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CHARLES DARWIN, ROBERT FITZROY AND SIMÓN RODRÍGUEZ

MET IN CONCEPCIÓN, CHILE, AFTER THE EARTHQUAKE

OF FEBRUARY 20, 1835

Guillermo Whitembury, Klaus Jaffé, Cesia Hirshbein and David Yudilevich

SUMMARY

Simón Rodríguez (SR) was in Concepción during the earthquake of Feb 20 1835 that destroyed the city. A month later, he and two other dwellers were asked for a report on the state of the city. The report, dated Aug 13, 1835 mentions: "FitzRoy Esq. noted that the Island of Santa Maria was upheaved 9 feet after the earthquake". The same value appears in the reports of Robert FitzRoy (FR) and Charles Darwin (CD). CD and FR visited Concepción Mar 4-7, and RF Mar 27-Apr 17 and Jun 21-Jul 9, 1835. There was no possibility of communication between the three men later in 1835, as SR stayed in Concepción, and CD and FR continued their voyage. The reports of RF and CD were published only in 1839. Therefore, for their values of the island's

elevation to coincide, the three must have talked and exchanged ideas and views about the earthquake within the mentioned dates. This statement is supported by additional facts: FR and CD were hosted by a friend of SR during their visits. They mention having talked extensively with the inhabitants. SR was one of the most learned persons at the time in Concepción. SR's and CD's reports converge in several aspects. In others, however, the reports differ, although this does not weaken our assertion. Thus, it is quite possible they maintained conversations previous to their reports, setting their ideas in agreement, although it cannot be ruled out completely that SR got CD's and FR's information via another person.

RESUMEN

Simón Rodríguez (SR) estaba en Concepción durante el terremoto de febrero 20, 1835, que destruyó la ciudad. Un mes después le fue solicitado, junto a otros dos moradores, un informe sobre el estado de la ciudad. El informe, fechado agosto 13, 1835 menciona que FitzRoy Esq. notó que la Isla de Santa María fue levantada 9 pies tras el terremoto. Igual valor aparece en los informes de Robert FitzRoy (FR) y Charles Darwin (CD). CD y FR visitaron Concepción entre 4 y 7 de marzo, y RF en marzo 27 a abril 17, y junio 21 a julio 9, 1835. No hubo posibilidad de comunicación entre los tres hombres más adelante en 1835, pues SR quedó en Concepción, y CD y FR continuaron viaje. Los informes de RF y CD fueron publicados en 1839. Por ello, para

que coincidieran los valores de elevación, los tres han debido hablar e intercambiar ideas y vistas acerca del terremoto entre las fechas mencionadas. Esta afirmación está apoyada por hechos adicionales: FR y CD fueron hospedados por un amigo de SR durante sus visitas y mencionan haber hablado extensamente con los habitantes. SR era una de las personas más ilustradas de la época en Concepción. Los informes de SR y CD convergen en varios aspectos. En otros, sin embargo, los informes difieren, aunque ello no debilita nuestra afirmación. Es muy posible que ellos mantuvieron conversaciones previas a sus informes, poniendo en acuerdo sus ideas, aunque no se descarta por completo que SR obtuvo información de CD y FR por vía de otra persona.

The naturalist Charles Darwin and Captain Robert FitzRoy circumnavigated the globe on board the Beagle from 1832 to 1836 (Darwin, 1839, 1988; FitzRoy, 1839; Keynes, 2002). The present paper shows as highly possible that Darwin, FitzRoy and the Venezuelan polymath

Simón Rodríguez (Salcedo-Bastardo, 1997 and references therein), pioneer in promoting general education and the instruction of the natural sciences and practical work to both boys and girls in the Americas; and teacher, tutor and mentor of Liberator Simón Bolívar (Uslar Pietri,

1997 and references therein), met, conversed extensively and influenced each others thoughts in Concepción (Chile), between Mar 4 and Jul 9, 1835 after the earthquake that had destroyed that city and Talcahuano.

This paper i) outlines Rodríguez' life until he arrived

in Concepción in 1834, and his relation to Bolívar; ii) describes the earthquake of Feb 20, 1835 and Darwin and FitzRoy's visits weeks later; iii) compares the respective reports of Rodríguez, Darwin and FitzRoy that lead us to conclude that they met and exchanged ideas about the

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Simón Rodríguez (SR) estava em Concepción durante o terremoto de fevereiro 20, 1835, que destruiu a cidade. Um mês depois lhe foi solicitado, junto a outros dois moradores, um informe sobre o estado da cidade. O informe, fechado agosto 13 1835, menciona que FitzRoy Esq. notou que a Ilha de Santa María foi levantada 9 pés depois do terremoto. Igual valor aparece nos informes de Robert FitzRoy (FR) e Charles Darwin (CD). CD e FR visitaram Concepción entre 4 e 7 de março, e RF em março 27 a abril 17, e junho 21 a julho 9, 1835. Não houve possibilidade de comunicação entre os três homens mais adiante em 1835, pois SR ficou em Concepción, e CD e FR continuaram viaje. Os informes de RF e CD foram publicados em

1839. Por isso, para que coincidissem os valores de elevação, os três devem ter falado e trocado idéias e vistas sobre o terremoto entre as datas mencionadas. Esta afirmação está apoiada por fatos adicionais: FR e CD foram hospedados por um amigo de SR durante suas visitas e mencionam haver falado extensamente com os habitantes. SR era uma das pessoas mais ilustradas da época em Concepción. Os informes de SR e CD convergem em vários aspectos. Em outros, no entanto, os informes diferem, ainda que isto não debilita nossa afirmação. É bem possível que eles mantiveram conversas prévias a seus informes, pondo em acordo suas idéias, ainda que não se descarta por completo que SR obteve informação de CD e FR por via de outra pessoa.

earthquake and its consequences; and iv) overviews Rodríguez' activities until his death, since the lives of Darwin and FitzRoy are better known.

Simón Rodríguez between 1791 and 1834.

His Relation to Bolívar

Simón Rodríguez was born in Caracas in 1769. He became a Schoolmaster in 1791 (Salcedo-Bastardo, 1997). The boy Bolívar was sent to his school as a day pupil in 1792 and as a full boarder in Rodríguez' home in 1795. Bolívar, born in 1783, had lost his father in 1786 and his mother in 1792 (Uslar Pietri, 1997). Rodríguez' endless intellectual curiosity is shown in his writings, which will be mentioned along. "Reflections about the actual state of the School and its new establishment" (Rodríguez, 1794) is an original, penetrating and imaginative criticism of colonial education. Because of his revolutionary ideas favoring Venezuela's independence, he had to leave the country in 1797, never to return. He moved first to Jamaica, changing his name to Samuel Robinson, then to the United States of America until 1800, when he travelled to France and translated *Atala* by F. R. Chateaubriand, that had just been published, into Spanish (Rodríguez 1801). In Paris, in 1804, he met again the then 21 year old Bolívar and was decisive in the latter's com-

mitment to politics. They traveled together to Italy. In Rome, Bolívar swore solemnly to dedicate his life to Spanish América's independence (Rodríguez, 1850). They would meet again 20 years later. From 1806 to 1823, Rodríguez lived in Italy, Germany, Prussia, Poland, Russia and finally in England, where he met again his countryman Andrés Bello, after 26 years. In 1823, Rodríguez returned to South América by way of Colombia, reassumed his name of Simón Rodríguez, and established a Workshop-School in Bogotá (Salcedo-Bastardo, 1997).

Spanish América became independent from the Spanish Crown in Dec 1824. In 1825, Liberator Bolívar, at the top of his powers after having achieved the independence of Venezuela, Colombia, Ecuador, Perú and Bolivia, invited Rodríguez to move from Colombia to Ecuador in order to establish a general education system in the newly established republics. There, Rodríguez taught Agriculture and Botany, and proposed to the government a visionary "Colonization plan for the Eastern part of Ecuador". Later that year, Bolívar asked Rodríguez to come to Perú, and requested that Rodríguez should accompany him to inspect Southern Perú and Bolivia, as an advisor in his Cabinet. In Bolivia Rodríguez was appointed Director of Public Education, as well as General Director of Mining, Agriculture and Public roads, in Nov,

1825. In Jan, 1826 Bolívar returned to Perú while Rodríguez stayed in Bolivia and established in 1826 a system of practical workshop-schools. Unfortunately, Rodríguez and Bolivia's President Marshal Sucre (also a Venezuelan) had disagreements. As a consequence, in 1826, Rodríguez resigned his positions and moved to Arequipa (Perú), where he published "American Societies in 1828, how they will be and could be in the coming centuries" (Rodríguez, 1828), stressing the need for original solutions for the problems of Spanish America. There he also published "Observations about the land of river Vincoyaya, in relation to the plan to deviate its waters from its natural course and transport them by the river Zumbai into the Arequipa" (Rodríguez 1830a), a technical work dealing with engineering, nature conservation, economy and society, and "The Liberator of South America and his comrades in arms defended by a friend of the social cause" (Rodríguez, 1830b). This book defending Bolívar, in manuscript form since 1828, was only published in Jan, 1830. Bolívar died alone and destitute in Colombia in Dec, 1830. Rodríguez and Bolívar never met after 1826 (Salcedo-Bastardo, 1997; Uslar Pietri, 1997). Rodríguez moved to Concepción (Chile) in 1834, invited by his friend José A Alemparte, Intendant of the Province of Concepcion, to improve public education. There he estab-

lished a school and published "Lights and social virtues" (Rodríguez, 1834).

The Earthquake

When the tremors were felt, on Feb, 20 1835, Rodríguez was busy at his school in Concepción. FitzRoy and Darwin had entered the Pacific Ocean, from the Atlantic, through the straight of Magellan, and were in the environs of Valdivia (Darwin, 1839, 1988; FitzRoy, 1839; Keynes, 2002). Valdivia is located some 350km S of Concepción.

FitzRoy describes the earthquake as follows: "At 10 in the morning of the 20th of February, very large flights of sea-fowl were noticed, passing over the city of Concepción, from the sea coast, towards the interior: and on the minds of old inhabitants... surprise was excited by so unusual... change in the habits of those birds, no... approaching storm being visible... At forty minutes after eleven, a shock of an earthquake was felt, slightly at first, but increasing rapidly. During the first half minute, many persons remained in their houses; but then... the alarm became general, and... all rushed into open spaces for safety. The horrid motion increased... buildings waved and tottered... Suddenly an awful overpowering shock caused universal destruction... and in less than six seconds the city was in ruins. The stunning noise of falling

houses; the horrible cracking of the earth, which opened and shut rapidly and repeatedly in numerous places... the... outcries of the people; the stifling heat; the blinding, smothering clouds of dust; the utter helplessness and... extreme horror, can neither be described nor fully imagined. This fatal convulsion... lasted... nearly two minutes, with equal violence. No one could stand unsupported; people clung to each other, to trees, or to posts. Some threw themselves on the ground;... poultry flew about screaming wildly. Horses and other animals were greatly frightened, standing with their legs spread out, and their heads down, trembling excessively... Persons riding at the time of the great shock,... some, with their horses, were thrown to the ground; others dismounted, but could not stand... Between the 20th of February and the 4th of March... more than three hundred shocks were counted..." (FitzRoy, 1839, pp. 402-406; cf. Caldcleugh, 1836). Concerning the earth cracks, Darwin complements our idea of the magnitude of the earth quake when he states "...some of the long fissures in the N & S direction were one yard (~0.9m) wide" (Darwin, 1839, cf. Caldcleugh, 1836).

FitzRoy informs about the three great waves invading Talcahuano after the earthquake, from the descriptions of Talcahuano's inhabitants. The Bay (and town) of Talcahuano (73°06'W, 36°44'S), with the small island of Quiriquina at its entrance, is 12km N of Concepción. In FitzRoy's words: "At Talcahuano the great earthquake was felt... as in Concepción... About half an hour after the shock,... the sea having retired so much, that all the vessels at anchor, even those which had been lying in seven fathoms (~14m) water were aground and every rock and shoal in the bay was visible,... an enormous wave was seen forcing its way through the western passage

which separates Quiriquina Island from the mainland. This terrific swell passed rapidly along the western side of the Bay... sweeping the steep shores of every thing moveable within thirty feet (vertically; i.e ~10m) from high water-mark. It broke over... overflowed the greater part of town, and then rushed back with such a torrent that every moveable... was carried out to sea. In a few minutes, the vessels were again aground, and a second great wave was seen approaching, with more noise and impetuosity than the first... Again the sea fell, dragging away... woodwork and... materials of houses, leaving the shipping aground... After some minutes of awful suspense, a third enormous swell was seen between Quiriquina and the mainland, apparently larger than either of the two former. Roaring, it rushed... destroying... along the shore. Quickly retiring,... the retreating wave dragged away such quantities... that after the tumultuous rush was over, the sea was... covered with wreck. Earth and water trembled: and exhaustion appeared to follow these mighty efforts" (FitzRoy, 1839, pp. 402-406).

The Three Reports Coincide

One month after the earthquake, José A. Alemparte asked Simón Rodríguez, Ambrosio Lozier and Juan José Arteaga for a formal report on the state of the city of Concepción and its surroundings, that was published on Aug 13, 1835. It is titled "Report presented to the Intendancy of the Province of Concepción, by Ambrosio Lozier, Simón Rodríguez and Juan José Arteaga, nominated to recognize the city of Concepción and its surroundings after the earthquake of February 20, 1835" (Rodríguez, 1835) and denoted herein as "Rodríguez' report". In the report it is stated that, after the earthquake "... according to the measurements made by FitzRoy Esq, Cap-

tain of the English Corvette The Discoverer, the sea floor elevated 7 to 8 feet in Tubul and 9 feet around the Island of Santa María that is 8 leagues (~40km) from the coast" (*ibid.*, p. 492). Tubul is a nearby river and the reference is to the altitude above sea level at the river mouth. Rodríguez had the wrong name of FitzRoy's ship, since actually, FitzRoy commanded the Beagle during the whole circumnavigation trip (1832-1836) and had the Adventure in part of it (Darwin, 1839; 1988; FitzRoy, 1839; Keynes 2002). However, Rodríguez had the right value for the elevation of the Island of Santa María and Tubul, which is the information central to our assertion. The Island of Santa María (73°31'W, 37°03'S, ~10-15km N-S by ~6-8km E-W is located 50km SW of Concepción, and 30km W from the coastal locality of Coronel. Therefore, Rodríguez' estimate of 8 leagues is correct. The island is sadly famous for the horrid stories described by Captain Amasa Delano (1763-1823) in his "Narrative of voyages and travels, in the northern and southern hemispheres" (Delano, 1817), which served H Melville (1819-1891), of Moby Dick's fame (Melville, 1851), for his story "Benito Cereno" (Melville, 1856).

The central questions of this paper are: How and where did Rodríguez, Lozier and Arteaga obtain FitzRoy's information about the upheaval of the Island of Santa María; why are there so many coincidences in Darwin's and Rodríguez' report? The 9ft value about the elevation of the Island is in FitzRoy's and Darwin's respective reports (Darwin, 1839; FitzRoy, 1839). FitzRoy and Darwin arrived to the area of Talcahuano and Concepción, and visited Concepción from 4 to 7 Mar, 1835. Darwin left on Mar 7. FitzRoy, however, returned to the area from Mar 27 to Apr 17, when he took the measurements about the uplift of the Island of Santa

María. FitzRoy was there for the last time from Jun 21 to Jul 9, busy with the rescue of the Challenger's crew, but he mentions visiting Talcahuano and Concepción and talking with the inhabitants (FitzRoy, 1839; Darwin, 1988; Keynes, 2002). FitzRoy writes "Santa María was upheaved 9 feet. It appeared that the southern extreme of the Island was raised 8 feet, the middle 9, and the northern end upwards of 10 feet" (~2.4, ~2.7 and ~3.0m, respectively)... The Beagle visited this Island twice -at the end of March and in the beginning of April: at her first visit it was concluded, from the visible evidence of dead shell-fish, water marks, and soundings, and from the verbal testimony of the inhabitants, that the land had been raised about eight feet"... However, on returning to Concepción, doubts were raised; and to settle the matter beyond dispute, one of the owners of the island, Don Salvador Palma, accompanied us the second time... A. Vogelborg was also passenger in the Beagle. Riding around the island afterwards, with Don Salvador and Vogelborg, I took many measures in places where no mistake could be made... At Tubul, to the south-east of Santa María, the land was raised six feet..." (FitzRoy, 1839, pp. 412-414). FitzRoy and Darwin's reports were published in 1839. Between the dates of the visits of FitzRoy and Darwin and Aug 13, 1835, date of publication of the report of Rodríguez *et al.* in 1835, there was no possibility of communication between Darwin, FitzRoy and Rodríguez, other than the conversations we are suggesting, because Rodríguez stayed in América while Darwin and FitzRoy navigated the Pacific.

We infer that Rodríguez, FitzRoy and Darwin must have conversed while the three were in Concepción, because the value given in Rodríguez' report is the same as that of the reports of FitzRoy and Darwin. The following

additional pieces of information reinforce our assertion: 1) Darwin, FitzRoy and Rodríguez were fluent in English and Spanish; 2) FitzRoy and Darwin describe having extensively talked with Concepción's residents; 3) Rodríguez was certainly one of the residents with wider knowledge in Concepción at that moment. FitzRoy and Darwin were often hosted, despite the difficult circumstances prevailing, by Rodríguez' friend José Alemparte (Darwin, 1839; 1988; FitzRoy, 1839); thus, there is a high probability that they met there. 4) Comparison of Rodríguez (1835) and Darwin (1839) reports show conspicuous coincidences between their intellects: a) They analyze in a similar way the geometry and direction of the telluric wave movements, and the effects on buildings according to the angle of impact. b) Their appreciations on the origin of volcanoes and of other aspects of their reports are close. All these points lead us to think that previous and extensive conversations set their ideas in concordance, although this could only be a chance occurrence.

It should however be pointed out that not all aspects of their respective reports agree. There are important differences between them, which in no way weaken our assertion. Rodríguez' report is more technical with a broader scope; it describes geological, climatic, forestry, health and general ecological aspects related to Concepción in general, emphasizing in aspects of practical usefulness as was requested by Alemparte, having a further reconstruction of the city in mind. Rodríguez' report reminds his already quoted "Observations about the land of river Vincocaya..." (Rodríguez, 1830a), which had a heavy stress in nature conservancy in relation to economy and society. On the other hand, Darwin centers his report on a more geographical and geological description with inferences

about the native population, looking in much more detail than Rodríguez on the primary nature and effects of earthquakes. Although it is highly probable that he, Darwin and FitzRoy conversed, we cannot rule out the possibility that the information in Rodríguez' report was given to him by a third party. Messrs Palma and Vogelborg; Rodríguez' collaborators in the report, Messrs Lozier and Arteaga and the British consul, Mr. Rouse, are likely candidates.

Epilogue

At the end of her circumnavigation trip of almost 5 years, the *Beagle* anchored in England. She was paid off mid November, 1836 (Darwin, 1839, 1988; FitzRoy, 1839; Keynes, 2002). Darwin's and FitzRoy's observations on the 1835 earthquake were quickly forgotten after Darwin's lecture to the Geological Society on Mar 7, 1838 (Darwin, 1840). It was only when the theory of plate tectonics became prominent, in the 1960s, that it was seen how right Darwin had been all along (Condie, 1997; Keynes, 2002).

FitzRoy was made Fellow of the Royal Society in 1851, for his eminence in hydrography, nautical astronomy and geography, and is considered the father of meteorology in Great Britain. Promoted to Vice Admiral, he died in 1865 at the age of 59 (Keynes, 2002).

Darwin, whose genius revolutionized the science of Biology, received many honors. His *Journal and Remarks* (Darwin, 1839), was reissued many times as *Journal of Researches*. He published among many immortal works, *The Zoology of the Voyage...*, *The Geology of The Voyage...*, *On the origin of species...* He died at the age of 73 in 1882 and rests in Westminster Abbey, London (cf. Keynes, 2002).

Rodríguez certainly experienced the second earthquake that shook Concepción on

Nov 11, 1835 (Darwin, 1840). Rodríguez moved to Santiago de Chile in 1837, where he met again Andrés Bello, who had arrived in Chile in 1829, was made by Congress a Chilean citizen (1832), a Senator-for-life (1837), the first Chancellor of Universidad de Chile (1842) and died in 1865 at the age of 84 year (Grases, 1997). Rodríguez continued to be as active as ever. When he was 71 years old, he reedited "Lights and social virtues" (Rodríguez, 1840a) and a "Summary of his Defense of Bolívar" (Rodríguez 1840b). In Lima, he reedited "American Societies in 1828..." (Rodríguez, 1842). In 1843 on his way to Ecuador he visited in Paita, Perú, Bolívar's mistress Manuelita Sáenz, who was to die in 1856 in poverty and need (Parra Pardi, 1997). He published, when he was 80, his "Extract of my work on Republican Education" (Rodríguez, 1849). He died in Amotape, Perú, very near Paita at the age of 85, in 1854.. His remains, ceded by the Peruvian government to Venezuela in 1954, are inhumed in the Panteón Nacional, Caracas (ME, 1955, Salcedo-Bastardo, 1997).

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