjöberg

Appendix 1
Wallengren's description of *Colias ponteni*

Wallengren's description of *Colias ponteni* in: "*Kungliga Svenska FREGATTEN EUGENIES RESA omkring jorden – Vetenskapliga Iakttagelser II*".

LEPIDOPTERA.

SPECIES NOVAS DESCRIPSIT

H. D. J. WALLENGREN.

TRIB. PIERIDES.

1. **Colias Ponteni.**

Alis supra fulvido-flavis (maris disco iridatis), macula discoidali anticarum, limbo omnium latissimo costisque nigris; apice anticarum flavo-maculato; omnibus infra maris fulvido-flavis, feminæ, disco anticarum excepto, grisescente-flavis; anticis macula ferruginea discoidali, costa flava intersecta, margineque interiore late nigro; posticis circulo discoidali ferrugineo.

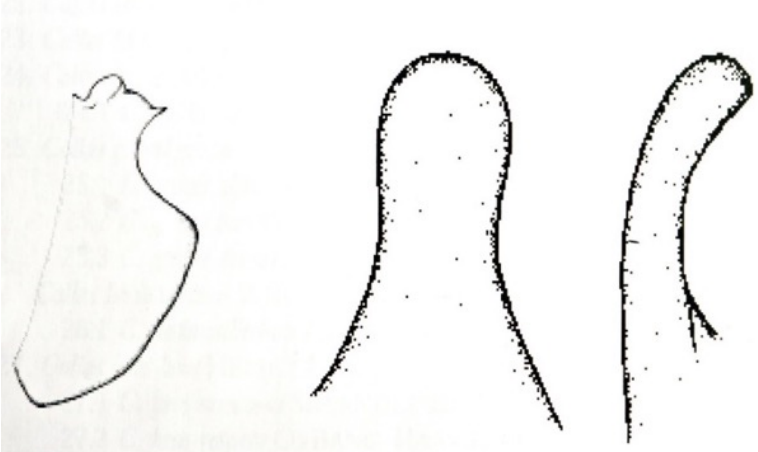
Patria: Insula Oahu (Honolulu) mense Junii.

Magnitudo *C. Vautieri*; forma alarum eadem. Antennæ supra fuscescentes, articulatione flavescente; infra flavæ. Clava ovata, determinata, crassa. Corpus totum supra fulvide flavo-pilosum, infra pallidius.

Mas. Alæ omnes supra læte fulvido-flavæ, certo situ iridatæ, limbo latissimo nigro. Terminus hujus limbi internus alarum anticarum in medio marginis antici incipit et erga costam quartam oblique se dirigit; deinde ad costam primam subrecte se extendit et ibi secundum marginem internum, usque ad ejus medium, se porrigit, ubi acute desinet; apicem itaque totum, marginem externum et partem marginis interni limbus ipse occupat, ut tantum discus cum basi alarum fulvido-flavus appareat. In apice alarum maculæ nonnullæ, indeterminatæ coloris fundi, aut disjunctæ aut confluentes observantur. Ad finem cellulæ macula ovata nigra cum limbo antice cohærit. Costæ omnes extra cellulam tenue nigræ. Limbus niger alarum posticarum marginem anticum totum et marginem posticum usque ad costam septimam occupat. Ad finem cellulæ macula nigra cum limbo confluens. Costæ tenue nigræ. Basis alarum omnium cum margine interno alarum posticarum nigro-pustulata. Terminus internus limbi nigri alarum omnium crenelatus. Alæ omnes infra fulvido-flavæ; anticæ macula ferruginea minuta, costa flava intersecta, ad finem cellulæ et posticæ circulo ferrugineo eodem loco ornantur. Alæ anticæ in margine interno late nigræ. Cilia utrinque flava.

Femina mari similis, sed nonnihil major et alas supra minime iridatas gerit. Limbus niger alarum anticarum totus maculis indeterminatis atque sat obsoletis, et limbus posticarum maculis duabus sat magnis fulvido-flavis ad angulum anticum ornatur. Alæ posticæ macula nigra discoidali carent. Alæ omnes, excepto disco fulvido-flavo anticarum, sunt infra grisescente-flavæ.

Appendix 2
Berger´s Palaeocolias, typ-genitalia: *Colias ponteni*



Palaeocolias (type: *C. ponteni*) (fig. 3)

Lucien Berger's genitalia of *Colias ponteni*. *Lambillionea* 86 (7-8) 1986

Appendix 3
Christer Hägg's book about the frigate Eugenie's World voyage

Christer Hägg's amazingly beautiful and extensive masterpiece about the frigate Eugenie's World voyage. The cover image is painted by Christer Hägg's great-grandfather Jacob Hägg and shows Eugenie during a hard journey through The Strait of Magellan when she had just rounded Cap Froward's steep cliff on February 7, 1852.

Appendix 4
Christer Hägg's letters

Letter from Christer Hägg published in 1999 with the amazingly fine and content-rich book: "*The frigate Eugenie's world voyage*".

Christer Hägg
Linnëgatan 92
115 23 Stockholm
Sweden

2000-10-14

Göran Sjöberg
Box 11056
S-800 11 Gävle
Sweden

Hello Göran,

Thank you for your very interesting letter etc ! I quite understand how keen you are to determine from where the rare butterflies come. Unfortunately I cannot help you with direct proof, only some small pieces of information, which perhaps can give more in future.

Hawaii or Magellan strait ?

As you know Eugenie made a number of stops along the strait.
In common for all the anchoring-berths, except for Port Famine, were that the stops only last for one day or a part of a day. The captain Virgin was in a tremendous hurry ! The stops were as follows:

1. Port Famine.
Eugenie run aground at the anchoring. The rest of that day (30th Jan) and during the morning next day I do not think anyone landed at all. At afternoon 31st January perhaps some of the men landed but I think that these men mostly were looking for a place to bury the allotment seaman Löpare, which they done 1st February afternoon. Probably the 2nd February was the day when several of the men from the ship landed and the day when they made the excursion to Mt Tarn. In the morning the 3rd February Eugenie left Port Famine. Mr J Andersson describes that he spend the night out (in the nature) under a tarpaulin (cover) one night during that excursion. Therefore that excursion must have been made 1–2 February.
Andersson writes that he never reach the "high mountain-region", but that he during his walking had the opportunity to collect "things of the great nature", which, because of their characteristic, peculiar and the rarity in our museums must be of the most interesting in the world". Af Trolle (a Swedish Earl, very interested in the Nature) writes that Andersson and Kinberg "made a great harvest for their collections". The only species named by Andersson are some trees and plants - they also shot some birds. None mention anything about insects specifically.

2. St Nicholas bay
Eugenie was here several times during 3–6 February after several unsuccessful attempts to come around Cap Froward. Captain Virgin was the whole time prepared to leave the strait at occasional better change of weather so I find it unbelievable that anyone left the ship for landing at that place.

3. Woods bay
At the evening the 7th February, the very tired shipmen on Eugenie anchored the frigate and then next morning the ship left the place. It seems to be quite sure that no collecting of naturalia on land was made here.

4. York Roads
Eugenie was anchored here for a whole day (the 8th February) and we know that officers and scientists landed here this day.

5. Borja bay
Eugenie was anchored here the night 9–10 February and on the 10th February small boats landed to fetch water and we know that officers and scientists landed here for a short time - perhaps one hour or two. Some naturalia was probably collected at that time, but I cannot belief that anyone, during that short time, could collect 3 ex of the butterfly, which probably was rare already at that time, seems to be unbelievable, but cannot quite be excluded (now 5 or 7 ex).

Consequently the butterfly could have been collected at Port Famine (most believable if it really where collected at the MS - Magellan Strait) or at York Roads (believable) or in Borga bay (less believable). On any of the other places no collecting could have been made. If it had been collected here the collecting must have been made in the forest lowland - not in the "high mountain region".

I have seen (one of ?) the diary of Kinberg, which they have on the Seahistorical Museum. The diary gives a very disconnected and smudgy (blotchy) impression - and is in big parts quite unenjoyable or speaks mostly about economic calculations.

Nowhere is mentioned that Pontén was co-operated in any of these excursions.

Eugenie stopped at Honolulu 22 June–3 July and 25–26 August.
At the first visit one made many collecting-trips. We know for example that Andersson and Pontén made at least one excursion together. Here there were good occasions to collect the butterfly if it really fly on Hawaii.

So, if the butterfly was rare, the probability speaks for collecting on Hawaii. There, we also know that Pontén followed Andersson on an excursion. They passed the Palipass and visited the plateau (plain) on the other side, which means the east side of the island.
Kinberg seems to have been most interested in amphibians (water-animals), while Andersson at another place (Australia) write that he collect plants as well as insects. My opinion is that most speaks for Hawaii.

J Anderson and J Andersson.

The connections King/Adventure/Banks cabinette seems to be believable but the circumstance that there were a scientist J Anderson at Adventurae seems to be mystic. I would investigate that more closely. Is it a confusion with J Andersson on Eugenie ? Is it possible that the butterflies came to the Banks Cabinette later than what one believe - even after the voyage with Eugenie or in some way be some of the specimens which were collected by J Andersson which in some way have come to the English collection? Just speculations - but that two J Anderson, only 25 years after each other, would have collected the only known specimens of the butterfly, which then newer had been refound is too good to be true. Are these 2 the same person and all the specimens from our Andersson on Eugenie ? Or can the Swedish specimens be from the Banks Cabinette? Eugenie visited Portsmouth as well as Plymouth during the voyage. In that case Port Famine would be the most probable local, as Adventure never visited Hawaii.

How does it looks like at Port Famine?

Andersson describe forest of beech and bushvegetation with close Ribes-species, Cineraries, Drimus Winteri, species of Berberis, swamps and bogs with a meter deep redmoss, ferns, rapid streams, rotting trees and primeval forest.

Captain King

Kings voyage to MS (Magellan Strait) I do not know much about, but you can perhaps get more data if you contact the National Maritime Museum in Greenwich. They have all the logg-books jorney-reports etc.

English scientific-voyage before that of Eugenie

Even here the NMM (National Maritime Museum) could help you. The most known visits on Hawaii is Cook, Vancouver (1792) and Paulet (1843)

Yes this was probably nothing new for you, but with more than this I cannot help you. It can probably be a rather big exhibition about the voyage with Eugenie 2003 (150 years) and at that time it would be very good if these butterflies could be at that exhibition. In that case I will write to you.

With the best regards
Christer

Christer Hägg 2001-10-05
Linnégatan 92
115 23 Stockholm

Hello Göran !

Thank you for your letter and the interesting pictures ! It was with recognizing I again saw the silhouettes from the Magellan Strait - I and Ivar Virgin (son-son-son-son of the captain of Eugenie) were offered to follow the Swedish ship HMS Carlskrona from Valparaiso to Punta Arenas in February this year. We were sailing through the strait, but without making any stops or enter/go to the land with exception of Punta Arenas. From that city we made a trip to Port Famine some miles south and also a day-trip north of Punta Arena. I was looking for butterflies of course but unfortunately I did not see any specimen at all of any type of butterflies. The climate can hardly be good for butterflies, so probably that was not so surprising.

According to the other stops of Eugenie which are mentioned in your and Haras letters I can say the following:

1. The visit in Desolate Bay (Watchmans bay) between Buenos Aires and the Magellan Strait can be totally excluded. Nobody made any landings there. They had only contacts with a number of anchored ships in their trying to get a pilot through the strait.

2. If Pontén really found the specimens as you think, he theoretically could have found them on the following places on or at South-America.

- Rio, Montevideo and Buenos Aires - here they made excursions in the country around the cities.
- Magellan Strait - this I have written about earlier.
- Valparaiso - in that case somewhere on the steep hills near the city. They did not made any longer excursions from Valparaiso.

- Chincha-islands outside Callao. Here they made a visit during a few (some) hours, but with the millions of birds on these guano-covered islands, so probably this place is a hard surrounding for butterflies.
- Callao - only a short visit for complementation of the supply for the ship, eventually small excursions near the city. Magister Andersson (the botanist) made during the latest (the last) day by boat to the island San Lorenzo, which he found very bare (big chariness) for the vegetation but with great numbers of birds - perhaps mr Pontén followed him on this excursion.
- The island Puna in the Guayaqil-gulf - Here we know that several persons on the ship landed on the island for hunting (mostly bird-hunting). Perhaps Mr Pontén also here followed the other to the island and found the butterflies. Some persons also go with a boat up to Guayaqil, but I do not think Mr Pontén followed them here. The lieutenant Fries who were in Guayaqil for a longer time bring some naturalies from locals up along the river, a cayman were specially mentioned.
- Panama - a short visit where there are less probable anyone made any collections, but at the Pearl-islands they stayed a few days to collect wood and water and here Pontén for sure landed several times together with the scientists.--The Galapagos islands - Here they made a visits at Chatham-, Charles- and James-islands. Here the main reasons was to collect naturalias and Pontén was surly helped them.

3. Mr Haras comments "Eugenie is too slowly ship?" is really strange when he speculates over the different times between the different harbours. Perhaps he does not know that Eugenie was only a sailor and therefore the winds quite caused when they reach their destination.

Just now I am working hard trying to convince the Royal Naval Society together with the Royal Science Academy to propose the Swedish Navy that HMS Carlskrona (a ship) made voyage around the world the same way as Eugenie during the first part of year 2003. During that voyage they also would make scientific experiments and collections on many of the places where Eugenie were 150 years ago. Perhaps they during that trip also can have a case to find your disappeared butterfly - we shall see in a few months if that voyage can be a reality.

Yes, this was all for this time.

With my friendly wishes
Christer

Appendix 5
Daniel Rosengren's journey

Some email from my friend Daniel Rosengren to me and the Newspaper in Gävle, Gefle Dagblad which he also wrote about his journey.

I'm still in Punta Arenas in southern Chile. But I haven't spent the time here but have taken me to a place few people come to. Everything to look for a small yellow butterfly.

12th of January 2009
Organization of the boat trip: It was Monday and time to organize the expedition to look for the harbor boat, *Colias ponteni*. The butterfly found during a Swedish world sailing in 1852. No one has seen it since and no one knows exactly where it was found. Göran Sjöberg, who lives just outside Gävle, heard that I was traveling in southern South America and asked me to take me to the mouth of the Bachelor River where the butterfly was possibly found. Göran is the only one in the world who

currently has this butterfly in his museum together with the Natural History Museum in London. But getting there wasn't easy. No roads or paths are available at the site. I went to the University of Punta Arenas to talk to an entomologist. He knew the butterfly well and had himself looked for it in different places. He also knew that there were five ex. in Sweden. But more than that, the entomologist couldn't help me. In the afternoon I instead visited the whale watching company that I visited earlier. It arranges boat trips to an island, Isla Carlos III, located near the mouth of the river. They agreed to take me on one of their whale safaris, then they would leave me alone on the river for four nights before coming back with the next whale watching. Now it was about shopping and packing fast. The boat would go early the next morning.

16th of January 2009

Hiking where few walked: It was a pause and some sun when I woke up. The rain came soon. It was constantly changing between a few minutes of rain and a few minutes of sun. After breakfast, I made a meal bag and walked up the salt river. I was looking for the butterfly and did what I really liked. To take pictures of the place so that Göran can see what kind of nature is on the river, if it would fit a butterfly. Sometimes I was forced to cross mosses. The pillows of the moss were large and soft, it became hot to walk. After just over four km I came to a place where the river narrowed. It was fresh water. I went a bit to see if nature changed with the freshwater. It didn't and it was time to turn again. Long distances of the way back I did not recognize myself. I went on a rocky shore I didn't recall having gone before. After a while I found out why, the tide was coming down and exposed a little more of the bottom. Once back to the house I made a fire in the stove to dry clothes and boots. On the bridge, a Kingfisher waited.

A view that few have seen. Photo Daniel Rosengren.

This year it is probably just me and the Huemul. It wouldn't surprise me if nobody sees it the rest of the year either. No butterfly in sight.

20th of January 2009, Punta Arenas, Chile

It turned out that the memory of the Huemul I wrote about in the previous post was a real rarity. Having talked to biologists and naturalists, I understand that I had a lot of luck seeing it and also managed to photograph it. The numbers vary but there are only between 1300 and 2000 huemuls left in the world and they are endangered. Only one percent of the original population size remains.

Probably one of the most south specimens of the extremely rare and endangered Patagonian Huemul, *Hippocamelus bisulcus* near the Bachelor river. Photo: Daniel Rosengren

Daniel Rosengren www.danielrosengren.se Instagram: @naturebydanielrosengren

Appendix 6
A lucky evening on October 12th, 2000 when the *Colias ponteni* pupa was found!

Göran Sjöberg has just discovered the pupa and two adult males of *Colias ponteni* at The Museum of Evolution in Uppsala after the museum's extensive renovation. Göran surrounded by his friends Lars Hedström, Clas Källander, Stefan Eriksson and Ingemar Frycklund. Photo Jan Isidorsson.