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# Earth Scientists as Time Travelers and Agents of Colonial Conquest. Swiss Naturalists in the Dutch East Indies

Bernhard C. Schär\*

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**Abstract:** »*Erdwissenschaftler als Zeitreisende und Akteure des Kolonialismus. Schweizer Naturforschende in Niederländisch-Ostindien*«. This case study on two Swiss naturalists illustrates some of the ways scientific exploration of planet earth was connected to imperial conquest in the Dutch East Indies at around 1900. Looking for answers for zoogeographical problems on the island of Celebes the Swiss benefited from and enabled Dutch colonial invasion of the island. The case illustrates that the Dutch empire was a site of scientific competition among a transnational community of scholars. Finally, the case illustrates how scientific knowledge on planet earth was shaped by and contributed to colonial culture.

**Keywords:** Postcolonial history, Paul Sarasin, Fritz Sarasin, transnational understanding of Empire.

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## 1. Introduction<sup>1</sup>

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From the seventeenth well into the twentieth century earth scientists (in the widest sense of the term) travelled on vessels of East and West India Companies and colonial powers. Their knowledge of the sea and the land and the stars helped modernize navigating skills as well as exploiting newly discovered lands and peoples (Kennedy 2009; Drayton 2000). For this reason various scholars have recently called for a closer dialogue between the history of science and global history or new imperial history (Raj 2007; Roberts 2009; Sivasundaram 2010; Hock and Mackenthun 2012).

In this article I illustrate some of the ways earth scientists benefitted from and helped sustain colonial power. My case study sheds some light on two interrelated areas of the world which historians of science have started to examine more closely only very recently: the Dutch East Indies and Switzerland in the late nineteenth and early twentieth centuries. Until recently the standard

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work for the Dutch East Indies was Peynson (1989). This book has been criticized for its ‘internalist’ approach portraying ‘exact science’ as a pristinely intellectual endeavor untouched by social context (Weber 2012; see also Goss 2011; van der Schoor 2012). As of yet there are no monographs on the history of earth and natural science in Switzerland in the nineteenth century. Some of the most original work has been brought forward by Westermann (2011). Valuable insights are also to be found in Simon (2010).

One of the archipelago’s largest islands, Celebes (today: Sulawesi), was explored by two Swiss naturalists, Paul and Fritz Sarasin from Basel, in 1893 to 1896 and again 1902 to 1903. During these four years they launched seven large research expeditions through the hitherto unknown highlands of the island. Looking at the relationship between earth science and social change through the lens of the Sarasin brothers I shall bring forward three broad claims:

- 1) Thinking global – acting local: In pursuit of ‘universal’ (global) scientific problems earth scientist’s impact on social change was local – that’s where we need to analyze it.
- 2) Towards a transnational understanding of Empire: Earth scientists worked within networks that transcended nations and empires.
- 3) Tropicalizing pre-history and pre-historicizing the tropics: Earth scientists in the colonies and in Europe mutually inspired each other’s thinking – together they produced a colonial culture.

First some brief remarks on the main actors of my story. Paul and Fritz Sarasin were both born in the 1850s in to wealthy Basel families (Schär 2013).<sup>2</sup> After having studied medicine in Basel and Geneva they went to Würzburg where they obtained their PhD’s in zoology in the early 1880s. Having almost unlimited financial means at their disposal they started their careers as ‘gentlemen-naturalists’ in the tradition of Alexander von Humboldt or Charles Darwin. From 1883 to 1886 they travelled through Ceylon (Sri Lanka). Returning to Europe they settled in Berlin where they published their findings in a five volume series of books entitled *Ergebnisse naturwissenschaftlicher Forschung auf Ceylon*.

In 1893 the Sarasin brothers set off to visit yet another island: Celebes in the Dutch East Indies – the eleventh largest island on the planet, roughly four times the size of Switzerland or the Netherlands.

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## 2. Thinking Global – Acting Local

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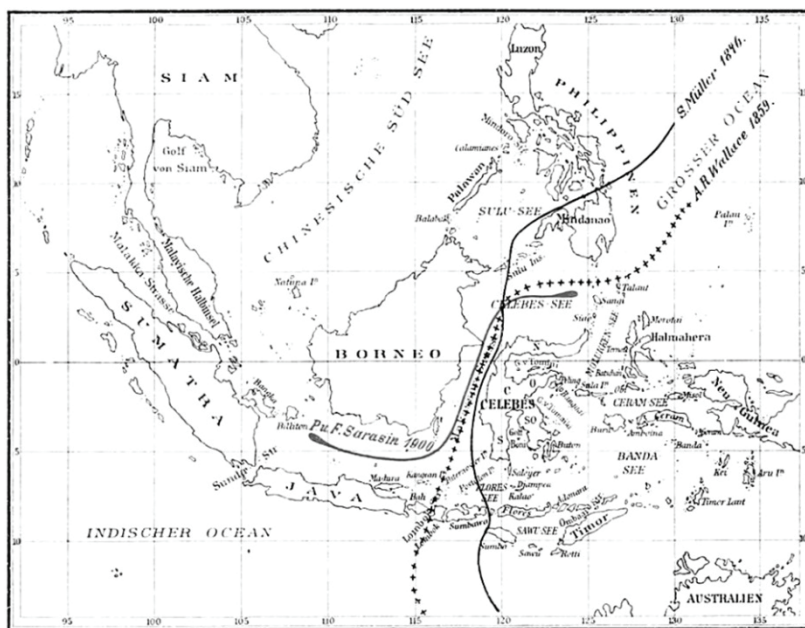
What were the Sarasin brothers doing there in scientific terms – and what effects did their expeditions have in political terms?

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<sup>2</sup> The first scholarly biography on the Sarasins is expected for 2014, authored by Christian Simon, University of Basel.

Scholarly interest in Celebes arose from the success of the theory of evolution. This theory was invented not only by Charles Darwin, but also by British naturalist Alfred Russel Wallace (1823-1913). He had travelled through the island world of South East Asia, which at the time was the Dutch East Indies in the 1850s. Studying the geographical distribution of animals on the many islands of the archipelago he developed the idea that different varieties of, e.g., birds on these islands were related to each other by common descent. He developed this idea in two papers, which he sent to Charles Darwin. Darwin recognized that Wallace had outlined the same theory he had been working on for twenty years. In 1858 papers by both authors were read in front of the Linnean society of London. Darwin then finally finished his book on the *Origins of Species* the following year where he developed his theory in great detail (van Wyhe 2013).

Figure 1: Map from Sarasin



Source: Sarasin (1892-1905, vol. 3, 146) showing Wallace's Line (with crosses) separating Borneo and Lombok in the western "Asian" part of the Archipelago from Celebes and Bali in the eastern "Australian" part. The short line depicts the Sarasin's "solution" to the problem which, however, has never been accepted by scholars.

The important thing for our story is to remember that the theory of evolution is not only a theory about the development of life in time. It is also a theory about the historical distribution of life in geographical space. It was this latter question Alfred Russel Wallace concentrated on mostly. He wondered how and why

animals spread out in geographical space the way they did. The most important explanatory factor for Wallace was to be found in geology. It was the rise and fall of oceans and continents, of deserts and mountains that explained why life on Planet Earth did not spread evenly but rather broke down in to particular geographical clusters. Wallace developed the central parts of his theory traveling through the island world of the Malayan archipelago. As he wrote in his 1869 travel account he eventually became aware of “the unexpected fact that they [these islands] are divisible in to two portions nearly equal in extent [...] and really form two parts of the primary divisions of the earth” (Wallace 2010 [1869], 2). While a north-western portion of the archipelago was inhabited by varieties of elephants, rhinoceros, wild cattle and birds that were also to be found in other parts of Asia the south-eastern portion possessed “no apes or monkeys, no cats or tigers, wolves, bears, or hyenas” etc. “Instead of these, it has Marsupials only: kangaroos and opossums, wombats and the duckbilled Platypus [...], the mound-making brush turkeys, the honeysuckers, the cockatoos, and the brush-tongued lorries” (Wallace 2010 [1869], 14). Wallace explained this (seemingly) clear zoogeographical division geologically. Asia and Australia had been separated a very long time ago. The islands of the archipelago did not constitute the remains of a former bridge between the continents, as it might seem at first sight. Rather the western islands were formerly connected to Asia and thus populated by ‘Asian’ animal species while the eastern parts were connected with and populated by the ‘Australian’ fauna. The line that supposedly separates Asia from Australia and runs through the archipelago came to be known as “Wallace’s line.”

Unfortunately for Wallace, Celebes did not fit into his scheme. According to his theory the island belonged to the ‘Austro-Malayan’ region. But not only did he find ‘Asian’ and ‘Australian’ birds there. He also found endemic species that did not exist anywhere else in the world, among them a “curious animal [...] the Babirúsa or Pig-deer” (Wallace 2010 [1869], 245) with slender legs and curved tusks resembling horns. These facts made it difficult for Wallace to neatly place Celebes in either the Asian or the Australian category. During his career he developed and dismissed several hypotheses to explain this anomaly. He never succeeded, the island remained “the most puzzling” (Wallace 1876, 389), “the most remarkable and interesting in the whole region, or perhaps on the globe” (Wallace 1876, 426) – in short: “absolutely unique” (Wallace 1880, 464).

Now let us return to the Sarasin brothers: When they arrived in Celebes in 1893 the island was thus at the center of a scientific controversy. “To solve such a problem seemed to us to be a worthy task” (Sarasin and Sarasin 1905, 2), they wrote, expecting great recognition and prestige among leading European naturalists. – One of the main obstacles for “solving” the problem at the time was that the Dutch empire in fact only controlled two very small coastal areas of the large island: Makassar in the Southwest and the Minahasa area in the Northeast. The interior parts of the island were unknown to Europeans.

They were governed by powerful Muslim Rajas<sup>3</sup> (kings) from the Bugi and Makassar societies (Pelras 1996). This meant that empirically Wallace's and other European naturalists' understanding of the island rested on rather limited data, collected mostly in the easily accessible coastal areas. The Sarasins sought to change this by systematically crisscrossing through different parts of the island in order to reconstruct its geological structures and to collect large quantities of animals and plants. This would allow them to create a much more nuanced understanding of the internal animal distribution patterns and internal geological varieties of the island (Sarasin 1896; Sarasin and Sarasin 1905).

In order to understand the political implications of the Sarasin's scientific expedition we need go local. For the Dutch, Celebes was part of the so called 'outer provinces'. The policy of the Dutch colonial state towards these islands was one of "abstention" (*onthouding*) (Kuitenbrouwer 1991, 88-123). This basically meant: They tried to rule the local Rajas on these islands indirectly through forcing them to sign contracts which would oblige them to entertain no commercial relationships with any other European powers but the Dutch. A small group of colonial officers was assigned to implement this policy with very limited resources, e.g. they did not have enough boats to entertain systematic diplomatic relationships with the plentitude of local rulers who usually resided in the coastal areas and along the great rivers. Also, they had very limited knowledge on how power was distributed among the different Bugi Kingdoms in the highlands. They also had no idea how densely the highlands were populated and what kind of natural resources were to be expected. The weakness of the Dutch colonial state in the outer provinces gave the Raja rulers advantages in their conduct with the Dutch (Schär 2013, ch. 6).

When the Sarasin brothers arrived on the island in 1893 the means of the colonial officers on this peripheral island increased considerably. Being extremely wealthy the Sarasin brothers rented up to 200 local carriers, cooks, guides and translators from the indigenous populations under direct Dutch rule in the Makassar and Minahasa area to accompany them in to the highlands. The Dutch were more than happy not only to recruit this staff for the Sarasin brothers. They also sent out their diplomats with command of the local languages to negotiate the right of passage for the Sarasin brothers with the Rajas. Furthermore they had some of their own colonial officers accompany the Sarasin brothers in to the highlands. On these occasions they were able to gather politically relevant information – most importantly about competing spheres of interest among different kingdoms in the highlands, about the density of population as well as about the topographical conditions in these hitherto unknown areas. In November 1903 the Sarasin brothers were honored with a medal from the Dutch queen in a ceremony in Amsterdam. In his speech the Dutch Coloni-

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<sup>3</sup> 'Raja' is the Malay term. Terms in local languages are 'Datu', 'Kolano', 'Mokole' (Henley 2004, 91).

al Minister said: “The Dutch Government will always welcome men as these, because they are the spearhead of civilization. They greatly facilitate the work of the Government” (Verslag 1914 [1913])<sup>4</sup>. What this meant became clear in 1905 when the Dutch colonial army invaded Celebes following the tracks the Sarasin brothers had ‘discovered’ and bringing all the populations of Celebes under direct Dutch rule.

Thus: Even though the Sarasin brothers were no Dutch citizens, had no imperial political ambitions in the strict sense of the term and were motivated primarily by scientific objectives their expeditions became an integral part of the political history of Celebes – and they themselves became agents of violent social change on that island.

Two broader conclusions might be drawn from this story: Firstly, it maybe does not always matter what kind of knowledge earth scientists produce. In Celebes the Dutch did not care much whether Celebes belonged to Asia or to Australia in geological or zoogeographical terms. They were more interested in using the Sarasin’s expeditions for their own political agenda. Secondly, although scientific goals and political goals are not identical they nevertheless belong to the same imperial invasive trajectory. In order to achieve their scientific goal, namely to collect systematic data which would allow them to ‘solve’ the Wallace problem, the Sarasin brothers were never prepared to respect the decisions of the local rulers the same way they respected the decisions of the Dutch rulers. Rather: When the Rajas told them they could not continue their journey the Sarasin brothers forced their way through and were happy that the Dutch assisted them. At one point the Dutch sent a canon boat and 300 infantry soldiers from the Dutch colonial army to break the resistance of a local ruler (Schär 2013, ch. 6). Thus: (universal) scientific ambitions and local political ambitions mutually supported each other in the field.

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## 2. Towards a Transnational Understanding of (the Dutch) Empire

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As Pierre Bourdieu, Bruno Latour and many other classic authors on the history and sociology of science have pointed out, modern scientists do not work as isolated individuals. Rather they usually come in swarms of a particular kind: They are competitors and partners in a “social game”, as Bourdieu (1991) put it. At the center of the game is a common problem – in our case: the problem of how to find the geological and zoogeographical boundary between Asia and Australia. In order to solve such problems scientists mutually depend on each

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<sup>4</sup> Original: “Zulke mannen [...] zijn der Regeering steeds welkom, omdat zij baanbrekers der beschaving zijn en het werk der Regeering zeer vermakelijken.”

other. Their colleagues need to sustain the common belief that this scientific problem is interesting enough to invest time, energy and money to solve it. As such they are partners in this game. At the same time they are also competitors because they mutually criticize each other's efforts of problem solving on methodological, empirical, epistemological and other grounds – in order to advance their own particular solutions to the problem. Looking at the Sarasin-expeditions from this point of view we can ask: who were their partners and competitors in the 'Wallace game'?

**Table 1:** Publications Quoted in Vols. 1-3 from Sarasin (1898-1905)

Volume 1	Total References: 31
German	21
French	5
English	3
Dutch	2
Volume 2	Total References: 113
German	82
English	15
French	14
Italian	2
Volume 3	Total References: 222
English	123
German	84
Dutch	7
Italian	5
French	3

Source: Figures taken from Schär (2013, ch 6).

One of the most interesting answers to that question is: The Sarasin brothers were part of a particular transnational group of naturalists who interacted in this 'game.' These naturalists were based not only in the Netherlands, where we would expect them, but also in Germany, in Switzerland and in Alfred Russel Wallace's home country: Great Britain. There are different ways to come to this insight: One is to ask which other authors the Sarasin brothers referred to in the five volumes they wrote on the natural history of Celebes (Sarasin and Sarasin 1898-1905). Depending on the particular subject of the volume – the first two volumes dealt with mollusks, the third with geology, the fourth with geography and the fifth with anthropology – the composition of national backgrounds of the authors varies. What stays the same, however, is the fact that the vast majority of these authors usually came from the same three countries: The Netherlands, Germany, Britain – the rest are usually Swiss, French and Italian. A similar conclusion can be drawn if we look at the references of other, German or Dutch, authors. We always arrive at the same pattern, which by the way seemed to continue well in to the twentieth century. German American biologist Ernst Mayr – considered to be one of the most eminent scholars of his field in the twentieth century – published an article on Wallace's line in 1944. He



quoted twenty-five books and articles, ten of which were authored by Dutch, eight by British and US, five by German authors, as well as one Swiss (the Sarasin brothers) and one Belgium scholar (Mayr 1944).

What these numbers indicate to me is the following: Scientific exploration of the Dutch East Indies was far from being the subject of a uniquely Dutch scientific debate. On the other hand: It would also be wrong to characterize the Wallace debate as subject-matter of ‘western’ or ‘European’ science given the (almost) complete absence of e.g. Iberian, Scandinavian and eastern European scholars. Rather, it seems to me that the Wallace debate was structured by a particular cultural geography: It was a debate among scholars from largely protestant countries with languages which were relatively easy to learn for many of these scholars: German, Dutch and English. As a consequence many of the legacies of the Dutch Empire in the East are not only to be found in the Netherlands but also in many non-Dutch scientific institutions such as the geographical society in Berlin, the natural history museum in Basel – to name only a few. This might lead us to what could be called a transnational understanding of (Dutch) Empire.

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### 3. Tropicalizing Pre-History – Pre-Historicizing the Tropics

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One of the ‘discoveries’ the Sarasin brothers were most excited about was the one of ‘pre-historic’ lake dwellers in the highlands of Celebes near the lake Matana. Their excitement had a lot to do with them being Swiss. Archaeological and paleontological surveys had discovered remains of Lake Dweller settlements in Swiss lakes in the 1850s (Kaeser 2004). This discovery coincided with the emergence of geology as science on the history of the earth. Analyzing the soil surrounding human remains (bones, instruments, pieces of pottery etc.) in these lake settlements led to the conclusion that human life on earth dated back to much older periods than the bible proclaimed. This was strong evidence for Darwin’s theory of evolution. Together with similar findings from other parts of the world it actually led one of Darwin’s most skeptical friends, Charles Lyell (1797-1875) who is considered to be one of the founding pioneers of geology,<sup>5</sup> to reassess his position. While he originally rejected the idea that the principles of evolution were applicable to humans for religious reasons he, in 1863, embraced the idea (Trautmann 1992). He dedicated almost the entirety of the first chapter of his book on “Geological Evidence on the Antiquity of Man” to

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<sup>5</sup> The first volume of his ground breaking “Principles of geology” appeared in 1830.

Swiss lake dwellers (Lyell 1863). In fact he even used an illustration made by Swiss archaeologist Ferdinand Keller as a cover for his book.<sup>6</sup>

The important point to note is that the debate on the “Antiquity of man” (Lyell 1863) among naturalists in the wake of Darwin’s theory of evolution was strongly inspired by travel accounts from the Pacific. As a matter of fact Swiss archaeologist Ferdinand Keller’s illustration of pre-historic lake dwellers in Switzerland was an adaptation of a sketch he found in the work of French traveler Jules Dumont d’Urville (1790-1842) of Papua settlements in New Guinea.

**Figure 2:** Settlement in the Matana Lake



Photograph taken by the Sarasin brothers in 1895 (Museum der Kulturen Basel).

**Figure 3:** “A Village Built on Piles in a Swiss Lake”

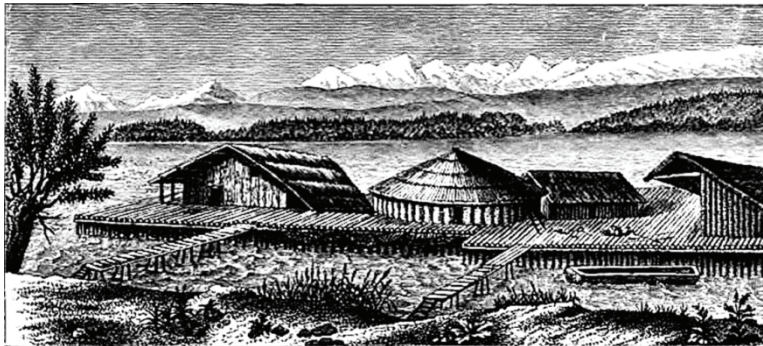
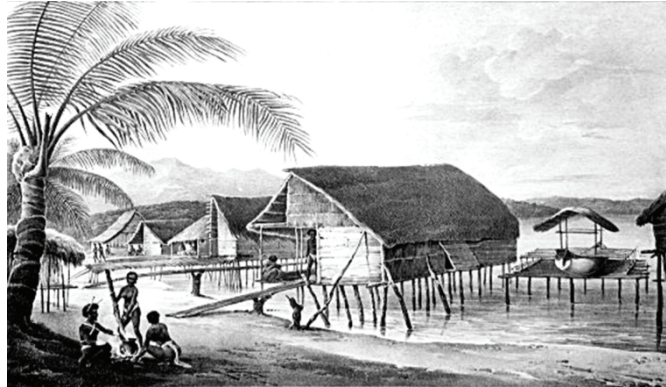


Plate from Lyell (1863). Note the strange roof on the right.

<sup>6</sup> I am indebted to Patrick Kupper for pointing this out to me. He developed the implications of the geological ‘discovery’ of ‘primitive man’ in his inaugural lecture at the Federal Institute of Technology Zurich in 2012 (Kupper2012).

Figure 4: Settlement in New Guinea



This plate of Jules Dumont d'Urville depicting a settlement in New Guinea served as an inspiration for Ferdinand Keller's view of pre-historic lake dwellers in Switzerland. Note the roof of the house in the center.

The general idea behind these debates thus was that pre-historic humans in Europe lived in a time and an environment, which could still be found in the tropics. Or, to put it differently: contemporary 'civilized' Europeans were separated by thousands of years of technological and cultural development from their contemporaries in the tropics. Authors such as Edward Said (1978) and Johannes Fabian (1983) described this way of thinking as one of the main features of colonial ideology. By constructing non-European 'others' as 'backward' opposites of a progressive European 'self', so the argument goes, these discourses implicitly justified imperial ambitions of European powers overseas. Looking at the case at hand it is interesting to note that this way of thinking was not restricted to "How Anthropology makes its Object," to use Fabian's famous line from the subtitle of his book. Much rather this thinking was embedded and sustained by natural history and particularly by the early emerging earth science disciplines such as geology and paleontology.

This becomes clear by looking at one of the most influential nineteenth century geologists, paleontologists and botanists in Switzerland, Oswald Heer (1809-1883). He corresponded, among others, with Darwin and Lyell (Burga 2013). While his main research area was the Alps, he also published on fossils from Sumatra. Only two years after Lyell's book, he published a monograph, which became extremely popular in Switzerland and was translated in 1876 in to English as *The primaeval world of Switzerland* (Heer 1876). Analyzing animal and plant fossils discovered in the Alps, Heer developed a vivid image of what Switzerland must have looked like before the ice age. Interestingly it looked, according to Heer 1865, just like the tropics: a world with palm trees, bamboos and coral reefs.

Figures 5, 6: Basel and the Jura Area a Long, Long Time Ago



Plates in Heer (1876).

The point is: Earth scientists working in Europe and in the European tropical colonies mutually inspired each other's understanding of their research subjects. While paleontologists studying fossils in the Swiss Alps discovered a 'tropicalized' (Arnold 2006) prehistory, field scientists like the Sarasin brothers in Celebes discovered a 'prehistoricized' tropical 'nature' in the widest sense of the term. Scholars like Oswald Heer 'discovered' not only skulls, remains of "primitive" instruments (made out of stones and animal bones), but also ferns and palm trees and strange looking animals which had become extinct in Switzerland a long, long time ago – but were still alive in the tropics. Scientists like the Sarasin brothers felt they were studying living versions of plants, animals and peoples which had survived in a kind of frozen time-sphere from the earliest of times. Travelling through space for those scholars was thus like travelling through time. And reconstructing distant European pasts was like travelling through space.

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#### 4. Conclusion

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My case study thus supports recent claims made by science and global historians. Namely to see earth (and other natural) scientists in the nineteenth and early twentieth century as a transnationally connected community, working in different local sites. Their impact on social change depended on the particular

local contexts. They nevertheless mutually inspired each other in interpreting their data in order to reach a common understanding of the entire globe. This understanding of “planet earth” showed imprints of colonial ideology regardless of whether they were working “here” or “there”.

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## 5. Post Scriptum

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The Sarasin’s ‘solution’ to the Wallace-problem was original: Wallace’s line was a purely conceptual fantasy, they claimed (Sarasin 1900). Nature knew no sharp boundaries, only gradual continuities. Geological structure and animal distribution on Celebes indicated that there used to be land connections to Java and Sumatra in the Southwest and the Moluccan Islands and New Guinea in the East. ‘Asia’ and ‘Australia’ thus used to form a single landmass. Unfortunately, for the Sarasin brothers, they were not able to convince Alfred Russel Wallace. When they sent him their book in 1901 he wrote back thanking them most kindly: “Alas, I don’t read German!” (State Archive Basel, PA 212a T 2 X 86). Subsequent earth scientists continued looking for boundaries rather than continuities. They have since found several new lines.

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