

**Statement presented on behalf of Chile in reply to the Argentine Report submitted to the Tribunal, constituted by H.B. Majesty's government acting as arbitrator in pursuance of the agreement dated April 17, 1896.**

Chile.

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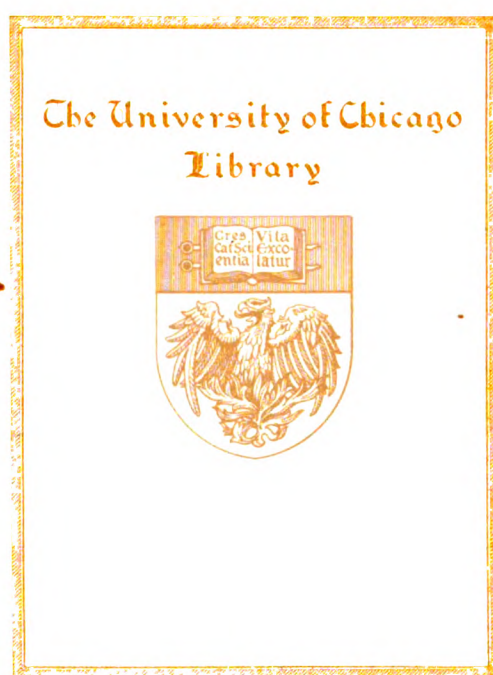
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## APPENDIX TO CHILEAN STATEMENT



*Chile*  
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APPENDIX  
to the  
STATEMENT  
presented on behalf of  
CHILE  
in reply to the  
ARGENTINE REPORT  
submitted to the  
TRIBUNAL constituted by H.B. MAJESTY'S GOVERNMENT  
acting as  
ARBITRATOR  
in pursuance of the Agreement dated  
April 17, 1896

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*Spencer*

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No. 61.

**Report of the Chilean Commissioner on the  
REVISION OF THE SAN FRANCISCO LANDMARK.**

[Translated from Bertrand's "*Estudio Técnico*," Docs. pp. 128-132.]

(Quoted on page 522 of the Statement.)

*The Chilean Assistant Commissioner to the Chilean Expert.*

SANTIAGO, May 10, 1894.

MR. EXPERT,—

In compliance with the instructions of January 1st of the present year, issued to the Sub-Commissions of the north, I have the honour of informing your Excellency of the work of revision carried out in the region of the boundary and outside of it, and of the results obtained from the said revision.

In accordance with the spirit of the Instructions, it was the Argentine Sub-Commission which formulated the scheme of the works which were carried out, the Chilean Sub-Commission confining itself to concurring in the material execution of same.

These works were the following :

At the Vega de San Francisco, a base-line of 2515 metres was measured and the situation of two high summits towards the east, and distant from one another 5323 metres, was thereby determined.

These two points constituted a fresh base and by means of these stations and of the extremities of the basis measured, all the visible summits were determined, which, in their turn,

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served to determine a fresh base, or side, to the west of the San Francisco Pass, and the latter side, in its turn, served to determine fresh summits.

Continuing in a similar manner as far as the ridge of Santa Rosa or Maricunga, three more sides, and all the summits which could be sighted from their extremities, were fixed.

Besides, from each station point, photographic views of the whole horizon were taken.

In the Argentine camp as in the Chilean, several observations were made to determine the latitude and longitude of the various places, connecting them with the extremities of the base measured.

In order to connect the latter with the San Francisco Gap, the survey of a polygonal line was made, which, starting from one of the extremities of the base, ended at the landmark erected on April 15, 1892, by Señores Bertrand and Diaz.

The sides of this line were measured with a chain and the angles with the compass.

In addition, some hypsometric observations were made in both camps, at the San Francisco Gap, at Las Peladas Pass, at that of Maricunga, and at other points.

Such were, Mr. Expert, the works proposed by the Argentine Engineers and carried out by both Commissions in common.

The result of the first works, and even more, the mere inspection of the ground in the vicinity of the San Francisco Pass, is to be found stated in the Record of March 7 last,<sup>1</sup> and confirms, throughout, the Record of April 15, 1892, as to the location of the landmark erected at that time by the Chilean-Argentine joint Sub-Commission: that is to say, that the said landmark has been erected on the San Francisco Gap, and that the two main basins separated by the latter are that of Laguna Verde on the side of Chile, and that of the Vegas de San Francisco on the side of the Argentine Republic.

<sup>1</sup> Document No. 60.

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In view of this result, in complete accordance with the existing agreements of the Experts, the Chilean Sub-Commission believed the case, foreseen in the Instructions of 1st of January, had arisen, to wit : to consider the investigations at an end, and to commence the works of demarcation, following towards the south. The Argentine Assistants did not accept, however, the opinion of the Chilean Sub-Commission, and made, in the Record to which I have referred, the decisive declaration that, in spite of the results obtained by the revision, they believed that the landmark erected by the joint Commission of the year 1892 was not planted in conformity with the Boundary Treaties.

Although they were invited to do so, the Assistants did not give us their grounds for such a declaration, which involves a direct charge against the joint Commission of the year 1892, of which one of the Argentine Assistants who now subscribes to this declaration, formed part.

They moreover requested our concurrence in carrying out the surveys as far as the Santa Rosa or Maricunga ridge, situated some 25 leagues, more or less, west of San Francisco Pass, and therefore outside the region of the boundary.

The undersigned observed that such surveys, not being pertinent to our mission, delayed to no purpose the demarcation of the boundary which, according to Article VII. of the Protocol of May, 1893, must be the principal object of the Expert's Commission. Moreover, as there existed good maps of the locality, the sketch or rough survey we were making would be of very little scientific value. I yielded, however, to the insistence of the Argentine Engineers, in the interest of the good understanding which always existed between both Commissions.

In order to prove that the landmark, to which the Record of 15th of April, 1892, refers, was erected in conformity with the agreements of the Experts and with the stipulations of the Boundary Treaty, I shall quote, first of all, a part of the

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Record of April 29, 1890, signed by both Experts, which textually says the following :—" It was agreed that a joint Commission of Assistants should be entrusted next dry season with the demarcation of the boundary from the Portezuelo or Pass of San Francisco, which is situated between the 26th and 27th parallels of south latitude, and proceed from this point southwards." Quoted  
p. 424.

And the same Record also adds : " That, in fixing on the *San Francisco Pass* the initial point for the boundary work, they do not mean to imply that this place is the northern extremity of the frontier which separates Chile from the Argentine Republic, but that *it is a point of the said frontier.*" Quoted  
p. 424.

These agreements, or declarations of the Experts, served as a basis for the instructions which, under date of the 24th of February, 1892, were issued to the Sub-Commissions of the north.

It may now be noted that, in the Record of April 15, 1892, as in the Record of March 7 of the present year, it appears that the landmark erected at that time is to be found planted at the spot called Pass or Gap of San Francisco, and that its latitude, 26° 52' 45", falls, besides, within the boundaries of latitude given in the Record of the Experts.

There is no doubt whatsoever, therefore, that the joint Commission of 1892, when fixing on the ground the starting-point of the demarcation of the boundary, acted in conformity with instructions given by joint accord and in writing by the Experts.

The agreement of the Experts to commence the work of the demarcation on the San Francisco Pass, and the precise declaration that the latter is, according to Article I. of the Treaty of 1881, a point of the frontier between Chile and the Argentine Republic, are based upon the preliminary survey made by them of that part of the Cordillera, upon existing maps and geographical descriptions; and it has not been abrogated by any

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subsequent agreement or treaty, but on the contrary, confirmed by the works of the joint Sub-Commissions of the years 1892 and 1894.

As a matter of fact, in the Record of the joint Commission of the year 1892, it is stated that, in order to determine the starting-point of the demarcation where, according to the same record, the first landmark was erected, Article I. of the Boundary Treaty of July 23, 1881, and the topographical definitions of a Pass or Gap in a mountain chain, have been borne in mind.

In the Record of March 7 last, it is stated that the landmark, the location of which we were ordered to verify, is planted at the spot which topographically should be called Pass or Gap of San Francisco.

According to the rules of topography, a pass or gap is a depression of the water-parting line, where two opposite valleys have their origin.

The two valleys, which, according to the Record in question, are separated by the Gap of San Francisco, are that of Laguna Verde on the side of Chile, and that of Vegas de San Francisco on the side of the Argentine Republic.

Now, the basin of Laguna Verde is tributary to the basin of Maricunga, and the latter, in its turn, has its geographical drainage in the basin of the Chilean River Copiapó, owing to the fact that *the passes which separate them are much lower than the Pass of San Francisco*, as may be seen on the map annexed hereto, the indications of which are based upon data obtained in common by both Commissions.

For a similar reason, the basin of Vegas de San Francisco is tributary to the hydrographical basin of the Argentine River Cazadero.

Consequently, the San Francisco Gap, where the landmark,—the object of the revision agreed to in Article VIII. of the Protocol of May 1893,—is erected, separates the sources (*verientes*) which flow down to either side, and is, therefore, a

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point of the frontier between Chile and the Argentine Republic, in conformity with Article I. of the Treaty of 1881 and with the Protocol of 1893, as well as with the declaration of the Experts dated April 29, 1890.

I have, etc.,

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### THE ARGENTINE COMMISSIONERS' REPORT ON THE SAN FRANCISCO LANDMARK IN 1894.

#### Enclosure A.

[Extracts translated from a certified copy of the Argentine Expert's Note dated August 14, 1894.]

(Quoted on pages 522 and 523 of the Statement.)

*The Argentine Expert to the Chilean Expert.*

BUENOS AIRES, August 14, 1894.

MR. EXPERT,—

The surveying Commission in the north has presented to me its report upon the works carried out by it in that region conjointly with the Chilean Commission, during the last season ; and, although the space of time which it had at its disposal to carry them out has been very short, I believe I am entitled to inform you that the opportunity has arisen for us to order our assistants to remove the provisional landmark of San Francisco to the place where it ought to be erected, according to the Treaty of Limits, in order to comply with Article VIII. of the Protocol of May 1, 1893, and to enable the Argentine Republic to retain her dominion and sovereignty over all the territory which extends to the east of the principal chain of the Cordillera, and Chile to retain hers to west of the same, in accordance with what is prescribed in Article II. of the Protocol, interpretative and explanatory of the said international Agreement.

Quoted  
p. 522.

However, if you should consider that more extensive and

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more detailed surveys are necessary for the better solution of this point, you can rely henceforward upon the fact that there will be no objections whatsoever, so that we may give instructions for them, without prejudice to the demarcation continuing elsewhere, as has been agreed.

\* \* \* \* \*

From the report of the Argentine Sub-Commission [Enclosure B], maps and photographs annexed, it results that the provisional landmark does not stand on the principal chain, and that the place where it has been erected does not even correspond to the *divortia aquarum*, which, besides, cannot be sought for outside of the principal chain of the Andes. Quoted  
p. 523.

Hoping that you, Mr. Expert, animated like myself, by the desire that the demarcation should not be delayed, will adopt either of the two courses proposed, or that you will transmit to me whatever your acknowledged wisdom may suggest to you regarding the provisional landmark, I have pleasure in advising you that all the Commissions under my orders will be ready to start to continue the work on the 15th of October next, as was agreed with you in Santiago last March, including the two recently created, which must work to the north of Tinguiririca and from Point Dungeness.

I beg to remain, etc.,

N. QUIRNO COSTA.

*Juan I. Ochagavia*, Secretary,

## Enclosure B.

[Translation of Extracts from the Argentine Commission's Report printed in Bertrand's "*Estudio Técnico*," pp. 106-110, footnote.]

(Quoted on page 52 of the Statement.)

FROM the Cerro de Famatina in about 28° 47' S. latitude, and always following the meridian 68° west of Greenwich, there runs to the north a mountain of over 4000 metres high, perfectly well defined and of vast proportions, which extends

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as far as latitude  $26^{\circ} 45'$ , where it joins the great Atacama tableland by means of Mount "Negro Muerto," and the range which stretches to the west of the latter, which seems to form the southern border of this tableland, continuing its main chain to the north by the "Peinado" and "Cueros de Purullas" and expanding from here into a large tableland.

\* \* \* \* \*

Mount San Francisco, like those surrounding it, is of volcanic origin, and has certainly risen at an epoch long subsequent to that of the formation of the real Andean Cordillera.

The San Francisco itself and its twin mountain, the Incahuasi, are great isolated volcanoes, the aspect of which hardly differs from that of the "Negro Muerto," also apparently a volcano and situated in the Cordillera del Famatina; but these mountains are not geologically connected.

It seems that there have been partial eruptions here, which have thrown up the ground to colossal heights.

\* \* \* \* \*

Mount San Francisco not only is not situated on the main chain of the Andes, but it does not even belong to any continuous range or chain whatsoever. It rises from the valley of the "Vega" which bears its name, and its slopes are merged into those of the great tableland, at the eastern border of which nature seems to have placed it, together with "Incahuasi," towering high, like two immense knots, ending in the insignificant and interrupted range that borders the Cordillera de los Andes on this side.

And, as a matter of fact, at first sight Mount San Francisco seems to belong to one of the many low hills forming a line from north to south from beyond Mount Coipa, all of a similar aspect and formation, among which are "Matambre," "Aguas Calientes," "El Tambero," "Las Losas" hills and others. If

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all these hills are connected with each other, such a chain would be insignificant, as I have already said, and moreover, interrupted at the same time, because its line is cut by all the water-courses which flow into the Vegas of the Cazedero and which form the River Guanchin, as well as by the headwaters of the River Los Jumes or La Troya.

But, in case of such a chain existing, there would be a further reason to reject by that mere fact, the landmark erected by Señores Diaz and Bertrand, because that line of mountains could never be considered as the Cordillera de los Andes.

\* \* \* \* \*

Whether Mount San Francisco be isolated, or whether it forms a part of the range already described, it cannot geologically be connected with the Sierra de Negro Muerto ; because, in the second case, which is the most favourable, we should have a range running from north to south, in connection with the centre of another one running from east to west along a wide valley, and this cannot happen.

If we were now to consider Mount San Francisco in connection with other large hills and the high massives of the Muerto and Ojos del Salado, we could construct a range with Mounts "Veteado," "Fraile," "Incahuasi," and "San Francisco"; but when we examine the level upon which these hills rise, noticing that they gradually decrease towards Incahuasi, that their direction does not correspond to that of the very high mountain which starts from Mt. Bonete (?) and when we observe the insignificance of the volume of "Veteado" and "Fraile" in comparison with that of the others "Bonete" (?), "Nacimientos," "Ojos del Salado," "Sierra Grande," and "Tres Cruces" which are connected with each other and which have a similar aspect and general direction, we should designate the said range as a simple spur.

\* \* \* \* \*

I am now going to deal, although but briefly, with the continental water-divide and with the small basins to be met with on the road from San Francisco to Santa Rosa.

In the extent surveyed, the watercourses flowing towards the east all rise somewhat to the west of the zone which is bordered on the east by the high tableland, and to which I believe (like Señor Bertrand) that the San Francisco belongs.

These waters form the sources of the River Guanchin which start on the north in the "Vega de las Peladas," and those of the River Jagüel.

The watercourses of the west, in that same extent, are all sources (*vertientes*), of the River Jorquera which debouches on the Pacific in the latitude of Copiapó, and all of them rise from the western springs of the range Azufre, Santa Rosa and Cerro Bravo.

Therefore, the continental water-divide lies to the west of the zone to which Mount San Francisco belongs and to the east of the westernmost chain.

Along the road five small basins are found without any outlet whatever, which the scheme of nature has placed there so as to serve as a reservoir for the waters of the melting ice, which do not disappear through filtration or evaporation.

These are, from east to west: the Vega de San Francisco, Laguna Verde, a small one at a great altitude between Sierra Grande and Barrancas Blancas, another between Tres Cruces and Bordo Negro, and the Maricunga lagoon.

Of these I shall simply take the three principal ones into consideration, which are those into which the watercourses flow in all seasons and where water is always to be found, to wit: Vega de San Francisco, Laguna Verde, Laguna Maricunga.

Into the first one no watercourse flows from any height. There rise, however, several watercourses, the high temperature of which shows that they are subterranean waters and not filtrations from springs (*vertientes*) proceeding from the heights;

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and only one of them, which comes from the north-east, is formed by filtration from the Negro Muerto.

All these watercourses flow into a lagoon situated to the south of the Vega.

The second one, Laguna Verde, only receives its waters from the melting of the ice from the Nevados del Muerto, Ojos del Salado, Sierra Grande and Barrancas Blancas.

The water-divide between this basin and the preceding one is at the San Francisco Gap (where the provisional landmark was erected).

The last one, Laguna Maricunga, receives a watercourse only at certain seasons,—the River Lamas, which is formed by the melting of the snows from the glaciers of Tres Cruces.

This river disappears in the borax plains of the hollow before reaching the lagoon itself. Its water-divide with the Laguna Verde is on the chain passing through Sierra Grande and Barrancas Blancas.

Not one of these three basins has any importance whatsoever, because, as I have already said, they are simply small reservoirs without any outlet.

I understand that, like these reservoirs, there are others to be found in the unexplored part, which are enclosed by the two ranges into which, apparently, the real Andean Cordillera is divided.

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### THE CHILEAN EXPERT ON THE REVISION OF THE SAN FRANCISCO LANDMARK.

[Extracts translated from a certified copy of the Chilean Expert's Note dated September 27, 1894.]

(Quoted on page 523 of the Statement.)

*The Chilean Expert to the Argentine Expert.*

SANTIAGO, September 27th, 1894.

MR. EXPERT,—

I have had the honour to receive your communication dated at Buenos Aires on the 14th of last August, concerning the surveys and work of demarcation of boundaries at the place called San Francisco Pass; and, with it, the Reports and Maps to which you refer. After having carefully studied those documents, I now fulfil the duty of replying to the communication mentioned.

Before entering on this reply, I deem it necessary to review briefly the antecedents of this question, which were prior to the epoch in which you were designated by your Government to fill the post of Expert in the demarcation of the boundary between Chile and the Argentine Republic. The knowledge of these circumstances is indispensable in order to regard in its true light the matter under discussion.

In April, 1890, when commencing the arrangements in both countries for the works of the demarcation of the boundary on the ground, Señor Don Octavio Pico, your distinguished

predecessor in the office of Expert on the part of the Argentine Republic, proposed to the Chilean Expert that such work should commence in the north, a proposition which was admitted without difficulty, with a complementary addition requested by the undersigned Chilean Expert.

Having before them some geographical descriptions and various charts or maps of that region, some of Chilean and others of Argentine origin, both Experts agreed that the first landmark of the demarcation should be fixed at the spot called San Francisco Pass, declaring in the Record signed on the 29th of April, 1890, that "it is a point of the frontier which separates Chile from the Argentine Republic."

In 1892 the works of the demarcation on the ground were begun. After protracted discussions which it would be useless to recall, the Chilean Expert proposed draft instructions which, owing to their general form, seemed to remove the difficulties which had arisen during those discussions. The Chilean Expert proposed that the joint Sub-Commission of demarcating Engineers which was to operate in the north "should go to the zone comprised between parallels  $27^{\circ}$  and  $30^{\circ}$  and should proceed to demarcate the dividing line between the two countries, and draw up, at the points as to which they should be in accord, the Minute to be signed by the Experts in accordance with Article I. of the Treaty of 1881." These draft instructions proposed by the Chilean Expert were submitted by the Argentine Expert to the Government at Buenos Aires. They signified their acceptance by telegraph, although proposing a modification which they believed to be substantial. They wished that in those instructions it should be clearly expressed that the work of demarcation in the north should begin in conformity with the agreement signed by the Experts on the 29th of April, 1890, that is to say, that the first landmark should be fixed at the San Francisco Pass. The Chilean Expert readily accepted this modification, and consequently the instructions

were approved and drawn up in the form proposed by the Government of Buenos Aires.

The facts which I have just recalled appear in the Record signed by the two Experts, and also in the Report presented to the Argentine Government in 1892 by the Minister for Foreign Affairs, of which the portion relative to the boundary question with Chile appeared in two other separate official editions at Buenos Aires. These circumstances, which I have deemed it necessary to recall, show that, by a formal agreement of the two Experts, it was decided to erect at the San Francisco Pass the first landmark of the demarcation, and that such an agreement was expressly approved by the Government of Buenos Aires.

The surveys made on the ground have amply confirmed the reasons which the Argentine and Chilean Experts had in April of 1890 for declaring that the San Francisco Pass is a point of the frontier which separates Chile from the Argentine Republic, and which the Government of Buenos Aires had in February, 1892, for approving this agreement and for insisting that the first landmark of the demarcation should be erected at this spot.

As a matter of fact, Mr. Expert, the joint Sub-Commission formed of three Argentine Assistant Engineers and three Chilean, who then went to these places, after the proper investigations and observations, acknowledged that the spot called San Francisco Pass combined the conditions exacted by the Treaty of 1881, for determining a point of the demarcation, drew up there the Record of April 15, 1892, in which this fact was confirmed, and, as the season was very much advanced, established there a provisional landmark made of stone, agreeing to substitute for it in the following summer one made of iron.

The Record alluded to, the Report which was presented to me by the chief of the Chilean Sub-Commission, and the map or sketch which the latter and his assistants made of the ground

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on which the landmark was erected, did not leave me in doubt as to the fact that the landmark had been erected in accordance with the provisions of Article I. of the Boundary Treaty, and of the Agreement of the Experts which had merited the approval of the Government of Buenos Aires.

Thus, when Señor Don Valentin Virasoro, your predecessor in the office of Expert, suggested to me the idea of making revision of the spot on which the landmark alluded to had been erected, I thought that it was only a case of finding out whether it was or was not situated in the Pass of San Francisco. Although that was an operation already finished, and one which I considered in perfect conformity, in form and substance, with the requirements of Article I. of the Boundary Treaty of 1881, with the supplementary Convention of 1888, and with the Agreement of the Experts, in the interests of the good harmony with which the work must be carried out, I had no objection to accepting the proposed revision which was sanctioned by the Protocol of May 1st, 1893. I then believed that such a revision, no matter what scope was given to it, would simply give support and authority to what had already been done. The fresh surveys have confirmed me in this conviction.

Those localities were newly explored in the summer of 1894 by a Chilean-Argentine joint Sub-Commission of Assistant Engineers. The Record which they drew up on the 7th of March of this year, the Report of the Chief of the Argentine Sub-Commission, the map or geographical chart accompanying it, and your esteemed communication to which I have the honour of replying, acknowledged that the landmark erected in April, 1892, is actually situated at the Pass or Gap of San Francisco. But it is now claimed, contrary to all the declarations alluded to, that this Pass is not a point of the frontier which separates Chile from the Argentine Republic, and that the boundary line must be fixed at another point which is not defined either in your Note or in the Report accompanying it.

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Permit me to tell you that the map itself which you have been good enough to send me, and the reasons given to support this fresh opinion, unquestionably contradict it.

As a matter of fact, Mr. Expert, the examination of the map drawn up by both Sub-Commissions plainly shows that *the point where the first landmark of the demarcation was planted in 1892*, is in reality *a point of the water-parting line in the main chain of the Andes*, that is to say, of *the continental watershed*.

The heights enumerated in that map leave this fact beyond all doubt.

The height of the San Francisco Pass is 4615 metres above the sea. The basin east of the Pass has no actual drainage ; but its topographical [scientific] drainage is to be found towards the east at a height of 3930 metres, and is therefore tributary to the basin of the River Cazadero, Guanchin and the River Colorado de la Rioja. These facts, sufficiently well known, establish that the eastern sources of the San Francisco Pass belong to the hydrographical system tributary to the Atlantic Ocean.

In a similar manner, the basin to the west of the San Francisco Pass (Laguna Verde) has no actual drainage ; but its topographical drainage is to be found towards the west at a height of 4320 metres, that is to say, 295 metres lower than the Pass of San Francisco. The western basin of Maricunga, which receives this drainage, also has no direct outlet towards the coast, but its topographical drainage is found still to the west at 3949 metres high, that is to say, 666 metres lower than the Pass of San Francisco. There starts the Paipote brook, an affluent of the River Copiapó.

Although the boundary treaty of 1881 clearly decided every question similar to the present one, when establishing that, along the whole extent of our territories where the Cordillera de los Andes serves as the frontier between both countries, the boundary line should run over the highest summits which divide the waters, perhaps some doubts might have arisen owing

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to the brooks, parts of rivers or incomplete rivers which do not reach the sea,—a very common occurrence in both countries, specially in the region of the north, where, almost at every step, interrupted watercourses are found, because the evaporation or filtration does not allow them to fill the depressions which they meet in their course. Happily, all doubt has been removed by Article I. of the Protocol of May 1, 1893, which helped to clear this point. After confirming the principle that, all along the extent of the Cordillera de los Andes, which extends between the two countries, the boundary line should pass over the highest summits which divide the waters, and enjoining the Experts and Assistant Engineers to hold this principle as the invariable rule in the demarcation, this Article establishes that all the lands and all the waters to be found east of such line are Argentine, and all those to the west are Chilean, designating by name the “parts of rivers, brooks, springs (*vertientes*), lagoons, etc.” These clear and imperative provisions applied to the present case and to the geographical facts shown in the map which you yourself have been pleased to send me, do not leave the slightest doubt that the San Francisco Gap, where in April, 1892, a landmark of the demarcation was erected, is a point of the boundary line between Chile and the Argentine Republic. And I must state to you that I rely on this map, not only because it has been made by distinguished engineers who have specially studied the ground, and presented to me by such an important person as yourself, but because the facts therein contained, which are pertinent to the present question, are in conformity with the other observations obtained by the Chilean Sub-Commission.

In the face of these data it is incomprehensible to the undersigned that the chief of the Argentine Sub-Commission, in contradiction with his own map, should affirm that “the continental water-divide lies to the west of the zone to which the San Francisco belongs.” But this assertion, which the

facts recalled completely destroy, is all the more strange as it is not therein stated where the continental water-divide is, although, on both sides of those Cordilleras, opposite hydrographical regions extend, between which a dividing line must forcibly exist. For my part, I believe that nothing is easier than to find it precisely at the spot where they [the Argentine Commission] have been unwilling to identify it.

This assertion has made you fall into the error contained in the following words of your esteemed communication: "It does not even correspond," you say, referring to the San Francisco Pass, "to the *divortium aquarum*, which, besides, cannot be sought for outside the principal chain of the Andes."

I believe, Mr. Expert, to have demonstrated by these clear and precise facts, as to the accuracy of which we are in perfect agreement, that, in that part of the Cordillera, the *divortium aquarum* is to be found precisely at the Pass of San Francisco; and moreover, I believe that there, as all along the bordering Cordillera, we must look for it on the highest summits which divide the waters; and that such line, easy of discovery and of being determined at any part thereof, being prolonged without the slightest interruption all along its extent, constitutes the distinctive and essential feature of the principal chain of the Andes.

Quoted  
p. 523.

This is what the international covenants, to which we must submit in our work of the demarcation, establish. Article I. of the Treaty of 1881 is both clear and explicit upon this point, and Article I. of the Protocol of May 1, 1893, confirming it amply, has imperatively enjoined, as I have already said, that the Experts and their assistants should hold this principle as the "invariable rule" in their proceedings.

Now, if, in such an explicit and imperative manner, we are commanded to fix the dividing line on the highest summits *which divide the waters*, can we go and fix it on summits which *do not* divide the waters? What would our respective Govern-

ments, who have honoured us with the posts of Experts, say, if they were to see us abandoning a rule which has been imposed upon us with the characteristic of the "invariable rule of our proceedings"? What would be the judgment of our fellow-citizens if we were to fulfil our mission in this manner? And finally, what legal value would our doings have, if we were not to subordinate our work to such a clear and peremptory stipulation?

For my part, I could not abandon it without neglecting the most elementary duties connected with my post.

For this reason, when the Instructions given to the demarcating engineers on the 1st of January of the present year were drawn up, I had the honour of informing you, and of expressly stating it on the Record signed that day, that by "main chain of the Andes" I understand the "uninterrupted line of summits *which divide the waters* and which form the separation of the hydrographic basins or regions tributary to the Atlantic towards the east and to the Pacific towards the west."

When making this declaration, maintaining a principle established by the existing treaties with so much precision, and based on sound principles of geography and of international law as well as on the Treaties in force, and besides, the only one which can lead us to a practical result in the demarcation, avoiding the thousand difficulties of detail which, without such a sure rule as this, would arise at every step, I have wished, Mr. Expert, to give a fresh proof of the sincerity and straightforwardness with which, in accordance with the directions of my Government and my own convictions, we must proceed in an operation which is purely one of loyalty and concord, destined to delimitate peacefully and quietly our respective territories, and to confirm and strengthen our relations of friendship and commerce.

I omit to show here that the faithful fulfilment of this "invariable rule" of the demarcation does not cause any detriment

to either of the two countries ; it facilitates and renders practicable the work which has been entrusted to us ; it is based on the principles of international delimitation ; it is proclaimed by the most authoritative geographers and supported by its most distinguished writers. The undersigned had the honour of treating of these various points in a note addressed to your predecessor, Señor Octavio Pico, under date of January 18, 1892, to which I have not had the honour of receiving a reply up to this date.

Although I could repeat these considerations, and strengthen and unfold them further, I abstain from doing so because I deem it unnecessary.

For the reasons stated above, I do not consider the considerations of a geological character adduced by the chief of the Argentine Sub-Commission conducive to the elucidation of the present question, even should they lack the vagueness and indecision which cannot but be inherent to them in the present state of our geological knowledge of this great chain of mountains. I shall only observe, in this respect, that we cannot but commend the good sense shown in the drawing up of our Boundary Treaty and in the Protocol which confirms it, when eliminating absolutely this kind of question. There, in Article I. of both covenants, *a frontier line has been fixed which may be determined along the whole of its extent by the mere inspection of the locality*, or at most by the study of the declivities of the ground, without taking at all into consideration the nature of the ground, which would only have given rise in each case to unending discussions, assuredly without any practical result.

\* \* \* \* \*

In view of the foregoing, I believe that the landmark, erected at the San Francisco Pass in fulfilment of the agreement drawn up by the Experts on the 29th of April, 1890, and with the concurrence of the engineers of the Commissions of both countries on the 15th of April, 1892, is erected on the spot which

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corresponds to it according to the Treaty of 1881 ; and, although by the Protocol of 1893 the Chilean Government agreed to accede to the request of the Argentine Expert that a revision of the work should be made, and that " in case an error should be found, the landmark should be removed to the point where it should have been placed according to the terms of the Boundary Treaty," the fresh surveys have simply confirmed the correct location of this landmark. I believe, for this reason, that the surveys made hitherto are sufficient, for the purpose of solving this question, whether by agreement of the Experts or whether by the decision of an Arbitrator, in conformity with the Treaty, should the said agreement fail to be obtained. This question cannot be a hindrance to the continuation of the work entrusted to us, which we both are interested in advancing in the same spirit of cordiality with which we have commenced it.

I have, etc.,

DIEGO BARROS ARANA.

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### THE ARGENTINE EXPERT ON THE SAN FRANCISCO LANDMARK AND THE "MAIN CHAIN OF THE ANDES," on December 14, 1894.

[Translated from a certified copy at the Chilean Legation.]

(Quoted on page 524 of the Statement.)

*The Argentine Expert to the Chilean Expert.*

BUENOS AIRES, December 14, 1894.

MR. EXPERT,—

I have had the honour of receiving your Note dated September 27 last, which is a reply to mine of August 14, in which I requested the removal of the provisional landmark of San Francisco to the place where it should be erected in conformity with the Treaty of 1881 and the explanatory and interpretative Protocol of same, dated May 1, 1892, or the continuation of the surveys in the region of the north in order to confirm or rectify our respective opinions.

After making lengthy remarks you maintain that the landmark referred to is correctly erected, in accordance with the provisions of those international covenants, that it is placed on the main chain of the Cordillera de los Andes, and that, on your part, you consider fresh surveys to be unnecessary, adding besides that, if a direct arrangement were to be impossible, *the controversy should be submitted to arbitration.*

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As your note embraces several important conclusions regarding the meaning which you give to the international covenants in force between the Argentine Republic and Chile, besides a narrative of the circumstances which you have deemed it advisable to recall in connection with this provisional landmark, I feel the necessity of replying at length to your note in order that there may be a record as to how I understand the duties imposed upon me by the office of Expert which I fill, and as to what meaning I give to the covenants binding both Governments in connection with the determination of their respective boundaries, at the same time, leaving our responsibilities clearly defined in case any emergency should arise in the future,—which I try, and will try, to avoid, in the interests of the prosecution of our work, and of the good relations which happily exist between the two countries, and which are well maintained and strengthened by the action of our Governments.

I must, first of all, inform you that I regret that you should have taken the trouble of recalling the circumstances in connection with the erection of the provisional landmark of San Francisco, not only because such operation was not approved by the Experts, but also because all divergences respecting its validity were eliminated by Article VIII. of the Protocol of May 1, which reads as follows : “ The Argentine Expert, having stated that, in order to sign, with full knowledge of the circumstances, the Minute of April 15, 1892, by which a Chilean-Argentine Sub-Commission marked on the ground the starting-point of the demarcation of the frontier in the Cordillera de los Andes, he thought it indispensable to make a fresh survey of the place to conform or correct that operation, adding that that survey would not delay the continuation of the work which could be carried on simultaneously by another Sub-Commission ; and the Chilean Expert, having on his part, declared that, although he believed the operation had been carried out strictly according to the Treaties, he had no objection to assent to the wishes of

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his colleague, as a proof of the cordiality with which the work was being carried out ; the undersigned have agreed that a revision of the operation shall take place, and that, in case any error is discovered, the boundary mark shall be removed to the spot where it ought to be placed, according to the terms of the Boundary Treaty."

The fresh surveys to remove the said landmark to the spot where it should have been erected according to the Boundary Treaty and Protocol,—in case it should not have been planted in conformity with the provisions of these—having been ordered, it seems to me that neither you nor your assistants could have maintained that what it was desired to know was whether such landmark was or was not in the San Francisco Pass, not only in view of the clear and imperative terms of the Article which I have just copied, but also because the representatives of the Argentine Republic have never doubted that the said point was the one designated by the Commissions. They did maintain that it was not the one that answered to the rule to be followed in the demarcation, for which reason they refused to sign the Record which you desired. This brief explanation justifies the remarks which I took the liberty of making regarding the Report of your Assistants, who joined the Argentines this year in carrying out the surveys in the region of the north,—which report is inserted in the Record of March 7th of the present year, and leads to a misunderstanding or to the ignoring of what was agreed to in the Protocol referred to.

It was not my intention to make a charge against the said Assistant, nor do I consider myself entitled to do so ; but, as the Expert on the part of the Argentine Republic, I could not omit calling your attention to this, since, as the joint Commission was given the instructions which I signed with you at Santiago, the latter were the only rule of procedure for the Chilean and Argentine Assistants. In a similar case I shall be most pleased to take your suggestion into consideration, although I have

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instructed those under my orders never to depart from the instructions which we may give them.

I must observe to you that, on my part, I do not give to the Protocol of 1st of May, in that part which refers to the San Francisco landmark, any other meaning than that expressed by its clear and unmistakable wording ; and that, although I sincerely respect the reasons which you had for denying to the Expert, Señor Virasoro, the right of revising the operation, which among other causes gave rise to the diplomatic negotiations which ended at that date, it surprises me that you should still hesitate as to the meaning of the terms of the Protocol, and that you should say in the note to which I reply, that Señor Virasoro only claimed the revision of the spot where the landmark was erected to which you consented, in the conviction that, no matter what scope might be given to this revision, it would simply afford fresh support and authority to what had already been done.

And, what had been done, and how had it been done ?

You say in this respect in the note to which I refer :—

“ In April, 1890, when commencing the arrangements in both countries for the works of the demarcation of the boundary on the ground, Señor Don Octavio Pico, your distinguished predecessor in the office of Expert on the part of the Argentine Republic, proposed to the Chilean Expert that such work should commence in the north, a proposal which was readily admitted, with a complementary addition requested by the undersigned Chilean Expert.

“ Having before them some geographical descriptions and various charts or maps of that region, some of Chilean and others of Argentine origin, both Experts agreed that the first landmark of the demarcation should be fixed at the spot called San Francisco Pass, declaring, in the Record signed on the 29th of April, 1890, that ‘ it is a point of the frontier which separates Chile from the Argentine Republic.’ ”

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The foregoing narrative which you have considered it your duty to make, places me in the position of saying that, although it was indispensable that the Experts should decide whether the demarcation should commence in the south or in the north, it was not within their powers to declare a certain spot to be a point of the frontier until the necessary investigations had been made, since their mission is to carry out the demarcation on the ground themselves or through their delegates, according to the Convention of 1898, the result of such demarcation being the only thing which could place them in a position to fix a point of the dividing line. You say that maps or sketches, some of Argentine and others of Chilean origin, were consulted ; but this very fact reveals that nothing definite was done, and that it was more of a suggestion, since, if the demarcation was to be carried out in conformity with pre-existing maps or sketches, the mission of the Experts and their Assistants would have had no object, for, in order to trace the line, the indication of the points where the landmarks were to be erected would be sufficient, and this operation could have been carried out without any difficulty whatsoever by any inhabitant of the country familiar with surveys in the Cordillera.

You yourself, after the Record of 29th of April, 1890, as you express it in the note to which I am now replying, proposed, in 1892, that the joint Commission of demarcating engineers, which was to operate in the north, should proceed to the zone comprised between 27° and 30° and start the demarcation of the boundary line between the two countries, drawing up, on the points as to which they should be in accord, the Minute which the Experts must sign in accordance with Article I. of the Treaty of 1881,—and this obviously indicates the necessity of previous investigations in order to fix the common frontier.

The negotiators of the Treaty of 1881 said that the boundary between the Argentine Republic and Chile is, from north to south as far as the 52nd parallel of latitude, the Cordillera de

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los Andes ; and, when giving the rule for the tracing of the dividing line, this international agreement, like the others which have been concluded, entrusted this operation to two Experts, and, by their delegation, to some Assistants, and not the determination of points of the frontier without previous investigation.

It is for this reason, Mr. Expert, that what was done at San Francisco in 1892 did not have, and could not have had, the validity which you maintain, nor did it obtain the approval of the Argentine Expert, who, as you know, refused to sign the Record of April 15, 1892 ; and it was likewise for this reason that your Government, as appears from the Protocol of May 1st, consented that what was done should be revised and that a joint Commission of Chileans and Argentines should proceed to the region of San Francisco to carry out fresh and detailed investigations.

As this is a demarcation which is being carried out with the greatest harmony, and it being to the manifest interests of both countries that truth only should prevail and that nothing should be based on an error, our respective Governments have given, and I am sure will continue to give, the most unmistakable proofs that the demarcation of the boundaries will be pursued and brought to a close without any exciting incidents or disturbances to weaken the ties of friendship which unite Chileans and Argentines ; and, I entertain the profound conviction that we, who are called upon to obey these purposes, will not lack the necessary patriotism for removing from our path such obstacles as may prevent us from realizing such noble ends.

Decided, as it is, by the Protocol of May 1st, that the demarcation made at San Francisco in 1892 is not definitive, I do not consider it necessary to enter into other considerations respecting the circumstances which you have deemed it your duty to recall ; and I pass on to other points of extreme gravity treated

in your Note when replying to mine of the 14th of August last.

In spite of what has been stated, when dealing with the application of the Protocol which establishes that the line must run along the main chain of the Cordillera de los Andes, you maintain that the San Francisco landmark is erected on it.

You understand by main chain of the Cordillera, the uninterrupted line of summits which divide the waters, and which form the separation of the basins or hydrographic regions which are tributaries to the Atlantic on the east, and to the Pacific on the west, and you state that when issuing the Instructions given last January, you recorded this fact.

On my part, I must remind you that I rejected that meaning, expressing that I did not consider at that time that I ought to point out the excesses and deficiencies of that definition, adding that *the Experts were not called upon to interpret the international Agreements, but to apply them*, because *we were simple demarcators*, and on the other hand no case had arisen which would cause a divergence.

The Argentine Republic, Mr. Expert, never accepted the continental *divortium aquarum* as the boundary with Chile, and when negotiating the bases for the Treaty of 1881 you, as Minister, proposed it to Señor Don Bernardo de Irigoyen, the latter, as Minister for Foreign Affairs, rejected it, and the wording was adopted which is read in Article I. of the Treaty of 1881.

This Article—which provides that the boundary between Chile and the Argentine Republic is from north to south as far as the 52nd parallel of latitude the Cordillera de los Andes, and that the boundary line shall run in that extent over the highest summits of the said Cordilleras which divide the waters and that it shall pass between the “*vertientes*” which start to either side—would be useless because it would have sufficed to establish that the boundary between the two countries was the continental *divortium aquarum*, which you now uphold against the very text of the Treaties, and their antecedents.

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You cannot mention a single geographer or scientist who applies the continental *divortium aquarum* as an absolute rule in the delimitation of countries separated by mountains, and still less when the text itself of a treaty provides that the line shall run along the highest summits which divide the waters, passing between the “*vertientes*” that you, as well as all the geographers, define by the name of sides or flanks of the mountain, and which *can never be proved to be synonymous with the origins or sources of rivers*: and when another explanatory or interpretative Agreement provides that the said highest summits be sought for in the main chain of the Cordillera, that is, in its dominant ridge, in that which without other interruptions than those in short spaces, caused by accidents of the same mountain, forms the real edge of the system. Consequently it is in this main chain that we must draw the line, whether the continental *divortium aquarum* be always situated on it or not, as it may often be situated outside of it, as is foreseen in the Protocol, when the latter provides that *part* or *parts of rivers* may belong to either country, and as happens in the Andes and other Cordilleras.

Always reacting against the text of the international agreement of May 1, 1893, and referring to the words “parts of rivers” you say: “Doubts might possibly have arisen regarding those streams, parts of rivers or incomplete rivers which do not reach the sea—a very common feature in both countries, particularly in the northern region, where interrupted water-courses are frequently met with, by reason of evaporation or filtration, which prevents them from filling the hollows to be found in their course. Fortunately all doubts have been set at rest by Article I. of the Protocol of May 1, 1893, which makes this point still clearer.”

Allow me to express my great surprise at the restriction placed by you on one of the most conclusive stipulations of the Protocol of May 1, 1893, and one which was the object of lengthy

and laborious conferences which caused your retirement when the said International Agreement was being signed. The Conferences began in March, 1893, in the Department of Foreign Affairs of Chile, you and my predecessor, Señor Virasoro, assisting as Experts, and Don Isidoro Errázuriz, Minister of the Department, and I, as Argentine Minister Plenipotentiary, being also present.

When dealing with the intersection of rivers by the boundary line, you stated that this should be left to be included in the Instructions which the Experts were to give to the demarcating Sub-Commissions, as this was understood; I, on my part insisting that, with regard to this matter, we ought to sign a declaration expressing it.

When, during the course of the negotiation, the said cutting of rivers was insisted upon, you refused to allow it to be inserted in the Protocol; and, as the Argentine Expert and myself refused to continue discussing the affair, declaring that we considered such an explanation to be indispensable, you did not return to the Conferences, the negotiations being continued between Señor Errázuriz and myself, and *the declaration as to the cutting of rivers*, established by Article I., *was included* without limitation or restriction of any kind.

How can you, therefore, reopen a discussion on a point which has already been solved by means of a solemn Treaty, sanctioned by the Congresses of the two nations concerned?

Besides, the cutting of rivers exists implicitly in the Treaty of 1881, and your persistence, in all the acts of execution of said Treaty, in leading us to the continental *divortium aquarum* as an absolute rule, was another of the chief causes of the negotiation of 1893, in which it was again eliminated as such, by the fact of stipulating the former, and by recognizing to Chile the Channels of the Pacific in the vicinity of parallel 52, it being likewise agreed that the coasts of those channels was to be amicably determined by both Governments. If the continental

divide were the general rule, you would not have consented to all this, nor would the Chilean Government have given its approval to it.

This stipulation regarding the southern channels is an express abandonment of the alleged and disturbing continental *divortium aquarum*, which, for you, never appears to have been eliminated as an invariable rule. In fact, in parallel 52° the divide between the Atlantic and Pacific basins is situated at the sources of the River Gallegos, which some call “ Plains of Diana ” (Planicies de Diana).

Could you maintain that in these plains is situated the main chain of the Cordillera mentioned by the Protocol, when it can only be found, if that parallel is followed, to the west of those plains, and after crossing inlets of the Pacific which a high-minded policy of sincere friendship towards Chile on the part of my Government caused them to declare as belonging to that Republic ?

The great Cordillera stretches longitudinally from north to south, and, taking into account in the aggregate, all its system, *it spreads out from east to west in a great extent*. The Treaty of 1881 enclosed within it the frontier line, providing that the line shall run along its highest summits which divide the waters, and adding that it shall pass between the “ *vertientes* ” which start to either side.

To what water-parting line does the Treaty refer ?

Saying, as it says,<sup>1</sup> “ the highest summits which divide waters ” [*sic*] it must be understood to mean those which form a chain, and the Protocol of May 1st has defined this point, since it locates them in the main chain of the Cordillera, which forms, as I have said, a sort of edge more or less flattened, stretching in a given trend. They are summits presenting two lateral opposite sides [*sic*], in declivity, which constitute the

<sup>1</sup> It must be noticed that the article *the* (*las*) before the word “ waters ” has been omitted by Señor Quirno Costa.

“*vertientes*” down which flow the rain waters or those produced by the melting of the snow on the summits.

There are other summits which deviate from the principal chain and are situated on spurs, on tablelands, or in lateral valleys, and which are cone-shaped. On these there may be a water-parting line, but [the waters will flow] not only on one side and the other as provided by Article 1 of the Treaty of 1881, but on all sides. These, therefore, are not the summits which we are to seek, but the former, where the “*vertientes*” on one side and the other, i.e., east and west, are exclusively to be found. For this reason all summits not bearing the separation of these two general “*vertientes*” of the Cordillera to which said Treaty and the Protocol of May 1st refer, must be rejected.

Thus, Mr. Expert, when we find that the line cuts a river or mere stream, we must not, nor can we depart from the prolongation by the summits, because it is on the latter that we must seek the said line.

I will not enlarge on this point, as you have only mentioned divergences, which, although I consider them fundamental matters, come more within the province of the Governments than within ours, *we being mere demarcators*, arbitrators only when dealing with valleys formed by the bifurcation of the Cordillera, where the water-divide should not be clear.

The good faith of both countries being at stake, the powers who direct their affairs must honour their international engagements, and they will not permit the patriotic work of many years, and of diplomatic negotiations brought to a successful issue, to be frustrated in a day.

I do not consider it necessary to weigh the reasons which you give for maintaining that the provisional landmark has been correctly erected on the San Francisco, owing to the fact that the continental divide, according to your opinion, is to be found on it; since our respective standpoints differ

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absolutely, such principle being the only rule to you, whilst to me that *divortium* may be found outside the main chain of the Cordillera de los Andes, whereas it is on the latter that we must trace the line.

Thus, it would be necessary that you should demonstrate that Mount San Francisco forms part of that chain in the Cordillera de los Andes, in spite of its being excluded from the latter by the very surveys of the Chilean engineers Señores Bertrand and San Roman and by the Report and Map of the Argentine Commission, which show that the San Francisco belongs to a line of hills bordering the said Cordillera on the east only, its origin and formation being perhaps the same as that of the Cordillera de Famatina, which belongs to the system called Central Bolivian, or Real Bolivian Cordillera, which is very different from the Cordillera de los Andes.

Thus the former of those two distinguished engineers, who at present is a member of the Boundary Commission of Chile, inserts on his map a profile of the Cordillera de los Andes, it being observed therein that, from the vicinity of 28° up to the 22°, the following hills appear: del Potro, Negro, Ternera, Volcan Doña Inez, Juncal, Volcan Llullaillaco, Volcan Socompa, Volcan Pular, Tumiza, Volcan Licancaur and Piniri, there not appearing Cerro Incahuasi, 6700 metres high, nor the San Francisco, nor the Negro Muerto of 6000 metres, nor any of the very high ones which form the Atacama tableland,—which means that these latter do not belong to the Cordillera de los Andes in which we must trace the boundary line.

Although I believe that Mount San Francisco does not belong to the Real Cordillera de los Andes, and still less that it is located on the main chain thereof, my Government consider it advisable to amplify the investigations in the region of the north, and it is for this reason that I invited you to carry them out by joint Commission, so as to confirm or rectify our respective opinions, and, in any case, to prepare us in due form

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for the direct settlement which you suggest in your note to which I am now replying, or for the arbitration itself, which you also mention, should the first solution not be possible, and should my Government consider this a case for arbitration.

I have laid before the Minister for Foreign Affairs, my immediate chief, your communication to which I am now replying, together with the antecedents referring to this matter, and I have directed the continuation of the work in the north by the Argentine Commission only, since I have not obtained that the Chilean should accompany on this occasion the Argentine one in an ample investigation of rectification or revision, stipulated in a solemn international covenant and destined to remove the difficulties which embarrass the work of the demarcation.

I consider, however, like yourself, that the question which separates us cannot be a hindrance to the prosecution of the work entrusted to us, and that it is to both our interests to continue them, animated with the spirit of cordiality in which they were begun.

I am, etc.

N. QUIRNO COSTA.

*Juan J. Ochagavia,*  
Secretary.

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### ACTS OF DELIMITATION IN 1895.

#### Enclosure A.

##### *Act of the erection of the landmark at "Las Leñas."*

[Translated from "*Memoria de Relaciones Exteriores de Chile*," presented in 1895, p. 247.]

(Mentioned on page 526 of the Statement.)

THE undersigned, Chiefs and Assistants of the Second Chilean-Argentine Boundary Sub-Commission, assembled in the Cordillera de los Andes on March 4, 1895, bearing in mind the instructions which have been issued to them by both Experts under date of January 4, 1894, as well as the stipulations of the Treaty of 1881, and the Protocol of 1893 and the Convention of August 20, 1888, have agreed to erect a landmark on the point of *the principal chain of the Andes which divides the waters*, commonly called "Paso de las Leñas," a point that serves as a means of communication between the Chilean valley of Las Leñas and the Argentine valley of Cajon Ancho.

In conformity with Article 7 of our Instructions we record in this Minute that, in the neighbourhood of this pass, *two streams (vertientes) diverge*, which flow: the western one to the River Leñas, an affluent of the Cachapoal, and the eastern one to the Rivers Atuel, towards the south, and Barroso to the north-east, the latter a tributary of the Rio Diamante.

In order to fix the geographical position of the place, the bearings, photographic views and other data prescribed in the

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instructions have been collected, the results of which are contained in an appendix to this Record, which shall be signed by the undersigned as soon as the necessary calculations have been made and verified so as to give to these results the greatest accuracy possible.

Bearing in mind what has been agreed upon by the Experts we have erected a cairn, which shall remain as a sign of the demarcation.

Drawn up in quadruplicate on March 4, 1895. VÍCTOR CARO TAGLE, PEDRO P. PICO, *Luis A. Bolados R., Jacinto Anzorena.*

## Enclosure B.

*Act of the erection of a landmark in the pass of Reigolil.*

[Translated from "*Memoria de Relaciones Exteriores de Chile*," presented in 1895, p. 245.]{

The undersigned, Chiefs and Assistants of the Fourth Chilean-Argentine Boundary Sub-Commission, assembled in the Cordillera de los Andes on February 24, 1895, bearing in mind the Instructions issued to them by both Experts under date of January 4, 1894, as well as the stipulations of the Treaty of 1881 and Protocol of 1893, therein mentioned, have agreed to erect a landmark on the point of *the principal chain of the Andes which divides the waters*, commonly called Paso de Reigolil, a point which serves as a means of communication between the Chilean valley of "Reigolil" and the Argentine valley of "Puelmari."

In conformity with Article 7 of our Instructions we record in this Minute that, in the neighbourhood of the before-mentioned Pass of Reigolil, *two streams (vertientes) diverge*, which flow: the western one towards the rivulet of Curimeno, the waters of which empty into the River "Maichin," an affluent of the River "Pucon" or "Minetué," belonging to the basin

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of the River "Tolten"; and the eastern one into Lake "Pilhue," which drains by the river of that name into Lake "Ñorquinco"; from the latter rises the River "Puelmari," an affluent of the "Aluminé," which conveys its water into the "Limay" under the name of "Collon-Curá."

The data indicated in the Instructions to fix the geographical position of the place have been collected, the results of which will be inserted in an appendix to this Record which shall be signed by the undersigned as soon as the necessary calculations have been made and verified so as to give to these results the greatest accuracy possible.

Bearing in mind what has been agreed upon by the Experts, we have erected a cairn which shall remain as a sign of the demarcation.

Drawn up in quadruplicate on February 24, 1895.—ERNESTO 2° FRICK, LUIS JORJE FONTANA, *L. Riso Patron, Guillermo S. MacCarthy.*

## Enclosure C.

### *Act of the erection of the landmark at Coloco.*

[Translated from "*Memoria de Relaciones Exteriores de Chile*," presented in 1895, p. 246.]

The undersigned, Chiefs and Assistants of the Fourth Argentine-Chilean Boundary Sub-Commission, assembled in the Cordillera de los Andes on March 27, 1895, bearing in mind the instructions which have been issued to them by both Experts under date of January 4, 1894, as well as the stipulations of the Treaty of 1881 and Protocol of 1893, therein mentioned, have agreed to erect a landmark on the point of *the principal chain of the Andes which divides the waters*, commonly called "Paso de Coloco," a point that serves as a means of communication between the Argentine valley of Coloco and the Chilean one of Quiñenahuin.

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In conformity with Art. 7 of our Instructions we place on record that, in the neighbourhood of the before-mentioned pass of Coloco, are separated the waters that flow, on the east, to the Cajon de Huechulin—whence they issue by the Malalco brook to the River Quillen, a tributary of the Alumine, which bears its waters to the Limay under the name of Collon-Cura—from the meteorological waters on the west, which feed the lake of Hualalafquen, which drain into the brook which we have called Quiñenahuin, a tributary of the River Maichin, an affluent of the River Pucon or Minetué, belonging to the basin of the River Tolten.

The data indicated in the Instructions for the purpose of fixing the geographical position of the place have not been collected, as the advanced state of the season did not allow of it. These data will be obtained when the circumstances permit, and the results will be inserted in an appendix to this Record which shall be subscribed by the undersigned or their deputies.

Bearing in mind what has been agreed upon by the Experts we have erected a cairn, which shall remain as a sign of the demarcation.

Drawn up in quadruplicate on March 26, 1895.—ERNESTO 2° FRICK, *Luis Riso Patron S.*, LUIS JORJE FONTANA, *Guillermo MacCarthy*.

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### ACTS OF DELIMITATION DRAWN UP IN BILATERAL FORM ON MARCH 14, 1896.

[Translated from "*Memoria de Relaciones Exteriores de Chile*," 1895, pp. 269-285.]

(Quoted on page 530 of the Statement.)

#### Enclosure A.

##### *Lagunita Landmark.*<sup>1</sup>

THE undersigned, Chiefs and Assistants of the First Boundary Sub-Commission on the part of the Argentine Republic and Chile, assembled at Villa de Jachal under date of March 14, 1896, with the object of proceeding to the demarcation of the boundary between the Argentine Republic and Chile in the Pass called Lagunitas, were in accord as to the precise point on the ground, but there was no such similar accord as to the form of the Act which, according to Article 3 of the general instructions for the demarcation in the Cordillera de los Andes, must be signed by the Assistants.

The Chilean Sub-Commission proposed with insistence to

<sup>1</sup> Similar Acts bearing the same date were signed, placing on record the delimitation at the following points :—

*Las Tórtolas landmark.* [*Loc. cit.* pp. 272-274.]

*Vacas Heladas landmark.* [*Loc. cit.* pp. 274-277.]

*Deidad landmark.* [*Loc. cit.* pp. 277-279.]

*Bañitos landmark.* [*Loc. cit.* pp. 279-281.]

*Sancarron landmark.* [*Loc. cit.* pp. 282-284.]

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sign an act similar to that drawn up by the demarcating Sub-Commission at the Passes of Las Leñas, Las Damas, Santa Elena, Reigolil and Coloco, in the years 1894 and 1895, by reason of their being in accord with the principles stipulated for the demarcation.

The Argentine Sub-Commission refused to take the proposed act as a pattern by reason of finding, according to their own opinion, that the stipulations of the Treaties of 1881 and 1893 had been altered, and proposed, on their part, that, in lieu of stating in the acts that the said landmark is erected by reason of its being *on the principal chain which divides the waters*,<sup>1</sup> as proposed by the Chilean Sub-Commission, they should say simply, because *it is in conformity with the Treaties above-mentioned*, a formula adopted by the Experts for the approval of the landmarks mentioned by the Chilean Sub-Commission.

As the Chilean Sub-Commission does not consider this last formula to be acceptable and regret that the Argentine Sub-Commission should abandon a formula already established by the agreement of the demarcating Sub-Commissions, they agreed to draw up the acts separately.

At the point agreed to, and where the landmark is erected, bearings, photographic views and other data suggested by the instructions for the fixing of the geographical position of the place have been taken, the results of which will be stated in a complementary Act which will be subscribed by the undersigned once the necessary calculations have been made and verified so as to give to these results the greatest accuracy possible.

Bearing in mind the great difficulties of transportation of the iron pieces forming the permanent landmark, to this point of the Cordillera, we have agreed to erect a provisional cairn

<sup>1</sup> This proves that the Assistants of the Argentine Expert in 1896 understood, contrary to what is affirmed in the Argentine Statement (p. 445), that it is the *principal chain* mentioned in the Acts, which *divides the waters*, and not merely the *point* selected for a landmark.

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which shall remain as a sign of the delimitation pending a further resolution of the Experts.

Act of the Argentine Sub-Commission. The Chief and Assistants of the Argentine Boundary Sub-Commission No. 1, bearing in mind the general instructions for the demarcation of the Cordillera de los Andes issued by the Experts under date of January 1st, 1894, as well as the stipulations of the Treaty of 1881 and Protocol of 1893 therein mentioned, declare that they have erected the landmark at the place commonly called Paso de la Lagunita, by reason of this place being on *the water-parting line of the principal chain of the Cordillera de los Andes*.

The point where the landmark has been erected serves as a communication between the valleys of the Argentine River Cura and the Chilean River Coquimbo. From this same place two *streams (vertientes)* flow, one to the east towards the Valle del Cura, and the other to the west towards the River Coquimbo.

Act of the Chilean Sub-Commission. The Chief and Assistants of the First Chilean Boundary Sub-Commission, bearing in mind the Instructions which have been issued to them by the Experts under date of the 1st of January, 1894, as well as the stipulations of the Treaty of 1881 and Protocol of 1893 therein mentioned, declare that they have erected a landmark at the point of *the principal chain of the Andes which divides the waters*, commonly called Paso de la Lagunita, a point which serves as a communication between the Chilean valley of Coquimbo and the Argentine valley del Cura.

In conformity with Article 7 of our instructions, we have recorded in this Act that, at the said Paso de la Lagunita, two streams (*vertientes*) diverge, which flow, the western one towards the valley of the River Seco which, joining the River de la Laguna, forms the River Turbio, an affluent of the River Coquimbo, and the eastern one to the Lagunita stream, an

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affluent of the River Valle del Cura which, joining the River Blanco, forms the River Jachal, a tributary of the River San Juan.

Drawn up in duplicate and signed by the Assistants.—C. SOZA BRUNA, VICENTE E. MONTES, *Carlos A. Barrios M.*, *Emilio T. Spiluzzi*.

## Enclosure B.

*Act of Suspension of the Works of the First Sub-Commission,  
dated March 15, 1896.*

DEMARCATIION OF THE BOUNDARIES WITH CHILE.—*Argentine Sub-Commission No. 1.—Act.*—The Chiefs and Assistants of the First Boundary Sub-Commission on the part of Chile and the Argentine Republic, after having ascertained the extent of the Cordillera comprised between the Passes of Lagunita and Sancarron, assembled at the Villa de Jachal on March 15, 1896, in order to come to an agreement as to the following operations. The Chief of the Chilean Sub-Commission stated that he had already made surveys in the region of the Cordillera stretching northwards to about 28° 50' of south latitude, comprising the passes El Chivato, Chollay, Valeriano, and Flecha, and on that account he invited his colleague to continue the demarcation in the present season. The Chief of the Argentine Sub-Commission stated that it was impossible for him to continue the demarcation during this season, as the state of his health absolutely prevented him from remaining in the Cordillera, for which reason he proposed the immediate suspension of the said works.

The Chief of the Chilean Sub-Commission, regretting the premature suspension of the said works, as a mark of deference to his Argentine colleague, agreed with pleasure to the said suspension, signing in duplicate and in testimony whereof the present record.—C. SOZA BRUNA, VICENTE E. MONTES, *Carlos A. Barrios M.*, *Emilio C. Spiluzzi*.

## No. 67.

### RECORD OF THE DIVERGENCE OF THE COMMISSIONS AS TO THE RILUL LANDMARKS.

[Translated from "*Memoria de Relaciones Exteriores de Chile*," 1895, pp. 289–293.]

(Quoted on pages 531 and 1103.)

*Republic of Chile.—Demarcation of the boundaries with the Argentine Republic.—Act.*—In the camp of the fourth Argentine Sub-Commission, on the shores of Lake Quillen, on the 7th of March 1896, the Joint Sub-Commission No. 4 for the demarcation of the boundaries between the Republics of Chile and Argentina being there assembled, the Chilean Sub-Commission stated that they proposed to the Argentine Sub-Commission the erection of two landmarks, belonging to the line of demarcation of the boundaries between both nations,—one at the place called Rilul on the pass of the same name, near the road running from Quillen to Pucon, and the other on the nearest gap south of the said pass.

The Argentine Commission stated that they could not give their consent to the proposal of the Chilean Sub-Commission regarding the erection of a landmark on the Rilul Pass, and another on Rilul Gap as belonging to the boundary line between both Republics, because they were of opinion that such *points do not correspond to the principal chain of the Cordillera de los Andes*, such as is prescribed by the Treaty of 1881, and the Protocol of 1893; that, according to their opinion, *this chain*

Quoted  
p. 1104.

*ought to be searched for in the Cordillera of snowy summits*, which extends to the west of the said places, and of which the massif of the Quetrupillan forms part ; and that consequently the Argentine Sub-Commission, in conformity with the stipulations of Article 3 of the Protocol of September 6th, 1895, invited the Chilean Sub-Commission to postpone the erection of the landmarks of demarcation and to continue the works of investigation and surveys of the region, including the mentioned snow-capped summits of the Quetrupillan, and others situated to the south and north of it.

On their part, the Chilean Sub-Commission declared that the points proposed by them, and marked by cairns, answer to the principle established in the Treaty of 1881 and the Protocol of 1893, since at those points diverge the streams (*vertientes*) which, on the west, feed Lake Hualalafquen whence starts the Lahuenhuenu stream which, flowing down a nameless ravine, empties itself into the River Maichin, an affluent of the River Pucon or Minetué belonging to the basin of the Tolten, and on the east, there rise the streams (*vertientes*) which flow to the two brooks which empty into the Champehuen, and thence to the Lakes Huihui and Quillen, tributaries to the River Aluminé, belonging to the basin of the Rivers Limay and Negro. On the other hand, the Argentine valley Huihui communicates with the narrow Chilean valley through which flows the Lahuenhuenu towards the Valley Maichin ; the landmarks are placed at points which are the highest between those streams and opposite valleys ; they have not been erected on the greatest depressions corresponding to the respective pass and gap,—that is to say, at the points where two contours, of the same level, but of opposite curve, are tangent,—owing to the dense forest preventing it, but there have been selected instead accessible and sufficiently visible points of the ground.

The Chilean Sub-Commission consider the season too advanced to commence the works of investigation and survey proposed

by the Argentine Sub-Commission, besides possessing sufficient data to establish that it is not in the Quetrupillan where they should seek the frontier line. For these reasons they regret being unable to accept the proposal of the Argentine Sub-Commission, reserving to themselves the right to submit this point to the more enlightened decision of their Expert, and to continue the investigation and surveys which they may deem necessary on the points they may consider as belonging to the frontier line, suspending the demarcation meanwhile.

The Argentine Sub-Commission declared that, the Chilean Sub-Commission having stated that they had already constructed landmarks on the pass and gap of Rilul, which they propose, they do not altogether acknowledge the right to erect landmarks of demarcation within the region of the works without their previous consent, for which reason they were of opinion that the said landmarks should be demolished, acknowledging to the Chilean Sub-Commission a similar right respecting the Argentine.

Like the Argentine Sub-Commission, the Chilean Sub-Commission neither claim for themselves, nor acknowledge to the former, the right to place boundary landmarks without the consent of both Sub-Commissions. The division of the work arranged previously at conferences held between both Sub-Commissions, involved their separation by a considerable distance, and they believed they had economized time and work by constructing the cairns in the places they were to propose to the Argentine Sub-Commission.

But, in proposing the planting of a landmark at some point, whether there existed an agreement or not, they considered it their duty to leave this point well defined on the ground ; in the present case cairns have been constructed sufficiently strong to withstand the weather, pending a definite result ; until such time the two cairns set up will not possess any other character than to fix on the ground a trigonometrical station so important

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as are, in the present case, the points proposed by the Chilean Sub-Commission as boundary landmarks.

The Argentine Sub-Commission, in spite of the declaration from the Chilean Sub-Commission, that the cairns constructed must be considered simply as trigonometrical landmarks for future reference to works effected, are of opinion that they must not assume either in their shape or dimensions a similarity to the landmarks which have been erected or should be erected in the future.

The Chilean Sub-Commission are of opinion that the shape, like the dimensions, of the said carins would not affect in the least the character which is given them by the foregoing declaration.

As the disagreement respecting the points proposed by the Chilean Sub-Commission, has, in fact, arisen, they wish to know whether the Argentine Sub-Commission propose, on their part, the planting of some landmark at some other point which they might consider to be situated on the frontier line, so as to carry out the necessary investigation and be able to form an opinion upon the case.

The Argentine Sub-Commission insist on the invitation made to continue the investigation of the snow-capped summits which rise on the western side of the points mentioned, and of which the massif of the Quetrupillan forms part.

In testimony whereof the Assistants of the Joint Sub-Commission signed the present Act in quadruplicate, sealing it with the seals of both Sub-Commissions, the Argentine Sub-Commission declaring that they will continue, on their part, the works of investigation and survey to which they refer in their invitation to the Chilean Sub-Commission.—DONISIO PARDO, ERNESTO 2° FRICK, *Julio Lederer, A. Moreno.*

## No. 68.

### ACT OF THE DELIMITATION BETWEEN DUNGENESS POINT AND MOUNT AYMOND.

[Translated from "*Memoria de Relaciones Exteriores de Chile*," 1895, pp. 293-296.]

(Quoted on page 558 of the Statement.)

#### Enclosure A.

*The Chilean Assistant to the Chilean Expert.*

*5th Chilean Sub-Commission.*

CAÑADON DEL CÓNDOR, January 9, 1896.

MR. EXPERT,—

I have the pleasure to transmit the Record drawn up in connection with the boundary line adopted between Dungeness Point and Mount Aymond, together with a map of this region which will inform you as to the location of the points which determine it.

From Dungeness Point to Mount Dinero, a careful survey of the ground convinced us of the impossibility of tracing a line which might be derived from the orography of the region; we were therefore compelled to select arbitrary points which would conform to the spirit and letter of the treaty.

The starting point was necessarily the buoy existing in the southern extremity of Dungeness Point. A little to the north of this buoy there exists a large estuary which is

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filled at high tide, thus rising as much as 40 feet, and permitting the entrance of sloops of some draught ; as these are waters of the Straits we deemed it advisable, in conformity with the spirit of the treaty, to leave aside this estuary, for which reason we have adopted point A as a starting point of the line which has to divide the Point. Hence the north to south line was adopted because it divided the ground more equitably, causing it to end on the highest part of the cliffs existing to the north and affording a predominant point for the erection of a landmark. From this point, marked on the map with the letter D, the line continues to Mount Dinero forming an angle at C, a solution which we have adopted acquiescing in the request of the Argentine Commission who expressed an ardent desire that there should remain included in their territory, the buildings of Monte Dinero Farm, the lands of which had been bought by the Argentine Government. As we considered that such a concession did not prejudice in the slightest the interests of Chile, and as, on the other hand, we were not going beyond your instructions, we considered it a duty of courtesy to acquiesce therein.

From Mount Dinero to Mount Aymond, as we have already had occasion to mention, and as is stated in the Act annexed, *there does not exist the chain of hillocks to which the Treaty alludes*, nor even any prominent local chain which might naturally indicate the boundary line ; the only chain we have observed is that which stretches from Mount Dinero to point 6, ending at that point, which was taken as the origin of *the arbitrary line which reaches as far as Mount Aymond*. The points of this line are small isolated heights, which are at a convenient distance from the coast, and which safeguard Argentine interests, such as the C6ndor Farm, which is similarly circumstanced to Mount Dinero Farm, thus conforming, on the other hand, to the spirit of the Treaty.

We hope, therefore, that our action will meet with your

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approval, taking into account that our only object has been to place the least possible obstacle in the way of the continuance of the work of delimitation, and to reconcile the Chilean and Argentine interests, confining ourselves to the Treaty which serves us as a rule.

In order not to delay the works of the season, we are going to proceed with the erection of the landmarks, on the line already mentioned, with the character of provisional, in accordance with our custom on previous occasions.

If our agreement receives your approval, the pyramids existing at present at Punta Arenas will be insufficient, and we therefore beg of you to be so good as to order the sending of 15 more which we consider indispensable during the present season.

I am, etc.

ALVARO DONOSO G.

## Enclosure B.

### *Act of Demarcation.*

*Republic of Chile.—Demarcation of the Boundaries with the Argentine Republic.—Act.*—At the Cañadon del Cóndor under date of the 8th of January, 1896, the undersigned, Chiefs and Assistants of the 5th Joint Sub-Commission for the demarcation of the boundary between Chile and the Argentine Republic, having in view maps of and information as to the ground comprised between Dungeness Point and Mount Aymond, with the object of giving effect to the Treaty of 1881, have resolved to submit to the approval of the Experts the following Agreement.

The boundary line shall start from the buoy situated at Point Dungeness towards Point A of the triangulation, situated east of Shark Creek, and shown in the respective map, and shall continue northwards along the meridian as far as Point B on the high part of the cliffs which stretch west of Cape Vir-

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gins ; thence it shall follow to the west towards point C, from which it shall run in a straight line to Mount Dinero.

Between Mount Dinero and Mount Aymond, as *the chain of hillocks to which Article 2 of the Treaty refers does not exist*, it has been agreed to select on the ground a series of conspicuous points shown on the map by the numbers stated as follows :—

One at Mount Dinero.

Six to the north-east of Mount Dinero.

Ten to the west of the preceding one.

Fourteen to the west of point 10.

Twenty-six to the north-west of 14.

Twenty-seven to the west of 26, and to the south of the houses of Cónдор Farm.

Thirty-seven to the north-west of the preceding one, and to the north of the northernmost part of Possession Bay.

Starting from point thirty-seven (37) the line runs straight to Mount Aymond.

As the boundary must run in a straight line from Mount Dinero as far as the intersection of parallel 52° south with the 70th meridian of longitude west of Greenwich, it has been agreed to determine this meridian by means of the transport of the time from Punta Arenas, a point of known longitude.

The undersigned subscribe the present Act in duplicate.—  
ALVARO DONOSO G., JUAN A. MARTIN, *Víctor Caro Tag'le*,  
*Atanasio Iturbe*.

## No. 69.

### THE ARGENTINE LEGATION AT SANTIAGO ON THE DEMARCATION IN 1898.

[Translated Extracts from the "*Diario Oficial de la República de Chile*,"  
July 7, 1898.]

(Quoted on page 561 of the Statement.)

*The Argentine Plenipotentiary in Santiago, to the Chilean  
Minister for Foreign Affairs.*

SANTIAGO, June 20, 1898.

\* \* \* \* \*

THE Argentine Government has, for a long time past, earnestly and unceasingly looked forward to the definitive conclusion of the frontier question at the earliest possible date. To accomplish this object of primary importance, the Minister for Foreign Affairs, Señor Amancio Alcorta, submitted in 1896 to the Chilean Minister in Buenos Aires, Señor Morla Vicuña, the idea of adopting by an agreement of the Governments, or simply of the Experts, the necessary measures to effect in as short a time as possible the exploration and survey of the whole Cordillera, and draw up the maps of the same. In this manner, the indispensable elements for determining the frontier line along the whole of its extent would be obtained.

Quoted  
p. 561.

The subject was dealt with by the Ministers mentioned, at various conferences. Señor Morla Vicuña found the plan

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suggested advantageous for both parties, and left Buenos Aires with the resolve of supporting it before his Government.

\* \* \* \* \*

On the other hand, the facts have corresponded to the wishes and assurances expressed by the Government I have the honour of representing. The operations and investigations carried out on the ground, under the direction of the Expert, Señor Moreno, and by him personally, have supplied the knowledge that it was desired to acquire.

At present the necessary office work is being carried out. In the month of August both Experts will meet, according to agreement, in order to decide as to the frontier line and fulfil their important mission.

All the efforts of the Assistant Engineers being directed to the preparation of the elements required to definitively conclude the boundary question, the reply from the Argentine Sub-Commissions respecting one or more landmarks proposed by the Chilean Commissions was not urgent, nor had it any importance whatever.

And it can be readily understood that the lack of a decision as to one or more landmarks could not practically delay the final solution of the question, since, once the ground is studied, the data obtained, and the maps made of the regions recently explored, the Experts, when they meet to propose and agree to a line, will necessarily have to decide as to those landmarks. If, on the contrary, the Sub-Commissions should have devoted themselves to discuss the erection of landmarks in more or less limited sections of the frontier, they would have left without investigating a portion of the Cordillera, which would have frustrated the plan of terminating the matter during this season.

To sum up, without the agreement of the Experts of May 1, 1897, and without the works carried out as a consequence thereof, the problem of the delimitation would have been prolonged still for many years, in the midst of uncertainties and

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alarms which are inherent thereto. I must add that the Argentine Government are convinced that, had that Agreement been accepted when it was proposed, the question would have ended in 1897.

I have been compelled to refer to these circumstances in order to refute the charge which, implicitly, if not explicitly, the Report of that department contains.

I trust that, in view of their accuracy, Your Excellency will accept the preceding remarks as the expression of a desire to re-establish and determine the facts, and to leave a record once more of the anxiety of my Government to reach a prompt and absolute termination of the Boundary Question.

I have, etc.

N. PINERO.

## No. 70.

### THE CHILEAN GOVERNMENT ON THE DEMARCATIION IN 1898.

[Translated Extracts from the "*Diario Oficial de la República de Chile*,"  
July 7, 1898.]

(Quoted on page 562 of the Statement.)

*The Chilean Minister for Foreign Affairs to the Argentine  
Plenipotentiary at Santiago.—A reply to the foregoing.*

SANTIAGO, July 4, 1898.

\* \* \* \* \*

THE delay in the carrying out of the works of the demarcation and the state of uncertainty in which the question has been maintained for so many years, have caused the two nations so much damage that your attitude in declining on behalf of Your Excellency's Government, to accept any responsibility for such delay is easy to understand and to explain; but on my part, I must state that the facts contained in the Report which has elicited Your Excellency's remarks, are unquestionably accurate.

The Experts' Commissions were constituted in 1890, in conformity with the stipulations of the Treaty of 1881 and the Convention of 1888.

In January of that year, the Government of Chile appointed their Expert; but nothing could be done, because the Argentine Expert arrived in the month of April when it was already impossible to commence the work on the ground.

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It was agreed that the Commissions should meet at Santiago in October, but the Argentine Expert was prevented from attending the meeting at the time named.

But for these mishaps, the works would have been commenced in the deserts of Atacama and Tierra del Fuego, and would not have been interrupted by our revolution in 1891.

Public order was restored in September, and the Chilean Expert hastened to communicate this fact to his Argentine colleague, but the latter did not arrive until the January of 1892.

The following season of 1892-1893, was, for similar reasons, equally fruitless for the demarcation.

It was in January 1894 that active work was commenced, but its results were scarcely satisfactory, for, if it is true that the delimitation of Tierra del Fuego, and of a great portion of the Magellanic territories has been tranquilly and happily ended, and that 33 landmarks have been erected on the extent of the frontier in the Cordillera de los Andes, it is also true that there are 111 landmarks which the Chilean Sub-Commissions have been proposing from year to year to the Argentine Sub-Commissions, without having been able to obtain that they be accepted or rejected.

You will readily understand the immense importance that the acceptance or rejection of such landmarks would have upon the tranquillity and welfare of both countries. The former course would have led us to an agreement, to a common interpretation of the treaty ; the latter would have led us before the Arbitrator ; in either case an amicable, dignified and honourable solution for the two nations.

There has also been another cause of loss of time. In accordance with what was agreed, the Argentine Commission should have had their office at Santiago ; but as a matter of fact, as soon as the works of demarcation and surveys on the ground

were suspended, they (the Argentine Commission) took their departure. It is easily inferred that the immediate and uninterrupted intercourse of the Experts and Sub-Commissions would have contributed greatly to facilitate their personal and official relations, to illustrate their opinions, to reconcile them, and, in any case to pave the way for speedy and cordial solutions which would obviate further vexatious controversy.

The above facts suffice to show you how convinced the Chilean Government are that no responsibility rests with them for the delay in the demarcation of the boundaries. If the Chilean Commissions had been seconded in their action, the Boundary Demarcation would have been terminated in 1896 or 1897, for, either by agreement, or by arbitration, *the meaning of the Treaties would have been established.*

Quoted  
p. 562.

But Your Excellencies think that "all the efforts of the assistant engineers being directed to the preparation of the elements required to definitely conclude the Boundary Question, the reply from the Argentine Sub-Commissions respecting one or more landmarks proposed by the Chilean Commissions was not urgent, and had no importance whatever." You attribute a decisive value, for the termination of the dispute, to the Agreement of May 1, 1897, and you state in your note, as I have already recalled, the fact that it was the Argentine Government who, in 1896, proposed the idea of prosecuting the investigation and survey of the Cordillera and of making a map of all that region, in order to be able to present within a short time the general line of the frontier.

In this respect I beg to recall to you that the Chilean Government as well as their Expert accepted the idea of the Argentine Government immediately that it was proposed. If the written agreement was not arrived at prior to May 1, 1887, it was not, as undoubtedly you will remember, because the idea was opposed on the part of Chile.

Quoted  
p. 562.

And it hardly could have resisted it, since this Government

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had never thought that the Agreement of May implied the abandonment of the course to be followed according to the treaties. Quoted  
p. 562.

In any case, Mr. Minister, it is not my intention at the present moment to demonstrate the keen desire which my Government has always shown for the termination of the protracted controversies.

I am pleased to think that such termination is near.

In August, as agreed, the Experts will propose the general line of the frontier, and if unfortunately, having regard to the nature of their functions, they should not reach a final Agreement during that month, I trust that the Governments will be more fortunate, and that, in any case, they will not forget the obligation, stipulated five times in solemn Treaties, which prescribes Arbitration as the final, ineludible, ample and unrestricted solution.

\* \* \* \* \*

I am, etc.

J. J. LATORRE.

## No. 71.

### THE EXPERTS' AGREEMENT IN 1897 AS TO THE PRESENTATION OF PROPOSALS FOR A GENERAL FRONTIER LINE.

[Translated from "*Memoria de Relaciones Exteriores de Chile*," 1896, Docs., pp. 27-30.]

(Quoted on page 562 of the Statement.)

#### Enclosure A.

##### *Agreement of the Experts.*

IN the city of Santiago de Chile, on the 1st of May, 1897, the undersigned Experts, Señor Don Diego Barros Arana, on behalf of the Republic of Chile, and Don Francisco P. Moreno on behalf of the Argentine Republic, having met in the International Boundary Office, after exchanging views regarding the means of hastening and giving impetus to the work of demarcation, with the object of being enabled to decide on the general frontier line at the end of next season of operations, thus satisfying the desires of the Governments they represent, agreed, exercising the faculty conferred on them by clause 2 of the Convention between the Argentine Republic and Chile dated August 20, 1888 :—

1.—To request from their respective Governments the appointment of three first, and three second class assistants, who shall form three new Sub-Commissions to work in the Cordillera de los Andes. The said Sub-Commissions shall carry out their operations : the first from latitude 41° to 44° S. ; the

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second from lat.  $44^{\circ}$  to  $47^{\circ}$  S., and the third from lat.  $47^{\circ}$  to  $49^{\circ} 30'$  S., approximately.

2.—To request, likewise, from their respective Governments the appointment of the number of auxiliaries required for carrying on with all activity the work of the new Sub-Commissions, as well as that of those at present existing.

3.—If, during the operations, differences should arise between the respective assistants, as to the location of the boundary line, the work of reconnaissance and survey of the ground shall be continued without interruption till the end of the season.

The Experts drew up and signed two copies of the present Record.

F. P. MORENO, DIEGO BARROS ARANA, *Diego Gonzalez Victorica, Alejandro Bertrand.*

## Enclosure B.

*The Chilean Expert to the Chilean Government.*

SANTIAGO, May 5, 1897.

MR. MINISTER,—

I have the honour of laying before you the Agreement drawn up with the Argentine Expert, with the object of giving more impetus to the work of the demarcation of the Chilean-Argentine Boundary in the Cordillera de los Andes.

With the aforesaid object, as may be seen from the Record of our Conference of May 1, a copy of which I beg to enclose, we have agreed to request of our respective Governments the appointment of six assistants and the other auxiliaries necessary for the organization of three fresh Commissions, and an increase in the staff of the existing ones, in order that they may be able to extend their radius of action.

The appointment of these assistants and auxiliaries will not be required before the end of next winter; it is urgent, however,

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that the supreme Government should decide immediately whether they accept our agreement, because, if they do so, it will be necessary to obtain from Europe, without delay, the instruments which would be required for the use of the new Commissions, and the majority of which are not to be found in this country. For this object it will be necessary to make use, for the moment, of the funds destined for the commencement of the works of the present Commissions during next season, relying on a grant by Congress of additional funds to reimburse the former, and to defray the salaries, outfit, purchase of horses and provisions for the three fresh Commissions, the total amount of which would not be under \$50,000.

I trust you will be good enough to inform me as to the decision of the Government on this matter at the earliest possible date, in order that I may take the steps indicated.

I am, etc.

DIEGO BARROS ARANA.

## Enclosure C.

*The Chilean Government to their Expert.*

MINISTRY FOR FOREIGN AFFAIRS OF CHILE,  
SANTIAGO, May 5, 1897.

SIR,—

I have had the honour to receive your communication, No. 15, dated May 5, and with it the copy of the Record of the conference you held on the 1st instant with the Expert of the Argentine Republic, wherein reference is made to the Agreement then arrived at for the purpose of giving impetus to the operations of the demarcation of the Chilean-Argentine boundary in the Cordillera de los Andes.

The Government of Chile sanction, on their part, that opportune agreement ; they are prepared to appoint, on your proposal and whenever you consider it advisable, the six assist-

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ants and other auxiliaries you may deem necessary for the organization of the three fresh commissions to which the Agreement refers, to increase the staff of the existing ones, and to authorize the sending to Europe for the necessary instruments to enable the fresh Commissions to operate, applying to this purpose the funds destined for the expenses connected with the commencement of the works of the present Commission during next season.

The Government will take the first opportunity of asking Congress for supplementary funds to replace those which may now be spent in the acquisition of fresh instruments, in the payment of salaries and equipment of the staff, and in the purchase of animals and provisions for the three fresh Commissions which it has been agreed to create.

The expectation that an Agreement should be reached regarding the general frontier line at the end of the next season of operations, is in accord with the ardent desire of the Government and you may count upon their decided co-operation in carrying it out.

I am, etc.

C. MORLA VICUÑA.

## No. 72.

### THE CHILEAN EXPERT ON THE DELAYS OCCURRING IN THE DEMARCATION.

[ Translated from a copy at the Chilean Legation.]

(Quoted on page 566 of the Statement.)

*The Chilean Expert to the Argentine Expert.*

SANTIAGO, May 11, 1898.

MR. EXPERT,—

Under date of the 9th of April of last year I had the honour of addressing to you a communication with the object of inviting you to put an end as soon as possible to the state of indecision and delay in which several sections of the demarcation under our charge were to be found. In that communication I recalled to you that such delay was due exclusively to the conduct of the Argentine Sub-Commissions, some of which had not proposed, accepted or rejected any landmark whatsoever during four consecutive seasons of work.

In reply to that communication and to a subsequent one which I forwarded to you under date of April 25, you addressed me those dated respectively the 21st and 26th of the same month. Recalling also the facts adduced by me and deploring the delay to which they gave rise, you reiterated to me your intention of hastening the demarcation as much as possible. In the latter of these communications you adduced to me, as an anticipated

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proof of your efforts to comply with the technical task devolving upon you, "the extent of the demarcation during this season" (1897), and you promised me that the surveys already carried out "would permit the continuation of the demarcation with all rapidity during the next season" (1898).

On the 1st of May, 1897, on the same day on which you handed me the last of these communications, and with it the formal promise I have recalled, we drew up an agreement designed to "Give impetus to and hasten the works of the demarcation," by which three fresh Sub-Commissions were entrusted with the operations between  $41^{\circ}$  and  $49^{\circ}$  S. Lat. It was therein agreed that, if, during the operations, divergences should arise between the respective assistants as to the location of the boundary line, the works of reconnaissance and survey of the ground should be prosecuted without interruption until the end of the season. The promises contained in your communication quoted, and which you repeated to me verbally at different times, and the creation of three fresh demarcating Sub-Commissions, in addition to the six which existed already, gave reason to hope that, in the season of 1898, the works of the demarcation would progress considerably. In view of these antecedents and these expectations, it was believed at our conference of May 1, 1897 that, at the end of the working season of 1898, we, the Experts, would find ourselves in a position to present to our respective Governments a general frontier line. Wishing to respond to this common aspiration, the Chilean Commission organized, independently, exploring expeditions to investigate those points upon which we had not sufficient knowledge, and which the demarcating Commissions would probably be unable to reach.

In spite of these steps, their result has not corresponded in any manner to the hope entertained. It is, therefore, painful but indispensable for me to state that, if the "extent of the demarcation" carried out in the Cordillera during the season

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of 1897 was very insignificant, the planting of landmarks during the recent season has been nil, owing to the same reasons which have caused the delays on previous occasions.

To the requests of the Chilean Sub-Commissions to obtain an answer from their Argentine colleagues to the proposals made in the previous year to fix landmarks in certain places, and to the further similar proposals made during the present season, they have simply replied that they are still not in a position to give a definite answer, or that their works should consist, not in demarcating, but in carrying out the necessary investigations in order to present a general frontier line. Moreover, in the case of one of the engineers under your orders agreeing to accept ten landmarks proposed, he did so with the reservation that, in case they should themselves reach a solution in the matter, he had to consult you previously. Now, as you left Santiago about that period and went to places hundreds of miles apart, where it was impossible for any communication to reach you, such restrictions of the powers of the demarcating Commissions created real embarrassment to the promised activity in the works of the demarcation.

I deem it my bounden duty to state here in the most conclusive and explicit manner that the arbitrary sense the engineers under your orders have attempted to give to the Agreement of May 1st is contrary to its letter and to the circumstances which gave rise to it, and that there is not in its text any expression whatsoever involving the idea of suspension of the operations of the demarcation during the season of 1898. Such suspension, expressly prohibited by Clause 7 of the Protocol of 1893, could not be sanctioned by the Experts. Moreover, the demarcating Sub-Commission entrusted with the operations on the ground could not in any case have suspended their tasks without clear and precise instructions signed by the two Experts; and those Instructions had not been given them; therefore, the line of action taken by those who have abstained

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from continuing the operation of planting landmarks, is completely irregular.

I cannot imagine either that you should have entertained the idea of suspending the work of the demarcation on the same day upon which you placed in my hands your communication in which you stated to me in such a categorical manner that the planting of landmarks would continue with all rapidity during the next season. In any case, I must state that you never gave me to understand, either explicitly or implicitly, that you entertained such ideas ; and that, on the contrary, whenever we spoke of the matter in the following month and until your return to Buenos Aires, you repeated to me the same ideas.

In view of these circumstances, you will readily understand my surprise when I was first informed of the replies which the Argentine Sub-Commissions gave to the proposals of the Chilean Assistants for the planting of the landmarks of the demarcation. If you had been then in Santiago or at a place where my communications could have reached you in due course, I would have actively protested against the action of the Sub-Commissions under your orders ; and surely the planting of landmarks would have progressed in the season which is now at an end. In this sense, your being hundreds of leagues distant, and at places with which easy communication was impossible, has contributed to the fact that the practical works in the demarcation in the Cordillera have not advanced one step during the season which is now at an end.

This lamentable result, like the delay on the part of the Argentine Sub-Commission to give a reply,—whether accepting or rejecting the numerous propositions for the planting of landmarks made by the Chilean Sub-Commission and which are pending up to now, some of them from 4 or 5 years back,—make the progress and termination of the work entrusted to us by our respective Governments become more and more indefinite.

In one of your communications (that of April 21, 1897), you assured me that there did not exist "fundamental divergences" between the demarcating commissions of both countries. Had this been really so, the demarcation would have progressed with much more rapidity, and the landmarks proposed by the Chilean Sub-Commission would have been either accepted or rejected, instead of being at a standstill for years without our getting a definite and explicit reply. This situation is still more irregular respecting the Rilul landmark, proposed by the fourth Chilean Sub-Commission on the 7th of March, 1896, and rejected by the Argentine Sub-Commission. This material divergence which we, the Experts, should study in order to try to overcome it, or in the event of not reaching an agreement, to lay it before our Government as a case upon which an arbitrator should decide, is still pending. In spite of your having intimated to me a year ago, that according to your communication of April 5, 1897, you would soon be in a position to accept or reject the proposed landmarks at Rilul, all that season passed, as also the one which is now at an end, without my obtaining a reply from you.

Believing, therefore, that in these antecedents there exist fundamental differences which impede the regular continuation of the work of demarcation, I deem it my bounden duty to request explanations which will place us in a position to expedite the demarcation, thus carrying out the desires, so many times expressed by our Governments, and the aspirations of both countries, to see all cause of apprehension concerning their amicable relations removed.

From the very first meeting I had with your predecessor, Señor Don Octavio Pico, in January 1892, in order to deal with the carrying out of the operations of the demarcation, I had occasion to explain clearly to him that, in my opinion, the essential and absolute character of the boundary line stipulated in the Treaty of 1881, was that of dividing the waters which

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irrigate both countries. On several occasions I made similar declarations to your other predecessors, Señores Virasoro and Quirno Costa. Your predecessors named, though not categorically accepting this fundamental principle, did not clearly repudiate it, nor did they propose another instead, whereby one could know the characteristics of the line which, in their opinion, should be adopted in the demarcation. The fixing and approval of landmarks in the Cordillera, in accordance with the fundamental idea maintained by the Chilean Expert as the unquestionably logical application of the boundary treaties, would lead one to suppose that this was a definitely agreed point between both parties, and that there do not exist "fundamental divergences" in the demarcation; but the indefinite postponement of the acceptance or rejection of the 56 landmarks which are pending, some of them since 1894 and 1895, show that the agreement to which you refer is not effective.

I have, however, vainly sought in the declarations of your predecessor, as in the publications made against the principle I maintain,—which until now has served as the basis for the demarcation,—some clear definition of the precise features of "the Andean cordon," which, as may be gathered from them, the Argentine Sub-Commissions are at present looking for. In vain, too, have I asked myself, over and over again, upon which clauses of the Treaty such a definition is based. The only thing upon which I have no doubt whatsoever is that you and your Commissions are not disposed to accept the only line which passes continuously between the sources which flow respectively towards Chile and the Argentine Republic.

To continue maintaining, in the face of these facts, that there do not exist "fundamental divergences," would be, in my judgment, Mr. Expert, unworthy of the high posts we fill by reason of the confidence with which our respective Governments have honoured us.

So fundamental, on the contrary, is the divergence of opinion

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in the application of the treaties, that it may be considered beforehand as irreducible, and necessarily that implies its uselessness for the object of the demarcation of a great portion of the ground in which surveys are being carried out by both parties.

Since there exists this divergence, which, moreover, is not due to a slight indecision in the planting of one or more landmarks, but to a *fundamental* disagreement proceeding from a different interpretation of *the more important provisions* of the Treaty of Limits, I believe, Mr. Expert, that the moment has arrived for you to give a substantial form to the bases of delimitation to which the Argentine Sub-Commissions confine themselves at present, whether by means of a precise and unmistakable formula, or by the geographical tracing of the general frontier line in the extent in which this be actually possible for you, within the period referred to in the preamble of the Agreement of May 1, 1897.

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p. 566.

Whatever the form may be, and whatever the extent as to which these data may refer, I have sufficient antecedents to know that they will provide abundant material for us, in the fulfilment of our duty, either to arrive at an agreement or to submit the divergences resulting therefrom without delay to our respective Governments, so as to place them in a position to apply, as soon as they may consider it advisable, to the decision of the Arbitrator designated in 1896.

Wishing, now more than ever, to bring to an end the period of indecision and delays so prejudicial to both countries, through which the demarcation of the Andean boundary in its sections of greater interest is now passing ; interpreting as the expression of your desire, the proposal which gave rise to the above-mentioned Agreement of May 1, I have wished to avail myself of your return by inviting you to join me in giving a tangible form to the divergence, the importance of which even those alien to the work of demarcation are not ignorant of.

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In laying these remarks before you, I am, etc.

DIEGO BARROS ARANA.

## No. 73.

### THE ARGENTINE EXPERT ON THE DEMARCATON WORK.

[Translated from a copy at the Chilean Legation.]

(Quoted on page 566 of the Statement.)

*The Argentine Expert to the Chilean Expert.*

SANTIAGO, May 12, 1898.

MR. EXPERT,—

I hasten to reply to your note dated yesterday which I received on the same date. The little time at my disposal,—occupied as I am in making preparations to fulfil, within the appointed time, my part of the obligations we contracted on the 1st instant,—does not permit me, at least for the present, to enter into any detail of the facts to which your communications of the 9th and 26th of April last refer, quoted in your note to which this is a reply, and my answers to same dated 9th and 26th ultimo.

I may simply mention to you that, if the latter note did not reach your hands until the 1st of May, it was delivered at the Secretary's Office of the Chilean Commission on the day following its date.

The Agreement of May 1st,—drawn up at my suggestion and as a consequence of my firm resolve to avoid delay as much as possible and to end as soon as practicable the operations of fixing the frontier of the Argentine Republic with that of Chile in conformity with the Treaties in force, thus satisfying the

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wishes of my Government—was subscribed to on my part with the object of preventing discussions from arising, respecting *the manner in which the Experts or their Assistants might interpret the Treaties we are called upon to give full effect to.* A great portion of the time which has elapsed since 1890 up to this date has been employed in these discussions, which have brought into the demarcation of the frontier between our respective countries more disadvantages than benefits.

When accepting the honourable post I hold, I did so with the profound conviction that my functions were exclusively of a geographical character and that the letter of the treaties was to be applied on the ground, and animated by the desire of removing everything that might embarrass their strict fulfilment. The Treaty of 1881 says, in Article I., that the boundary between the Argentine Republic and that of Chile is from north to south, as far as the 52nd parallel of south latitude the Cordillera de los Andes; that the boundary line shall run in that extent over the highest summits of the said Cordillera which divide the waters, and shall pass between the “vertientes” which start on either side. The Protocol of 1893, interpretative and explanatory of the Treaty of 1881, establishes, also in Article I., that the Experts shall hold as the invariable rule in their proceedings the geographical line agreed to in the said Treaty and that “consequently, there shall be held as perpetually belonging to the Argentine Republic and as under its absolute dominion all the lands and all the waters, to wit: lakes, lagoons, rivers and parts of rivers, brooks, springs (*vertientes*) lying to the east of the line of the highest summits of the Cordillera de los Andes which divide the waters; and, as the property and under the absolute dominion of Chile, all the lands and all the waters, to wit: lakes, lagoons, rivers and parts of rivers, brooks, springs lying to the west of the highest summits of the Cordillera de los Andes which divide the waters,” and, according to Article VI. of this Convention for the effects

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of the demarcation, "the Experts, or in their place, the Commissions of Assistant Engineers acting on the instructions given to them by the former, shall seek the boundary line on the ground and carry out the demarcation by means of iron landmarks of the kind already agreed upon, placing one on each pass or accessible part of the mountain which is situated on the boundary line." The Agreement of April 17, 1896, in its first basis extends the boundary line, the determination of which must be carried out in conformity with the Treaty of 1881 and the Protocol of 1893 as far as parallel 23° of South latitude. The Convention of 1888 says, in Clause III., that the Experts shall carry out on the ground the demarcation of the lines indicated in Articles I., II. and III. of the Boundary Treaty; in Clause IV. that the Experts may, however, entrust the execution of the work to commissions of assistants. The instructions which, under date of January 1, 1894, the Experts agreed to for the demarcation in the Cordillera de los Andes, in its chapter entitled "Preliminary Operations," Article III., says: "The chiefs of each joint Sub-Commission shall form by joint accord a plan of the work for each season and they shall form an approximate list of the points where it is proposed to erect landmarks. They shall search on the ground for the boundary line, and they shall effect the demarcation by means of iron landmarks of the kind already agreed upon, placing one upon each pass or accessible point of the mountain which is situated on the boundary line"; and, in the chapter on the "Operations on the Ground" following that on the "Preliminary Operations," Article V. stipulates that the Sub-Commissions that should operate in the Cordillera de los Andes "shall hold, as the invariable rule of their proceedings, the principle established in the first part of Article I. of the Treaty of 1881, and that, therefore, those Sub-Commissions shall investigate the location, in the said Cordillera, of the main chain of the Andes, in order to search on the ground for the highest summits

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which divide the waters, and shall determine the boundary line in its accessible parts, making it to pass between the 'vertientes' which start on either side." Guided therefore by the Treaty of 1881, the Protocol of 1893, the Convention of 1888, the Agreement of 1896 and the Instructions of the Experts of January 1, 1894, for the operations of the demarcation in the Cordillera de los Andes, in that part referring to the preliminary investigations and operations upon the ground (Article V.), I have incessantly attempted, from the moment of my appointment until now, to carry out in the Cordillera de los Andes, the operations I have considered necessary for the delimitation of the frontier between the Argentine Republic and that of Chile. In my communication of April 21 of last year, I stated the manner in which I understand my duties of Expert in the following terms: "An Expert cannot accept the limitation of the investigation which he may deem necessary in order to comply with the stipulations of the Treaties, because he must have perfect knowledge of the ground in order to look for the boundary line according to his own judgment, and cannot, therefore, be hindered in the operations he may direct, provided they have no other object than that indicated. The Experts have given, by joint accord, some instructions for the demarcation, but these do not prevent them, each, without abandoning the general plan of the work, from arranging that their Assistants should furnish them with the elements they may need in order to form an opinion as to the conditions of the ground of the operations, wherever they may not be able to carry out personally the demarcation of the frontier line upon the ground." Under this impression I signed the obligation of May 1st, subsequent to my declarations, and understanding by *demarcation work* every investigation of the ground which in this case might contribute to the better knowledge of the geography of the Cordillera de los Andes in which is included the immovable boundary be

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tween the Argentine Republic and that of Chile,—a knowledge without which it is impossible to carry out the demarcation of the Argentine Chilean frontier and the investigation which, in all countries of the world, invariably precedes the determination of the frontiers. Besides, I have always considered that the necessity of these previous surveys is implicitly acknowledged in the Instructions which the Experts have subscribed, because it would be materially impossible otherwise for the Sub-Commissions to give effect to the preliminary operation of forming a plan of the work for the season and an approximate list of the points where they propose to erect landmarks.

The special instructions which I have given to the Assistants under my orders had for their main object the fulfilment on my part—which I insisted on when we exchanged views for the wording of the Record of May 1st of last year—of the obligation to hasten the work of the demarcation in the Cordillera de los Andes, so that we, the Experts, might find ourselves “in a position to decide as to the general frontier line at the end of the present season.” Had I acted in the contrary manner, that is to say, in the manner understood by you, materially demarcating in detail the Andean line, I could not have fulfilled my obligation, since such a procedure,—which must in any case be subsequent to *the survey of the ground without which, I repeat, frontiers are never marked out*, especially in such a complicated mountainous region as is the Cordillera de los Andes between 23° and 53° of south latitude. The realization of the wishes of my Government and my own, which are—as I have repeatedly expressed to you in writing and verbally—to terminate in the shortest time possible the delimitation of the frontier with the Republic of Chile, in accordance with the Treaties in force, would then have been rendered impossible from the first moment.

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I consider that you are led into an error when you say that “the arbitrary sense” which the Engineers under my orders

“ have attempted to give to the Agreement of May 1 is contrary to its letter and to the circumstances which gave rise to it, and that there is not in its text any expression whatsoever involving the idea of suspending the operations of the demarcation during the season of 1898.” You will allow me to remind you that the agreement of the Governments of the Argentine Republic and Chile, dated April 17, 1896, considers, as operations of the demarcation, the investigation of the ground, and that you were of the same opinion when ordering, without my previous consent, the investigation of that part of the Cordillera de los Andes, to which basis 1 of that agreement refers, which stretches between parallels  $23^{\circ}$  and  $26^{\circ} 52' 45''$ , “in order that you might be in a position to give effect to basis 1 of the Agreement of April 17, 1896” (I believe these are the words employed by you when transmitting to me at Buenos Aires your resolution), previous to my arrival at Santiago to act as Expert, and therefore, before agreeing to the “clear and precise” instructions signed by the two Experts, which are those which you say my engineers must have received prior to acting as they have done, in compliance with my instructions, and which I have given with the same right as you had to give them to your demarcating engineers in the Andean region mentioned. For my part, I then considered your action as regular, and I did not offer any objection to the operations of the demarcation between  $23^{\circ}$  and  $26^{\circ} 52' 45''$  being carried out as you understood it. Moreover, my note of April 21 of last year, replying to yours of the 9th of the same month, ended by stating that in it you would find the loyal expression of my wish of complying with the stipulations contained in the treaties which serve us as a guide, for which “we have decided,” I said, “that the investigations of the Sub-Commissions should extend to the whole region which, in the judgment of the respective Experts, might contain the line of demarcation.” You have not observed to me that I was in error when expressing such a resolution, and

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it is with your knowledge of this that we have signed the obligation of May 1, 1897.

It is not possible for me at this moment to go into a detailed refutation of the numerous points which you touch upon in the note to which I am replying, but I shall do so as soon as the occupations which absorb all my time, tending to demonstrate without doubt the loyalty of my proceedings, may permit; and I shall simply deal with some of them which I consider it necessary to clear up immediately. Previous to contracting the obligation of May 1st of last year, we exchanged ideas on that same day regarding the manner of determining the general frontier line by the end of the present season, and I proposed to you the creation of a larger number of Sub-Commissions, which was not accepted because it was considered that it would be very difficult, if not impossible, to obtain in Chile as many engineers as would be necessary to form them, in view of which we agreed to request of our Governments the creation of only three Sub-Commissions that were to work between parallels  $41^{\circ}$  and  $49^{\circ} 30'$  of South latitude. I then urged the necessity of having a fresh Sub-Commission that should work to the south of  $30^{\circ}$ , in order that the first Sub-Commission might occupy itself, with all its staff, in the zone the demarcation of which had commenced north of the said parallel, and, as you did not accept my proposition for the reason already given, I decided, when tracing the plan of work for the season which is now at an end, to divide this Sub-Commission into two sections, one of which, the northern one, would continue the work commenced, and the other one would proceed with it to the south as far as the Valle de los Patos. You are familiar with this resolution since it was communicated to you by a telegram of the fourth of last October, which informed you of the departure of some Argentine Sub-Commissions for the ground of operations, a telegram which was amplified by another one of the 29th of that month. In those telegrams I stated the dis-

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tribution of the staff, and also my intention of reconnoitring all the extent of the Cordillera which comprises the demarcation, from  $23^{\circ}$  as far as  $52^{\circ}$ ; and, in my opinion, the indication of the several points where I had distributed that staff, so distant one from another, and from the several zones assigned in the previous instructions and which were new to the Sub-Commissions, was sufficient to show that, unless with great loss of time, it would be impossible for the Assistants, who were to survey each zone, to meet, and therefore the acceptance or rejection of landmarks, in case they should be proposed by the respective Chilean Sub-Commissions, would be impossible. Between planting landmarks,—an operation which in any case, would have required a previous detailed investigation of the ground, rendering impossible the fulfilment of the Agreement desired by the two nations we represent—and surveying the ground of the demarcation so that once acquainted with the result of those surveys, I might fulfil the said obligation, I decided to adopt the latter course.

The restriction on my part of the powers of the demarcating Sub-Commissions, I do not think exists either, since, by the Experts' Agreement, of April 17, of last year, the second-class Assistants, or auxiliaries of the demarcating Sub-Commission, were provisionally authorized to fulfil the functions of Chief Assistants, only in case of the illness of the latter or of their absence from the ground of the demarcation, a case which has not arisen in the present season; and, respecting the Argentine Sub-Commissions, as these are composed of two Assistants, according to the Convention of 1888, who are therefore both of them responsible for the operations they may carry out, it is not possible for them to decide upon the erection of landmarks without being previously in accord amongst themselves and without my consent, because on my part I have not delegated in any way the duties imposed upon me by the Treaties and Clause III. of the Convention of 1888. I am aware of the

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responsibility connected with the high office with which I have been honoured by the Government of my country, and I fill it in such a manner as, I have the profound conviction, is the only one which can avoid the repetition of difficulties, of the kind of which some have arisen since 1892 and which have contributed to cause the uncertainties which happily will be over shortly.

I regret to be of a different opinion from yours, and I now come to the part which concerns me most of the communication to which I am replying, respecting the claims of the Sub-Commission under your orders laid before those under mine, owing to the answer which they have given to the proposals which have been made to them during this season for the erection of boundary landmarks, and I do not admit the charge you make against me of being absent from Santiago, "some hundreds of leagues" and "at places with which easy communication was impossible, owing to which the actual work of demarcation in the Cordillera has not advanced one single step." I have issued the instructions to which you refer, being assured that, only if they are complied with by my engineers, can I reach on my part the desired end of this long question. I firmly believe that, during the season now ending, "the actual work of demarcation in the Cordillera" has advanced more than it has since the beginning of the Experts' work in 1890, and you will admit this once you receive the information which I shall transmit to you as soon as the office work relating to this season has been done. I cannot blindly accept, in my capacity of Expert, the determination of the frontier line, without exposing myself to contribute in rendering it difficult and in prolonging our dissensions; and I must await those results before authorizing, on my part, the proposals which the engineers under my orders will make of materially demarcating extensive zones of the Cordillera de los Andes,—a demarcation in which the landmarks proposed will not be counted by tens, but by hundreds, and to

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which my journey, the object of which I intimated to you verbally when I had the honour of announcing it, will greatly contribute.

If your reference to my absence at hundreds of leagues from Santiago were to involve a charge against me, I repudiate it with all the energy I am capable of. In carrying out my journey I have fulfilled my duties as Expert, so as to enable myself to comply with our obligations, with a complete knowledge of the facts related thereto; and, therefore, I strongly reject the slightest insinuation that the investigations in the Andean region which I have just carried out, have been made with the object of delaying the fulfilment of our agreement of May 1st, which I shall accomplish on my part immediately after the Sub-Commissions under my orders have provided me, within this season, with the elements I require.

It is in view of the aforesaid that I consider it unnecessary at present to enter into explanations upon the landmarks proposed by the Chilean Sub-Commissions to the Argentine Sub-Commissions in previous seasons and in the present one, because the reply to those propositions will be included in the agreement to which the Record of May 1st refers, without any desire existing, on the part of those Sub-Commissions, to elude the stipulations contained in the Treaty and agreements in force, as to their referring to the divergences which might arise from those replies and which are foreseen by the Agreements themselves.

This is the proper moment for presenting to you a proof of the difficulties which the act of hastening the demarcation might create, if prior to proposing the actual demarcation, the investigation demanded by such a serious question as the tracing of the line of the international frontiers, clearly stipulated, has not been carried out. During the present season the Chief of the Chilean Sub-Commission No. 8 has proposed to the respective Argentine Sub-Commission to demarcate, from 44° southwards over an extent of 30 kilometres, "the water-parting line"

comprised between "the range of hills bordering the basin of the Nerivao stream, an affluent of the River Jénua, and that of the River Palena," that is to say, at the points designated as "high, stony pampa" (*Pampa alta pedregosa*) in the "*Carta jeneral de la Patagonia occidental*" constructed last year by the Chilean Boundary Commission; the said Chief is, however, still ignorant as to whether the waters really flow to the River Palena, or at least, the greater part of them, which irrigate the region which he proposes to demarcate. Up to this moment it has not been ascertained whether the River Pico is an affluent of the Palena, nor has the Chilean Boundary Sub-Commission made any investigations to find this out. Señor Barrios' note has not been answered by the Argentine Chief Assistant, because the latter has not been informed yet of its contents, having been, up to a week ago, in the interior of the Cordillera between 44° and 45°, effecting the investigation connected with his mission. The said proposal will not be considered by the Argentine Sub-Commissions, as the "water-divide" proposed as the international boundary is situated outside the Cordillera de los Andes,—a very common phenomenon in the southern part of this continent, and one which was verified in the vicinity of the 52nd degree of latitude by the learned engineer-in-chief of the Chilean Commission. The work of demarcation must be carried out only in "the Cordillera de los Andes," and, while the Treaty of 1881 and Protocol of 1893 are in force, neither the Sub-Commissions, nor the Experts, nor the Argentine or Chilean Government may extend it, or cause it to be made outside of that Cordillera.

Your communication ends by inviting me to give a specific form to the bases of delimitation now followed by the Argentine Sub-Commissions, "whether by means of a precise and unmistakable formula, or by the geographical tracing of the general frontier line, in the extent in which this be actually possible for me, within the period referred to in the preamble of the agree-

ment of May 1, 1897,—an invitation which I beg to say is not opportune, as this period has been determined, and you have no reason for supposing for a moment that I should fail to fulfil my part of an agreement which I was the first to propose. Furthermore, you point out to me the essential and absolute character of the boundary line prescribed by the Treaty of 1881, which, in your opinion, is that of dividing the waters which irrigate both countries,—a fact which you tell me you stated in January 1892 to my predecessor, Don Octavio Pico, and later to the other predecessors in the office which I now hold, Señores Virasoro and Quirno Costa. You must permit me not to consider here the statement of your views with regard to the boundary line. We, as Experts, have no other duty than that of tracing the frontier in strict accordance with the stipulations, which determine the Cordillera de los Andes as the boundary between the two nations which we represent in this question, and which, as shown in the texts of the agreements of 1881 and 1893, provide, besides, that the boundary line “shall run over the highest summits of the said Cordillera which divide the waters, and shall pass between the ‘*vertientes*’ which start on either side.” I cannot, therefore, discuss interpretations of the Treaties, and thereby reopen a fruitless debate which I think it expedient to consider as ended.

Having answered the principal points of your communication of yesterday, I have, etc.

F. P. MORENO,  
*Enrique Lynch Arribalzaga.*

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## No. 74.

### THE ARGENTINE EXPERT ON THE DEMARCATIION WORK.

[This translation follows nearly that given in the Argentine Statement, foot-note p. 347.]

(Quoted on page 566 of the Statement.)

*The Argentine Expert to the Chilean Expert.*

BUENOS AIRES, June 26, 1898.

MR. EXPERT,—

I have received your note of May 22nd last, to which I proceed to reply. You inform me that a conference having been held on May 14 last, at which we were present, in the office of His Excellency, the President of the Republic of Chile, at which I announced my approaching journey to this capital, and my return to Santiago in the month of August, which was fixed for the discussion of a general frontier line, in accordance with the information we might both have collected,—by this agreement the main object you had in view in addressing to me your communication of the 11th of the same month was fulfilled.

I regret to have to revert to this “main object,” and must again insist that you could not have pointed out to me the importance of carrying out my undertaking, you being aware of the exertions made and which are still being made by the

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Sub-Commissions under my orders, to enable me to carry it out,—exertions which exceed those of the Sub-Commissions under your charge.

I remember that, at the meeting referred to, you said that, the region of the Cordillera between lat.  $47^{\circ}$  and  $49^{\circ} 30'$  S. being completely unknown to you, the general frontier line would be settled, in that part, in accordance with the plans and investigations which the Argentine Commission might submit.

It was I who, on April 21, 1897, proposed to His Excellency the President of Chile that, for the purpose of terminating, in the shortest time possible, the demarcation of the international boundary, you should be given the same facilities as those accorded to me by my Government, so that, by increasing the number of Sub-Commissions and providing them with further elements we should be able to hasten our operations and find ourselves in a position to decide, by the end of the coming season, that is to say, during the present months, the general boundary line ; repeating at that time what I had already stated to you several times, as to the necessity for preliminary investigations which always precede the demarcation of frontiers in every country in the world.

It was in view of this proposal that the Chilean Minister for Foreign Affairs, Señor Morla Vicuña, suggested to you that we, the Experts, should agree together and carry out all the work which might enable us to decide as to the dividing line in the time named, and you will recollect that, during the exchange of views preceding the statement of May 1, owing to the doubts expressed by you of our not being able to carry out, in so short a time, such extensive labours, I intimated that, for my part, I should be ready by the time named. I then repeated to you that my Government would supply me with all I might require, as they were very desirous of bringing this lengthy boundary question to a conclusion as early as possible.

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If you entertained any doubt as to the possibility of satisfying the desires expressed to us by our Governments, as to the expediency of determining in the coming season a general frontier line, the doubts which I then entertained, were not because I thought my efforts would be insufficient, but because you did not believe you could accept the five new Sub-Commissions which I proposed, but only one to work south of lat.  $41^{\circ}$ . You considered it impossible to find a sufficient number of surveyors in Chile necessary for the new Sub-Commissions, while, on my part, I had the required number of them. It being agreed that it was impossible for a single Sub-Commission to survey 9 degrees in one season, we decided to create three new Sub-Commissions, instead of five proposed by me, I contenting myself with increasing the number of Assistants in each of my Sub-Commissions.

It was necessary that the rumours of possible grave difficulties between the two nations which we represented, should cease, and to effect this it was indispensable that we, the Experts, should have the necessary data to form our own opinion with respect to all the territory on which the frontier line would be traced in accordance with the Treaties in force ; I considering that the procedure followed up to the present—which has no precedent in the world—of fixing in detail the boundaries of a frontier, the general features of which were almost completely unknown, would oblige me to make continual investigations which would have required many years.

I had communicated to His Excellency the President of Chile what my views were regarding the operations of the demarcation, and the necessity of carrying out, prior to fixing the boundaries in detail, a preliminary survey of the Cordillera de los Andes, so as to be able to locate within that Cordillera the general frontier line in accordance with the Treaties ; and it was, therefore, my duty to take all the precautions possible,

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so that my views, which were to be converted into an agreement between the two nations, should be carried out in an unmistakable manner.

I have, therefore, seen with surprise, that you, ignoring my priority in the intention of practically carrying out the desire so frequently manifested by the Governments of Argentina and Chile, have attempted to urge me to fulfil my duty, and you continue to state in reference to this, that you were satisfied with what was decided at the meeting of May 14.

The time will come, Mr. Expert, when I shall prove that it is not the Argentine Expert who has wished to delay the definite solution of the protracted boundary question. Then the work of the Chilean and Argentine Engineers will be examined, and it will be known whether the Argentine Sub-Commission have acted rightly or wrongly in rejecting proposals which, if accepted, would have completely destroyed the hopes which the two nations we represent built on the carrying out of the Agreement of May 1. The instructions of internal character given by me to my Assistants are the same as you might have given to yours, without violating the agreement, and all tended to the greater success of the works which I had entrusted to them. By some of their clauses I have sought to avoid delays which, had I assented thereto, would have made me break an agreement which is inviolable. To abandon the investigation of the whole region which must comprise the general frontier line, in order to fix the actual boundary in a gap, etc., that is to say, in a very limited area, would not have been to "accelerate the demarcation," and, by so doing, I should have failed to keep my word as an Expert. The work of the demarcation is accelerated by deciding upon a general frontier line, and that was what was understood by their Excellencies, the Presidents of the Argentine Republic and Chile, in their opening messages to the respective Congresses.

I find that we are not in accord with respect to the inter-

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pretation of the word " demarcation." To you it appears that the work of the demarcation consists solely in the " material planting of landmarks," whereas to me, *the operations of the demarcation include all the work which should be performed in order to fix a frontier line.* The only instance in which an Argentine Assistant accepted suggestions from a Chilean Assistant at a meeting, occurred in Sub-Commission No. 6. The Assistants, according to the instructions given them by us on February 17, 1897, in order to carry out what is laid down in Article 1 of the Agreement of April, 1896, were to meet in order " to agree on the plan for carrying out the work in accordance with said instructions " ; but it was in vain that the Argentine Chief Assistant attended the meeting arranged with the Chilean Chief Assistant. According to the declarations of the latter to the Argentine second Assistant, such meetings were unnecessary. In all the preliminary arrangements, the Argentine Assistants lost several days which might have been devoted to further surveys, had he received my orders in time. This, nevertheless has not prevented the said Commission from providing me, from works executed by it, with the data required to come to a decision as to the general frontier line in the whole region specified in the said Article of the Agreement of April, while it is known to you that the Chilean Sub-Commission has not visited at least half of that zone.

The Treaty of 1881, the Protocol of 1893 and the general instructions for the demarcation of the Cordillera de los Andes which you and my predecessor, Dr. Quirno Costa, gave, provide that the work of demarcation shall be carried out in the Cordillera de los Andes. And I have told you that neither Experts, nor Assistants, nor Governments can seek the dividing line outside of that " immovable " boundary fixed by the Treaties. Moreover, the case of the region where the first Assistant of the Chilean Sub-Commission No. 8 proposes to demarcate, is not quite analogous to that of the region in which are situated Las

Damas and Santa Elena landmarks. In the latter the course of the Rio Grande is as well known as is the Maule, or any other river of Central Chile which originates in the Cordillera de los Andes; whereas in latitude  $44^{\circ}$ , where Engineer Barrios proposes to demarcate, the demarcators of both countries are unable to say that they possess the necessary data to form an opinion so long as they have not made previous surveys of the zone which includes there the Cordillera de los Andes and its main chain.

In all boundary demarcations, the boundaries are discussed with a complete knowledge of the ground which such demarcation is to include, and this was understood by the Governments of the Argentine Republic and Chile when they agreed that the differences which might arise between the Experts and which those Governments might not solve, should be decided by the Arbitrator who must strictly apply in such cases the clauses of the Treaty of 1881 and Protocol of 1893, after a survey of the ground has been made.

The Argentine Sub-Commissions will always take into consideration whatever proposal may be made to them as to places situated within the Cordillera de los Andes, but never as to places situated outside that Cordillera.

I hope that, at the Conferences we are to hold in August next, and at which we, the Experts, shall have to settle the general frontier line, each of us will supply the data we shall have collected *in order to circumscribe the mountainous region to be considered as the Cordillera de los Andes*, which is the "immoveable boundary." In the meanwhile I shall continue in the belief that the region, the demarcation of which is proposed by the Chilean Sub-Commission No. 8, does not correspond to that in which we ought to seek the international dividing line.

Quoted  
P. 567.

Within the powers which I possess as Expert, in virtue of the Treaties in force, I am disposed to consider all the pro-

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posals which you may submit to me ; but I must decline their consideration when such proposals refer to points which I regard as being outside our functions.

I am, etc.

FRANCISCO P. MORENO.

## No. 75.

### THE CHILEAN EXPERT ON THE DRAWING UP OF THE FINAL RECORDS.

[Translated from the official publication entitled "*Demarcacion de Limites entre Chile i la República Argentina*," etc., pp. 40, 41.]

(Quoted on pages 571 and 572 of the Statement.<sup>1</sup>)

*The Chilean Expert to the Argentine Expert.*

No. 117.

SANTIAGO, September 9, 1898.

MR. EXPERT,—

The terms of your communication compel me to insist again upon what I stated to you at the end of my last note. As the exclusive object of the meeting arranged for the 7th, was to sign the list of the points agreed to and those upon which we differ, in our respective lines of demarcation, I consider it useless that the said Conference should be held before we come to an agreement in regard to the form which the Record of that Conference is to take.

I must also state here that, if the meeting was not held on the day agreed, it was simply because you have insisted that there be stated in the Act, as *enunciated by both Experts*, some declarations which you have worded, and which I, on my part, do not consider necessary or convenient in the form proposed.

On my part, I have proposed to you a form of Record in

<sup>1</sup> By an error the date of this communication is referred to, in the Statement, as September 10, the correct date being September 9, 1898.

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which, while retaining the declarations inserted by each of us in the Record wherein our respective propositions appear, we should confine ourselves to enumerating the points agreed to and those where a disagreement has occurred, so as to inform our Governments of them.

As you insisted on the necessity of giving expression to the declarations you have proposed, I observed that it could be stated in the Record as a proposition from you, that you had requested from me such a declaration and that I, in my turn, would give the reasons I had for not concurring in it.

Finally, the Minister for Foreign Affairs having expressed to me verbally that he had learned through the Minister Plenipotentiary of the Argentine Republic that you would accept a form of Record in which both Experts should state that the lines presented by them answered to the stipulations of all the Treaties and other international Agreements, which should also be inserted in their entirety, I replied in writing to the Minister for Foreign Affairs that, although I did not see the object for their inclusion, I had no objection to accept it as requested by you.

I must here remind you that, throughout this transaction, the Expert of Chile has not requested from you any declaration as to the foundation for your proceedings, nor has he looked for anything else but the strictest fulfilment of our Agreement, the scope of which is to present in a concrete and precise form to our respective Governments the sections of the boundary line ready for demarcation as accepted by both, as well as those about which we are not agreed. Consistent with this line of conduct, I have tried to remove all the difficulties foreign to the substance of the question itself ; and, as appears from our Records, I have tried by all possible means to bring to an end in the shortest time possible, the task on which we are engaged.

Quoted  
p. 572.

As regards the place where we must hold our meetings, if you have an objection to assisting where they have been held

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hitherto and from the time when the Experts' Commission came into existence, I have much greater ones to going to the place you suggest, especially in view of the terms of the communication in which you inform me of this resolution.

Summing up, I consider that the difficulties which have arisen in this connection may be easily solved by one of the following two courses: either by a Record, such as the one I proposed and to which I have referred above, or by means of a Record in which each of the Experts should state his opinion in the manner heretofore accepted. Either of these two courses may be adopted without the necessity of fresh conferences, since you are opposed to continuing to hold them in the usual manner.

Moreover, should you not accept either of these two courses, desiring to terminate this incident, I shall lay before my Government the antecedents which appear in the Records of August 29 and September 3 which are amply sufficient, in order that steps may be taken on the part of the Governments respecting the disagreements existing between our two propositions of general frontier lines.

I have, etc.

DIEGO BARROS ARANA.

## No. 76.

### THE CHILEAN EXPERT ON THE DELAYS IN THE DRAWING UP OF THE RECORDS.

[Translated from "*Diario oficial de la Republica de Chile*," Santiago, September 12, 1898. No. 6,099, p. 2201.]

(Quoted on page 572 of the Statement.<sup>1</sup>)

*The Chilean Expert to the Argentine Expert.*

No. 119.

SANTIAGO, September 10, 1898.

MR. EXPERT,—

In reply to your note dated yesterday I must state that I have never refused to acknowledge any principle or declaration whatsoever which may be stipulated in the Boundary Treaties, the strict fulfilment of which I have unceasingly and zealously endeavoured to procure.

The difficulties which have arisen in the drawing up and signing the Record in question, far from originating in the insistence you attribute to me of not conforming in my declarations to the stipulations of those covenants, are indeed but a clear and evident demonstration that I scrupulously abide by them. Therefore, there is no cause for the surprise you express in your communication referred to, wherein you attribute to me ideas and intentions which I have never had.

<sup>1</sup> It is said in the Argentine Statement, p. 375, that "it is necessary to reproduce in full" the present Document, of which, however, not a single line has been reproduced in the said Statement. The few lines given in a footnote on the page quoted are from a *Note from the Argentine Expert* to which the following is a reply, which was, in turn, answered by another note from the latter, inserted in the same Statement, footnote, pp. 377-380.

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When dealing with the drawing up of the Record wherein those points of the demarcation on which we are agreed and those on which we are not, were to be enumerated, you wished it to be preceded by considerations to be signed by both of us, which, although reproducing some articles of the Treaties, do not reflect entirely the spirit and scope of the said Treaties, as you ignore others in which it is clearly stated what is, according to those covenants, *the geographical condition of the demarcation*.

Thus, for instance, you proposed the insertion of Article 1 of the Treaty of 1881 and of Articles 1 and 2 of the Protocol of 1893, and omitted Article 3 of this same Protocol which textually reads as follows :—

“In the case, foreseen in the second part of Article 1 of the Treaty of 1888 of difficulties that might arise ‘owing to the existence of certain valleys, formed by the bifurcation of the Cordillera, and where the water-divide should not be clear,’ the Experts shall endeavour to settle them amicably, causing this geographical condition of the demarcation to be searched for on the ground. To this end they shall dispose by mutual agreement that a survey be made by the Assistant Engineers which may serve them to solve the difficulty.”

Likewise it would have been advisable to recall that Article 6 of the Instructions quoted by you, when dealing with the cases where the water-divide should not be clear, attributes to this physical feature the character of being *the geographical condition of the demarcation*.

Wishing to avoid every difficulty I have proposed to you the adoption of either of the two following courses :—

1. The drawing up of a Record in which, referring to the grounds stated by each Expert when presenting his proposal for demarcation, there should be inserted clearly and simply the enumeration of the points on which we are agreed and of those on which we are not.

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2. A Record in which each Expert should state on his part the reasons for such an agreement or divergence, acknowledging the right of both to insert, wholly or in part, the Treaties and other Agreements or antecedents concerning the matter.

Besides, in the case of our agreeing to draw up a record containing considerations accepted by both of us, it would be necessary to state that the points upon which an agreement exists are situated on *the main chain of the Andes which divides the waters*,—a formula which comprises the letter and the spirit of the Treaties, one which was used by the demarcating engineers of both countries in the Acts of erection of landmarks in 1894, 1895 and 1896, and which the Chilean engineers, faithful to this precedent and to what is stipulated in those Treaties, have continued to reproduce in subsequent records.

Finally, after having reached, in the manner stated in my note No. 117 of yesterday's date, the agreement of stating simply "in the pending Record" that the lines presented by the Experts answer to the fulfilment of all the Treaties and other international covenants, and of inserting therein, the said documents in their entirety, while on my part I have always been disposed to sign the Record drawn up in that form, you have subsequently proposed to introduce an addition which modifies what was agreed.

I believe I am excused from entering into discussion upon the advisability of this addition, which would lengthen this debate fruitlessly and would, perhaps, prevent me still more from arriving at an agreement with you.

Moreover, as I foreshadowed to you at the end of my note mentioned, No. 117, I am laying before my Government on this date the antecedents therein mentioned as well as a copy of the present communication.

I am, etc.

DIEGO BARROS ARANA.

## No. 77.

### THE DIFFICULTIES IN THE DEMARCATION ARE OFFICIALLY SUBMITTED TO ARBITRATION.

#### Enclosure A.

[Translated from "*Memoria de Relaciones Exteriores de Chile*," 1899, pp. 48, 49.]

(Quoted on page 576 of the Statement.)

*The Chilean Minister in London to the Marquis of Salisbury.*

LEGATION OF CHILE,  
LONDON, November 23, 1898.

MY LORD,—

In June 1896,<sup>1</sup> the Governments of Chile and the Argentine Republic, conforming to the stipulations contained in the Agreement signed by them on the 17th of April of the same year, requested Her Britannic Majesty's Government to deign to accept *the office of Arbitrator in order to determine the doubts or questions arising in the course of the demarcation of the boundary between the two Republics, whenever the Governments might not be able to settle them directly.*

Her Majesty the Queen deigned to accede, with marked benevolence, to the application in which both Governments entrusted to Her traditional spirit of justice the final solution of the difficulties which might eventually arise.

Although the efforts of the Governments interested have had for result the determination of a considerable extent of

<sup>1</sup> See next Document, No. 78.

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the frontier line, the differences or disagreements contemplated subsist in regard to another important part thereof.

In this situation, both Governments have considered that the case,—foreseen in Article 2 of the Agreement of April 17, 1896,—of requesting Her Majesty's Government to act as Arbitrator, has arrived; and, to this effect, I have now the honour of proffering this request on behalf of Chile and in fulfilment of orders I have received, enclosing a copy of the Minutes drawn up by the Experts and the respective Governments wherein the divergences which have arisen have been placed on record.

Allow me respectfully to call the attention of Your Excellency to the desire expressed by both Governments in the final part of the Record of 22nd of last September.

Finally, I have the honour of including a map which will render more comprehensible the scope of the disagreements to which the said Minutes refer, and to add that, in conformity with the rules of procedure which Your Excellency may think fit to lay down for the arbitration, an opportunity will arise for presenting further data and information to illustrate the matter.

I am, etc.

DOMINGO GANA.

## Enclosure B.

[Copy from the original at the Chilean Legation.]

*The Marquis of Salisbury to the Chilean Plenipotentiary.*

FOREIGN OFFICE, November 28, 1898.

SIR,—

I have the honour to acknowledge the receipt of your Note of the 23rd instant in which you recall that in the year 1896 Her Majesty's Government consented to accept the office of Arbitrator conferred upon them by the Chilean and Argentine Governments for the settlement, in the form laid down by the

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Protocol signed on April 17th, 1896, of *the difficulties which might arise in fixing the boundaries between the two Republics.*

You state that you have now received instructions from your Government to inform me that the contingency provided for in the 2nd Article of the Agreement of 1896 has arisen and you are accordingly to request that Her Majesty's Government will proceed with the necessary steps in fulfilment of the engagement which they accepted on the invitation of the Governments of Argentina and Chile.

I have the honour to inform you that Her Majesty's Government take note of your communication which will be laid before Her Majesty the Queen.

I have, etc.

SALISBURY.

## No. 78.

### HER B.M.'S GOVERNMENT IS REQUESTED TO ACCEPT THE OFFICE OF ARBITRATOR.

#### Enclosure A.

[Translated from "*Memoria de Relaciones Exteriores de Chile*," 1896, Docs. pp. 16, 17.]

(Quoted on page 576 of the Statement.)

*The Chilean Minister in London to the Marquis of Salisbury.*

LEGATION OF CHILE,

LONDON, June 15, 1896.

MY LORD,—

The Governments of Chile and the Argentine Republic having agreed to designate the Government of Her Majesty the Queen in order that, in the capacity of Arbitrator, they may decide, in the manner established in the Agreement signed on the 17th of April last, *the doubts which might arise in the process of the demarcation of the boundary between the two Republics whenever the Governments may not reach a solution thereof*, I have received instructions from my Government to transmit to its high destination the autograph letter in which His Excellency the President of Chile requests Her Majesty the Queen, in the name of the Chilean people and Government, to deign to accept the office of Arbitrator conferred upon Her by the Agreement mentioned.

I have the honour to enclose to Your Excellency the original of the said letter, requesting Your Excellency to kindly place it in Her Majesty's hands, and I likewise enclose the customary

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copy thereof, and a certified copy of the five Treaties and Conventions enumerated at the end of this note.

The Government of Chile, when placing unlimited confidence in Her Britannic Majesty's Government, do so in the conviction that their high-minded action will always be inspired by the sentiments of unfailing justice which distinguishes all their acts, and I do not doubt that they will lend the important service which is requested by two equally friendly nations.

I am, etc.

AUGUSTO MATTE.

**Enclosure B.**

[Copy from the original at the Chilean Legation.]

*The Marquis of Salisbury to the Chilean Plenipotentiary.*

FOREIGN OFFICE,

July 14, 1896.

SIR,—

I have had the honour to receive your note of the 15th ultimo, enclosing a letter addressed to the Queen by the President of Chili.

In that letter which I have submitted to Her Majesty, the Queen is requested to act as Arbitrator, in accordance with the terms of the Protocol between Chili and the Argentine Republic of the 17th of April, 1896, in order *to determine any questions arising in the course of the demarcation of the boundaries between the two Republics which it may not be found possible to settle directly between the two Governments.*

I have the pleasure to inform you that the Queen has graciously been pleased to accept the office of Arbitrator under the provisions of the Protocol of April 17, and by Her Majesty's command I send to you Her reply to the President of Chili for transmission to its high destination.

A copy of the Queen's letter is inclosed herein.

I have, etc.

SALISBURY.

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Enclosure C.

[Copy from the original.]

*Her Majesty Queen Victoria to the President of Chile.*

VICTORIA, by the Grace of God, of the United Kingdom of Great Britain and Ireland Queen, Defender of the Faith, Empress of India, etc., etc., etc., to the President of the Republic of Chili, sendeth greeting !

Our good Friend, we have received the letter which you addressed to us on the 9th of May last and in which you invite us to act as Arbitrator in accordance with the terms of the Protocol between the Republic of Chili and the Argentine Republic of the 17th of April, 1896, in order *to determine any question that may arise in the course of the demarcation of the boundaries between the two Republics and which cannot be amicably settled by direct agreement.*

We have received a similar request from the President of the Argentine Republic, and we are much gratified by the confidence thus placed in us.

We shall be ready to accept the obligation which may fall upon us and we will use our best endeavour to arrive at a right conclusion in the event of any question being referred to our decision.

And so we recommend you to the protection of the Almighty.

Given at our Court at Windsor Castle the 11th day of July, 1896, and in the sixtieth year of our Reign.

Your good Friend,  
VICTORIA R.I.  
SALISBURY.



## No. 79.

### THE DEFINITION OF THE ANDEAN FRONTIER LINE IN THE TREATY OF 1881.

#### Spanish, French, and English Versions.

(Mentioned on page 580 of the Statement.)

##### ORIGINAL TEXT

from "*Demarcacion de  
Límites entre Chile i  
la República Argentina*,"  
etc. Santiago, 1898,  
pp. 1 and 2.

ARTÍCULO PRIMERO. — El límite entre Chile i la República Argentina es de Norte a Sur, hasta el paralelo cincuenta i dos le latitud, la Cordillera de los Andes.

La línea fronteriza correrá en esa estension por las cumbres mas elevadas de dichas Cordilleras que dividan las aguas i passará por entre las vertientes que se desprenden a un lado i otro.

Las dificultades que pudieran suscitarse por la existencia de ciertos valles formados por la bifurcacion de la Cordillera i en que no sea clara la línea divisoria de las aguas, serán resueltas amistosamente por dos peritos nombrados uno de cada parte.

CHILEAN OFFICIAL  
*translation into English.*  
p. 4 of this Appendix.

ARTICLE I.—The boundary between Chile and the Argentine Republic is, from north to south, as far as the 52nd parallel of latitude, the Cordillera de los Andes.

The boundary line shall run in that extent over the highest summits of the said Cordilleras which divide the waters, and shall pass between the sources [of streams] flowing down to either side.

The difficulties that might arise owing to the existence of certain valleys formed by the bifurcation of the Cordillera, and where the watershed should not be clear, shall be amicably solved by two Experts, appointed one by each party . . .

ARGENTINE  
OFFICIAL  
*translation into English.*  
Argentine Statement, p.  
1116.

ARTICLE I.—The boundary between the Argentine Republic and Chili, from north to south as far as the parallel of latitude 52° S. is the Cordillera of the Andes.

The frontier line shall run in that extent along the most elevated crests of said Cordilleras that may divide the waters and shall pass between the slopes which descend one side and the other.

The difficulties that might arise from the existence of certain valleys formed by the bifurcation of the Cordillera, and in which the watershed may not be apparent, shall be amicably settled by two Experts, one to be named by each party . . .

## No. 79.

### THE DEFINITION OF THE ANDEAN FRONTIER LINE IN THE TREATY OF 1881.

#### Spanish, French, and English Versions.

(Mentioned on page 580 of the Statement.)

BRITISH AND  
FOREIGN STATE  
PAPERS.  
Vol. lxxii. (1880-1881),  
p. 1103.

FOREIGN  
RELATIONS OF THE  
UNITED STATES.  
1881, p. 12.

FRENCH VERSION  
BY AN ARGENTINE  
AUTHOR.  
Charles Calvo. "*Le Droit  
International*," vol. i.,  
Livre V., p. 425.

ART. I. — "The  
limit between Chile  
and the Argentine  
Republic is the  
Cordillera of the  
Andes from the  
north to latitude  
52° south.

The frontier line  
shall follow the  
crest of the Cor-  
dillera which di-  
vides the waters,  
and will pass be-  
tween the sources  
thereof on either  
side.

Any doubts due  
to the existence of  
valleys formed by  
the forking of the  
Andes, where the  
line dividing the  
waters is not  
clearly determined  
shall be amicably  
settled by two Ex-  
perts, one named  
by either side . . .

ART. I. — "The  
boundary between  
the Argentine Re-  
public and Chili  
is, from north to  
south, up to par-  
allel 52° latitude,  
the Cordillera of the  
Andes.

The frontier line  
is to run in that  
direction over such  
of the highest peaks  
of said Cordillera  
as may divide the  
waters, and is to  
cross the springs  
that start from  
both sides.

Any difficulties  
that should arise  
on account of  
there being certain  
valleys that are  
formed by the bi-  
furcation of the  
Cordillera and  
wherein the divi-  
sional line of waters  
may not be clear,  
will be amicably  
settled by two Ex-  
perts, one to be  
named by each  
party . . .

ARTICLE PREMIER.  
—La limite entre  
le Chili et la  
République Argen-  
tine est du Nord au  
Sud, jusqu'au 52°  
parallèle de latitude,  
la Cordillère des  
Andes.

La ligne de sépara-  
tion partant des  
points les plus  
élevés de la Cor-  
dillère qui divisent  
les eaux et passant  
entre les chûtes  
qui se déversent de  
l'un et de l'autre  
côté.

Toutes les dif-  
ficultés qui surgi-  
raient pour la  
délimitation de cer-  
taines vallées for-  
mées par la bifur-  
cation de la Cordil-  
lère et où la ligne  
de division des eaux  
ne serait pas bien  
nette, seront réso-  
lues par l'entre-  
mise de deux Ex-  
perts nommés par  
chaque partie . . .

## No. 80.

### “CUMBRES” TRANSLATED BY “SUMMITS” IN ARGENTINE OFFICIAL DOCUMENTS.

(Quoted on page 580 of the Statement.)

[Extracts from Calvo's "*Collección de  
Tratados*," vol. ii.]

#### *Tratado de 1750.*

(P. 248 *et seq.*) Artículo 4°.  
—Los confines del dominio de  
las dos monarquías principia-  
rán en la barra que forma en  
la costa del mar el arroyo que  
sale al pié del monte de los  
Castillos Grandes, desde cuya  
falda continuará la frontera,  
buscando en línea recta *lo más  
alto ó cumbres* de los montes,  
cuyas *vertientes* bajan, por una  
parte, á la costa que corre al  
norte de dicho arroyo, ó á la  
laguna Merín ó del Miné, y  
por la otra á la costa que corre  
de dicho arroyo al sur ó al río  
de la Plata: de suerte que las  
*cumbres* de los montes sirvan  
de raya al dominio de las dos

[Extracts from the "*Argentine Evi-  
dence*" in the case of Misiones,  
submitted to the President of the  
U.S. New York, 1893.]

#### *Treaty of 1750.*

(Pp. 53, 54) IV. Article.—  
The boundaries of the domin-  
ions of both monarchies shall  
begin from the bar on the sea  
coast, laid by the stream, fol-  
lowing at the foot of Castillos  
Grandes Mountain, from the  
slope of which the frontier  
shall continue following on a  
right line the *highest ground*  
or *summits* of the mountains  
the *springs* of which *descend*  
on one side to the coast running  
to the north of said stream or  
to Lake Merin or of the Miné,  
and on the other to the coast,  
running to the south of the  
River Plate, so that the *sum-  
mits* of the mountains may

coronas, y así seguirá la frontera hasta encontrar *el origen principal, y cabeceras* del río Negro, y por encima de ellas continuará hasta el origen principal del río Ybicuy, siguiendo aguas abajo de este río hasta donde desemboca en el Uruguay por su ribera oriental, quedando de Portugal todas las *vertientes* que bajarán la dicha laguna ó al río Grande de San Pablo, y de España, las que bajan á los ríos que van á unirse con el de la Plata.

serve as boundary to the dominion of both crowns, and thus the frontier shall continue until it finds *the main source and head springs* of the River Negro, going on along them up to the principal source of the River Ybicuí, down the stream of this river to its outlet in the Uruguay, by its eastern bank, remaining for Portugal all the *springs* descending to the above-mentioned lake, or the Rio Grande de San Pedro to be owned by Portugal, and those descending to the rivers flowing into that of the River Plate, to be owned by Spain.

“ Art. 9.—Continuará la frontera por en medio río Japurá y por los demás ríos que se le junten y se acerquen más al rumbo del norte, hasta encontrar *lo alto de la cordillera de montes* que median entre el río Orinoco y el Marañón ó de las Amazonas, y seguirá, por la *cumbre* de estos montes al oriente hasta donde se estienda el dominio de una y otra monarquía. . .

IX. Article.—The frontier shall continue along the River Japurá and through the rest of the rivers that may flow into it and running nearer to the north until it finds the *summit of the ridge* lying between the River Orinoco and the Marañón or Amazons, and it shall continue over the *summits* of these mountains towards the east until the end of the dominions of both monarchies. . . .

Art. 18°. . . . I por lo que mira á la *cumbre* de la cordillera que ha de servir de raya entre el Marañon y el Orinoco pertenecerán á España todas las *vertientes* que caigan al Orinoco y á Portugal las que caigan al Marañon ó Amazonas.

(P. 57) XVIII. Article.— . . . And with respect to the *summit* of the ridge of mountains which is to serve as boundary between the Marañon and Orinoco, all the *springs* falling to the Orinoco shall belong to Spain, and to Portugal those running to the Marañon or Amazons.

Art. 20°. — Para evitar algunos perjuicios que podran ocasionarse fué acordado que en los montes donde en conformidad de las precedentes articulos que de puesta la raya en sus *cumbres*, no será lícito á ninguna de las dos potencias erijir fortificacion sobre las mismas *cumbres* ni permitir que su vasallos hagan en ellas poblacion alguna.

(P. 58) XX. Article.—In order to avoid some prejudices which are likely to occur, it was agreed that on the mountain where, according to the preceding articles, the boundary be fixed along their *summits*, it will not be licit for any of the two powers to build fortifications over the said *summits*, nor to allow their subjects to build any town on them.

*Tratado de 1751.*

(P. 261.) Art. 28° (Portuguese text).—Que en toda a fronteira, onde ella não for terminada por ríos ou por *cumes* dos montes e *vertentes das agoas*, que forão declarados no Tratado deijen postos ou marcos, ou signals que les pareceren mais proprios e perduraveis.

*Treaty of 1751.*

(P. 68) XXVIII. Article.— That in all places of the frontier not marked by rivers or by *summits* of mountains and *falls of water* which were declared in the Treaty, they shall set the landmarks or signs which they may consider more available and durable.

*Tratado de 1777.*

(P. 137 *et seq.*) Art. 4°.— Para evitar otro motivo de discordias entre las dos monarquias que ha sido la entrada de la laguna de los Patos ó Río Grande de San Pedro siguiendo después por sus *vertientes* hasta el rio Yacuí, cuyas dos bandas y navegación han pretendido pertenecerles ambas coronas, se han convenido ahora en que dicha navegación y entrada queden privativamente para la de Portugal, extendiéndose su dominio por la ribera meridional hasta el arroyo de Tahim siguiendo por las orillas de la laguna de la Manguera en línea recta hasta el mar, y por la parte del continente irá la línea desde las orillas de dicha laguna de Merin, tournando la dirección por el primer arroyo meridional que entra en el sangradero ó desaguadera de ella, y que corre por lo mas inmediato al fuerte portugués de San Gonzalo desde el cual, sin exceder el límite de dicho arroyo, continuará la pertenencia de Portugal por las *cabeceras* de los ríos que corren

*Treaty of 1777.*

(P. 87) IV. Article. — In order to avoid another cause of discord between both Monarchies, which has been the entrances to Laguna de los Patos or Rio Grande of San Pedro, following afterwards its *springs* up to the River Yacuy, both banks of which and its navigation have been claimed as their property by both Crowns. Their Majesties have now agreed that said entrance and navigation must exclusively remain to Portugal; its dominion to extend through the southern bank until the brook Tahim, following the shores of the Laguna de la Manguera in a straight line to the sea, and by the side of the continent the line shall run from the borders of the aforesaid Lake of Merin through the first southern brook flowing into its drain or channel and running nearest to the Portuguese Fort of San Gonzalo, from which, without trespassing the limit of the aforesaid brook, the dominion of Portugal shall extend by the *sources* of the rivers running

hacia el mencionado Rio Grande y hacia el Yacuí, hasta que pasando por encima de las del rio Ararico y Coyacuí que quedarán de la parte de Portugal, y las de los ríos Piratini y Ibimini que quedarán de la parte de España, el tirará una línea que cubra las establecimientos portugueses hasta el desembocadero del río Pipirí Guazú en el Uruguay, que han de quedar en el actual estado en que pertenecen á la corona de España : recomendándose á los comisariós que lleven á ejecución esta línea divisoria, que segun en toda ella las direcciones de los montes por las *cumbres* de ellos, ó *de los ríos* donde los nubiene á proposito ; y que las *vertientes* de dichos ríos y sus *nacimientos* sirvan de marcas á uno y otro dominio, donde se pudiere ejecutar así, para que los ríos que nacieren en un dominio y corrieren hacia el, queden desde sus *nacimientos* á favor de aquel dominio, lo cual se puede efectuar mejor en la línea que corréra desde la laguna Merin hasta el río Pepirí Guazú en cuyo paraje no hay

towards the aforesaid Rio Grande and Yacuy until that, passing over those of rivers Araricu and Coyacui which shall remain on the side of Portugal, and that of the Rivers Piratini and Ybimini which shall remain on the side of Spain, a line be drawn which shall cover the Portuguese settlements up to the draining of the River Pepirí Guazú into the Uruguay and shall likewise save and cover the Spanish Missions and settlements of said Uruguay which must remain in the present state in which they belong to the Crown of Spain ; the Commissioners which are to carry into execution this divisory line being recommended to follow all along of it the directions of the mountains through their *summits*, or *those of the rivers*, where these would be used ; and that the *fall* of the aforesaid rivers and their *sources* may serve as landmarks to both dominions whenever this were possible, so that the rivers which may rise in one of the dominions and run towards it may remain from their *sources*

## No. 80.

( 541 )

ríos grandes que atraviesen de  
un terreno á otro. . . .

in favour of that dominion,  
which can be better done in  
the line which will run from  
Lake Merin to the River Pepirí  
Guazú in which place there are  
not large rivers to cross over  
from one to the other land. . . .

Artículo 6°.—A semejanza  
de lo establecido en el artículo  
anterior, quedará tambien re-  
servado en lo restante de la  
línea divisoria. . . un espacio  
suficiente entre los límites de  
ambas naciones . . . de modo  
que los tales espacios sean  
neutrales poniéndose mojones  
y señales seguras que hagan  
constar á los vasallos de cada  
nación el sitio de donde no  
deberán pasar ; á cuyo fin se  
buscarán los lagos y ríos que  
puedan servir de límite fijo é  
indelible, y en su defecto las  
*cumbres* de los *montes mas*  
*señalados*, quedando estos y  
sus faldas por término neutral  
divisoria en que no se pueda  
entrar poblar, edificar ni forti-  
ficar por alguna de las dos  
naciones.

(P. 88) VI. Article. — In  
accordance with that which  
has been established in the  
preceding article, a sufficient  
space between the boundaries  
of both nations . . . shall  
be reserved in the remainder  
of the divisory line, . . . said  
spaces to be thus neutral, and  
said landmarks and signals  
to be placed that they may  
point out to the subjects of  
either nation the place from  
which they shall not pass, to  
which end the lakes and rivers  
that may serve as a set and  
indelible boundary shall be  
searched out and in their de-  
fault the *summits* of the *main*  
*mountains*, these and their  
brows remaining as the  
divisory neutral bound where  
neither nation shall be per-  
mitted to enter, to settle, to  
build or to raise forts.

## No. 81.

### THE ARGENTINE EXPERT'S ASSISTANTS' USE OF THE TERM "VERTIENTES" AS SOURCES AND HEADWATERS.

[Translated from Señor Gunardo Lange's Report on a survey of a part of the Province of Mendoza in "*Revista del Museo de la Plata*," vol. vii. p. 28 et seq.]

(Quoted on pages 617, 1036 and 1038 of the Statement.)

#### OROGRAPHY.

(P. 28) Having the map in sight, it is easy to see that the regions surveyed may be divided in three different zones.

1. The western mountainous region which forms part of the eastern slope (*falda*) of the Cordillera de los Andes ; 2. the intermediate extensive plains ; and, 3, the eastern mountainous zone of lesser height from the Cerro Nevado to the Cerro de Guayqueria.

The western zone is subdivided by the upper course of the large rivers which intersect the region ; Rio Diamante, Rio Atuel, Rio Salado y Rio Malargüe ; north of River Diamante the Mount " Nevado del Arroyo Hondo," of 4920 metres height, forms *the extremity of the secondary chain of the Cordillera*, over which passes the road called " de la Cruz de Piedra," which crosses south of " Laguna del Diamante " and reaches Chile by the pass situated at the foot of " Volcan Maipú."

(Quoted  
p. 1036.

Between the Rio Diamante and the Rio Atuel, the zone surveyed extends almost as far as the Chilean boundary (the Portezuelo del Cerró de Rio Negro [Las Leñas]) and forms part of the principal chain of the Cordillera de los Andes. This region

(Quoted  
p. 1036.

is very rugged and is traversed by the tributaries of the aforesaid rivers. In this part stands the picturesque Cerro del Sosneado whose broken peaks attain 4930 m.

South of the River Atuel we have surveyed as far as the Chilean boundary situated at the Pass Tinguiririca 2800 m. [Las Damas Pass], west of Rio Tordillo, as the upper course of Rio Grande is called. From this corner between the tributaries of the Rio Atuel and the sources (*vertientes*) of the Rio Tordillo, a new secondary chain becomes detached, runs from north to south, to the east of the Rivers Tordillo and Grande and on the eastern slope (*falda*) of this chain rise the following rivers: the Rio Salado, which is the most important tributary of the River Atuel, and the River Malargüe, which ends in the Laguna de Llanquanelo. The principal peaks of this chain are: the cerro "Nacimiento del Arroyo del Burro," "Cerro del Risco Plateado," "Cerro del Cajon Perdido," "Cerro de Las Leñas," "Cerro Hollada," "Cerro Serrucho," "Cerro Puchén," etc.

Quoted  
p. 1036.

Quoted  
p. 1037.

The intermediate zone begins in the somewhat undulated lands north of the River Diamante, with isolated hillocks: "Cerro de los Leones," "Cerro Gaspar," y "Cerro del Arroyo Hondo." South of the River Diamante, the Cerro Diamante rises to 2300 m., being a picturesque volcano of a very symmetrical shape; on the west the uniformity of the plain is broken by the "Cerro de las Leñas Amarillas" with 2230 m., being another volcano of regular shape. Further on, when dealing with the hydrography, I will mention the possibility of an interesting diversion of the River Atuel to the benefit of these plains.

South of Rio Atuel the plain continues its intermediate part, being irrigated by the Rio Malargüe and forming the great salt deposit of the Llanquanelo. This extensive plain is interrupted on the south by hills detached from the aforementioned chain, and the extremities of the Cerro Nevado. On either side of the Llanquanelo salt-plain a small hill rises solitary; these hills appear as islands on the broad plain, on account of

their dark colour, and are a special feature of this bleak and uniform landscape.

The eastern mountainous zone is the continuation of the ranges of hills that, from the vicinity of Mendoza, run from north to south as far as the Cerro Nevado. *The continuity of this chain of hills is interrupted by the Rivers Diamante and Atuel*, which break their way to the great eastern Pampa by canyons with perpendicular and inaccessible cliffs. The highest part of this chain of hills is the Cerro Nevado (3810 m.) south of the River Atuel, and the Cerros de los Tolditos to the north of the Rio Diamante (1790 m.). The part immediately south of the Rio Diamante, the Sierra Pintada, is extremely broken and rugged; innumerable dry and sandy river beds intersect the ground in every direction, between sharp and straight rocks giving to the whole the aspect of a true labyrinth.

#### HYDROGRAPHY.

(P. 30) The lands travelled over are relatively abundant in water; they are irrigated by various rivers and streams, and in many parts *springs or sources (vertientes o aguadas)*. The underground water is generally near the surface, and, where neither *streams nor sources (arroyos o vertientes)* exist, wells might easily be sunk.

There is a feature which calls our attention on the map. The chief rivers and streams of the region we are dealing with run in their upper course towards the north-east, rounding in this way *the secondary chains which are detached from the mass of the main Cordillera*. This parallelism of general direction is characteristic of all the main rivers of the Province of Mendoza, including Rio Mendoza, Rio Tunuyan and Rio Grande, and is important for the geological surveys of this part of the Andean slope (*falda*).

RIVERS: Beginning in the north, the most important rivers and streams of the zone surveyed are the following:

*Arroyo Yaucha.*—It descends from the Cordillera in an eastern direction, turns almost to the north, and waters the lands of the Yaucha property, Tierras Blancas, Chilecito and San Carlos ; to the north of San Carlos it joins the Arroyo de Aguanda, which runs from south to north, from the swamp of the lagoon where this streamlet is formed by the junction of the Arroyos de Papagayo and Cortaderitas, the first of which brings the greater volume of water.

After their junction the Arroyo de Yaucha and the Arroyo de la Aguanda take the name of Arroyo de San Carlos, which runs north and joins the River Tunuyan.

*Rio Diamante.*—It rises in the Lake Diamante, east of the Volcano Maipú ; it flows chiefly from north to south, turns a little to the east and continues deviating to the left until it takes an east-north-east direction ; it debouches on the plains skirting the extremities of the Nevado del Arroyo Hondo and the small Cerro Negro ; it makes a small détour to the north compelled by the volcano of the Cerro Diamante, and opens a course between the mountains of the Sierra Pintada in a deep and narrow ravine, to water the extensive fields of San Rafael or 25 de Mayo.

(P. 31) The most important tributaries of the River Diamante are the following : from the north the Arroyo Blanco, the Arroyo Hondo, which joins the Arroyo de la Faja and, near San Rafael, the Arroyo Salado ; from the south the Arroyo Barroso, the Rio Negro, the Arroyo Tordillo, the Arroyo de las Aucas, and the Arroyo del Tigre which rises in the Sierra Pintada.

In their upper course the River Diamante and its tributaries flow among mountains, through deep ravines and steep slopes ; further east, over the plains, north of the “ Cerro de las Leñas Amarillas ” and “ Cerro Diamante ” high cliffs particularly enclose the north bend of the river, which, as before stated, *crosses the eastern range by a very narrow gorge.*

The Rio Diamante is of about the same volume as the Rio Mendoza ; the water, which is quite fresh issuing from the Cordillera, becomes brackish after receiving the Arroyo Salado, whose water is very bitter and unfitted for irrigation ; so that there is a project of bringing the water from the Canal of the village of San Rafael by means of an aqueduct across the bed of the Arroyo Salado.

Quoted  
p. 617.

*Rio Atuel.*—*This has its sources (vertientes) amongst the highest mountains covered by perpetual snow of the main Cordillera.* In its upper course it receives its chief tributaries, amongst them the Arroyo de las Lágrimas, and runs by a wide bed as far as the Lagoon of Sosneao, where an ancient moraine interrupts the uniformity of the broad valley. The Rio Atuel, describes a curve similar to that of the Rio Diamante and receives before debouching to the plain the waters of the Arroyo Malo, the Arroyo Blanco, the Arroyo La Manga del Norte, and the Arroyos Paraguay, Terron and Colorado del Sur.

The Rio Atuel receives a great part of its waters near and above the Laguna del Sosneao ; in its northern bank, at the base of Cerro Sosneao *a number of springs (vertientes) of great volume emerge, which join their clear and fresh waters with the water somewhat turbid that the rivers bring from the glaciers and perpetual snows.* Abroad, on the plains near the village las Juntas, the River Atuel joins the Rio Salado, which rises on the eastern slope (*falda*) of the secondary chain, which has been mentioned, east of the River Tordillo and Rio Grande. The Rio Salado carries fresh water in its upper course, but in passing the salt deposits and bath of los Holles it receives salt water in sufficient quantity to give a brackish taste to the very River Atuel. The plains north of the Rio Atuel include in their lowest part "Las Salinas," and it has been projected to divert the Rio Atuel from a point due south of "Agua Caliente" in a northeasterly direction, making it pass by the lowest ground and return to its old bed south of Las Salinas. In this way it

Quoted  
p. 617.

could be avoided that the waters of Rio Atuel be mixed with the brackish water of the Rio Salado before coming to the Narrows of Niguil, a very important circumstance for the utilization of the river for the cultivation of the lands between the Rivers Diamante and Atuel. At the same time a diversion of the River Salado to the south is always spoken of with the object of causing it to discharge its waters into the Salina de Llanquanelo, thus preventing them from going to spoil the waters of the Atuel. A detailed examination as to the possibility of these projects would be of great importance and interest.

The banks of the River Atuel, when crossing the intermediate plains, are not generally so high as those of the River Diamante; it is broader with low banks. It is only after passing the Niguil bridge that the river becomes encased and *crosses the eastern chain by high waterfalls and between rocks*. Between Niguil and the Boca de Atuel, where the river debouches once more on the plain, it is impossible to get at the bottom, and the cattle can only view from the border of the cliffs the tempting patches of green grass which skirt the narrow banks of the rapid stream below. Outside the Boca de Atuel the land is flat and appropriate for the cultivation, and doubtless some day it will become an important centre of population. Further east the River Atuel turns to the south and to the east, and joins the Rio Chadileuvu or Salado, which is the general drainage-channel of all the northern part of the Province of Mendoza.

At first sight the River Atuel seems to carry a larger volume of water than the Rio Diamante.

*Arroyo Chacay*.—It rises on the eastern slope (*falda*) of the Cerro de la Hollada, irrigating the land of Chacay, and sinks in the ground before reaching the Laguna de Llanquanelo.

*Rio Malargüe*.—The headstreams (*vertientes*) of this river rise, as those of the Rio Salado, on the eastern slope (*falda*) of

the secondary chain mentioned before, east of the Rivers Tor-dillo and Grande. The river runs east and receives from the north the Arroyo de Torrecilla, the Arroyo Negro which passes by la Estancia, and the Arroyo Moro; when debouching on the plain it turns to the E.N.E. to empty its water into the Laguna de Llanquanelo. The Rio Malargüe carries much water, in proportion to the extent of the lands from which it receives its tributaries, and irrigates the cultivated lands of the important establishments of Cañada Colorada and Malargüe. The Rio Malargüe also receives a tributary with salt water—the Arroyo de Torrecilla, but as the volume of water of this stream is relatively small, it hardly gives a brackish taste to the waters of the river.

(P. 33) It is worthy of calling attention to the fact that every one of the three chief rivers of the zone we are dealing with receives a tributary of salt water, which to some extent prevents the utilization of the water for irrigating purposes.

LAKES.—The region we are dealing with contains few lakes, and these are more worthy of the names of lagoons or ponds.

The only lagoon of some extent is the "Laguna Salada de Llanquanelo," in the north-western part of the salt plain of the same name; this is a shallow lagoon, its extent being very changeable according to the seasons and the volume of water carried by the Rio Malargüe. The Laguna Amarga, north of Ramaditas, the Laguna Sosneao and the Laguna Blanca to the west of Cerro de Coegüeco are insignificant lagoons of some acres in extent; the Laguna Blanca holds water very seldom, and is surrounded by ground saturated with salt; the Laguna del Sosneao, at the base of the mountain of the same name, and where the huts lie at the foot of the hills on its eastern shore, is very picturesque. When we passed by this place the lagoon was covered with thousands of ducks, while large herds of sheep were grazing in the abundant pastures which exist around it.

*Springs and Sources (vertientes i aguadas).*—Springs (*vertientes*) exist at several places, especially on the hills of the eastern chain, north and south of the River Diamante. In these hills springs (*aguadas*) are found at a considerable height and very abundant ; on the southern slope of the Cerro Carrizalito, north of the Rio Atuel, there are springs (*vertientes*), some hundred metres above the river, which indicate the presence of powerful subterranean watercourses, and the probability of finding, by means of wells, waters at not very great depth on the plain of the intermediate zone.

On the plains, south of the River Malargüe and near the salt plain of Llanquanelo, there are *several abundant sources (vertientes) of fresh and sweet water*, and everywhere is the water very near the surface, it being sufficient to dig two or three metres to reach good water. The construction of artesian wells is very likely to give good results on these plains, and some day this method will be introduced in order to give life to the lands where irrigation by the water of the rivers is not possible.

The tracts where the water is scarcer are the slopes (*faldas*) of the Cerro Nevado and the plains and hillocks around this mountain. In this region the springs (*aguadas*) are scarce, of small importance, and this part is consequently the least peopled of the region we have surveyed.

## No. 82.

### SYNONYMY OF "VERTIENTES" (SPRINGS OR SOURCES) AND "CABECERAS" (HEADWATERS)

#### In the Text of the Spanish-Portuguese Treaties of 1751 and

[The Spanish or Portuguese text from Calvo's "*Coleccion de Tratados etc. de la República Argentina*," the English version from the "*Argentine Evidence*" in the Misiones case.]

(Quoted on page 622 of the Statement.)

*Tratado entre S.M.M. Católica y Fidelísima para determinar las instrucciones para los comisarios de las dos Coronas en la demarcación de las lîmites respectivos en la América Meridional en ejecución del tratado de Lîmites* (17 de Enero de 1751). [Calvo, *Coleccion*, vol. ii. p. 261.]

*Treaty of 1751, by which the Ministers Plenipotentiaries of Their Most Faithful and Catholic Majesties adjusted and determined the instructions which were to guide the Commissioners of the two Crowns in the demarcation of their respective boundaries in S. America, in execution of the Treaty of boundaries.* (Arg. Ev. p. 60.)

Art. 12°.—A terceira tropa, que ha de deixar este signal, e seguir para cima as agoas daquelle rio que se tem pelo

(P. 65) XII. Article.—The third party which is to leave this monument and to go against the stream of that river which

Igurei, logo que chegar á *origem principal* d'elle buscará as *fontes* mais visinhas, que correm para o Paraguai, ou d'ellas se forme o rio que em varios Mapas vem com o nome de Corrientes, ou seja outro qualquer que n'aquella paragem tenha o seu principio, e por estas agoas abaixo continuará a mesma Tropa a marcar a a fronteira até o Rio Paraguai.

shall be had as the Ygurei, on reaching its *principal source*, shall search for the most neighbouring *springs* which may run towards the Paraguay, or those of which the river that in the several charts is seen with the name of Corrientes, is formed, or any other which may flow out from that place, and down the stream, from these springs, and the same party shall mark out the frontier until the Paraguay. . . .

(Article XXVIII. given in Doc. 8o.)

Artigo 34. . . . Do dito marco, como de ponto fixo, passarao a reconhecer e demarcar tambem da mesma sorte a falda meridional do Monte de Castilhos Grandes, discorrendo por ella, e pondo de commum consentimento os mais que forem necessarios dos referidos marcos nas paragens que lhes paracerem mais opportunas até os cumes dos montes, que tomarao para seu governo, sem attenção a rumos, *desde os logares mais superiores, onde tem seus principios as vertentes das aguas que descem dos*

(P. 7o) Article XXXIV.— From the said landmark, as a fixed point they shall proceed to survey and mark out also in the same manner to the northern slope of the hill of Castillos Grandes, surveying it, and placing if it were necessary other of the mentioned landmarks, in the places which they may deem it fit, to the summits of the hills by which they shall be guided, mindless of the direction, *from the highest places where the springs of the waters descending from the said hills flow out*, namely :

*referidos cumes* ; a saber : por parte dos Dominios de Portugal para a banda da Lagoa Merim ; e pela parte dos Dominios de Hespanha para a banda do Rio da Prata. . .

on the side of the dominions of Portugal to the banks of Lake Merim ; and on that of the dominions of Spain to the banks of the River Plate. . . .

*Declaração de 1751.* . . . E porque na dita Carta se acha hum linha vermelha, que asinala, e pasa pelos lugares por onde se hade fazer a demarcação, que por ser anterior ao Tratado dos Limites que se fes depois nam vae conforme com ele em pasar do pé do Monte de Castilhos grandes a buscar as *Cabeceiras do rio Negro*, e seguir por ele ate entrar no rio Uruguai, devendo buscar a *origem principal* do rio Ibicui conforme o dito Tratado, se declara que a dita linha só serve em quanto ela se conforma com o Tratado referido. . . .

(Pp. 77, 78) . . . and as on the same chart a red line appears, pointing out and passing over the places through which the demarcation is to be made, which line, because of its being previous to the Treaty of boundaries, afterwards adjusted, does not agree with it inasmuch as it passes from the foot of the hill of Castillos Grandes to find *the springs of the River Negro* and following it along until entering the River Uruguay, instead of searching out *the source* of the River Ybicui, according to the said treaty, it is declared that the said line only serves inasmuch as it may be in conformity with the said treaty ; . . .

*Tratado preliminar de lmites  
en la América Meridional,  
ajustado entre las coronas  
de España y Portugal : fir-  
mado el 1° de Octubre de  
1777.*

Art. 3° . . . se han conven-  
ido los dos altos contrayentes  
por el bien recíproco de ambas  
naciones y para asegurar una  
paz perpétua entre las dos,  
que dicha navegación de los  
rios de la Plata y Uruguay y  
los terrenos de sus dos bandas  
septentrional y meridional per-  
tenezcan privativamente a la  
corona de España y a sus  
súbditos hasta donde desem-  
boca en el mismo Uruguay por  
su ribera occidental el rio  
Pequirí ó Pepiriguazú esten-  
diéndose la pertenencia de Es-  
paña en la referida banda  
septentrional hasta la linea  
divisoria que se formará prin-  
cipiando por la parte del mar  
en al arroyo de Chui y fuerte  
de San Miguel inclusive y  
siguiendo las orillas de la lag-  
una Merim a tomar las *cabe-  
ceras ó vertientes* del Rio Negro  
las cuales como todas las demas

*Preliminary Treaty about the  
boundaries of the countries  
of S. America, belonging  
to the Crowns of Spain and  
Portugal, by which the places  
through which the boundary  
line of their dominions is  
stipulated. (Arg. Ev. p. 85.)*

(P. 87) Article III. . . .  
both high contracting parties  
for the mutual benefit of both  
nations, and in order to assure  
a perpetual peace between  
both, have agreed that the  
said navigation of the Rivers  
Plate and Uruguay and the  
lands of their two banks, nor-  
thern and southern, may solely  
belong to the Crown of Spain  
and to its subjects, until the  
place where the River Pequiri  
or Pepirí Guazú flows into the  
aforesaid Uruguay by its west-  
ern bank, the dominion of  
Spain to extend along the  
above - mentioned northern  
bank until the boundary line  
which shall be drawn, begin-  
ning by the sea side on the  
brook of Chui and San Miguel's  
Fort included, and following  
by the banks of Lake Merim  
*as far as the sources or springs*  
of the Rio Negro, which *springs*

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de los rios que van a desembocar á los referidos de la Plata y Uruguay, hasta la entrada en este ultimo de dicho Pepiriguazú quedarán privativas de la misma corona de España, con todas los territorios que posee y que comprenden aquellos paises. . . .

*as well as those of the rivers which flow into the aforesaid Plate and Uruguay, until the entrance of the Pepirí Guazú into the latter shall be left exclusively to said Crown of Spain with all the territories which it possesses and which those countries comprise. . . .*

(Art. IV. given in Document 80.)

Art. 8° . . . se han convenido los altos contratantes en que la linea divisoria seguirá aguas arriba de dicho Pepirí hasta su *origen principal*, y desde este por *lo mas alto del terreno*, bajo las reglas dadas en el artículo 6°, continuará á encontrar las corrientes del rio San Antonio. . . .

(P. 89) Article VIII. . . . the High Contracting Parties have agreed that the boundary line shall follow against the stream of the aforesaid Pepirí until its *main source* and thence by *the highest ground*, according to the rules stated in the VI. Article, shall continue to find the waters of the River San Antonio which drains into the Grande of Curitiba. . . .

Art. 9°.—Desde la boca ó entrada del Igurey seguirá la raya aguas arriba de este hasta su *origen principal* y desde el se trazará una linea recta por *lo mas alto del terreno*, con arreglo á lo pactado en el citado art. 6° hasta hallar la *cabecera ó vertiente principal*

(P. 89) Article IX.—From the mouth or entrance of the Ygurei the line shall continue against the stream until its *main source*; and from it a straight line shall be drawn through *the highest ground*, according to what has been stipulated by the said VI.

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del rio mas vecino á dicha línea, Article, until finding the *head*  
que desague en el Paraguay. . . *source or spring* of the river  
next to its eastern bank. . . .

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### MINISTER ZEBALLOS' OFFICIAL TRANSLATIONS OF "VERTIENTES" BY "SOURCES," "HEAD- WATERS," AND "WATERSHEDS."

[From the official Spanish and English editions of the Argentine Argument in the case of Misiones.]

(Quoted on page 623 of the Statement.)

[Extractos del "*Alegato de la República Argentina sobre la cuestion de límites con el Brasil en el territorio de Misiones*, presentada por Estanislao S. Zeballos, Enviado Extraordinario y Ministro Plenipotenciario de la República Argentina." (Publicacion oficial—Washington, 1894.)]

(P. 138) Los exploradores internacionales hispano-portugueses de 1791 y los demarcadores argentino-brasileros de 1885-1891, al estudiar el terreno, en virtud de los tratados de 1777 y de 1885, han hallado aquel rio, es decir, el rio D E

[Extracts from the "*Argument for the Argentine Republic upon the question with Brazil in regard to the territory of Misiones*. Presented by Estanislao S. Zeballos, Envoy Extraordinary and Minister Plenipotentiary of the Argentine Republic." (Official publication—Washington, 1894.)]

(P. 146) The International Hispano-Portuguese explorers of 1791, and the Argentine-Brazilian Demarcators of 1885-1891, when surveying the ground in accordance with the treaties of 1777 and 1885, found such a river, that is to

(grabado incluido antes), convenido, dibujado y señalado por los Reyes a los comisarios demarcadores del límite, en el mapa de 1749, que sirvió de base y de guía a los tratados de 1750 y de 1777. La cuestión queda así resuelta. Para completar el límite basta remontar su curso y buscar *las vertientes mas cercanas* de un río que corra al Yguazú, siguiendo el límite por este río.

Es notable además esta circunstancia: el río pretendido por los brasileiros, desde el punto B al Norte, no tiene sus *vertientes* cerca del río que desagua en A en el Yguazú, sino de otro río llamado Urugua-y afluente del Paraná. Este hecho será comprobado más adelante con una declaración oficial brasileira del general Cerqueira, Ministro Plenipotenciario del Brasil en este Arbitraje, y que fué uno de los exploradores del Territorio,

say, the river "D E" (see preceding engraving), agreed upon traced and pointed out by the Kings to the Commissioners and boundary Demarcators in the Map of 1749, which was the basis and the guide of the treaties of 1750 and 1777. The question is thus solved. In order to complete the boundary it is sufficient to follow up the course of this river in search of "*las vertientes mas cercanas*" (the *springs* or *sources* in closest proximity) of a river that runs to the Yguazú, the boundary then following this river.

Besides this there is also another important circumstance, namely, that the river the Brazilians claim to be the boundary from the point "B" towards the north does not have its *sources or springs* near or close to the river that empties at "A" into the Yguazú, but nearer another river called the "Urugua-y," a tributary of the Parana. This fact will be also proved later on by international documents and by an official Brazilian

como miembro de la Comision Internacional Argentino — Brasileira. Luego, está demostrado por dos exploraciones hechas con un siglo de intervalo: 1°. Que existe en el terreno el rio adoptado para límite internacional por el tratado de 1750. 2°. Que dicho rio ha sido cartografiado en 1885-1891 por una comision internacional y resulta con la misma posicion y direccion general que tiene en el *Mapa de las Cortes*, 1749, que sirvió de base y de guia a los tratados y que encontraron tambien los demarcadores de 1791. 3°. Que tiene *contravertientes* inmediatas en un rio que desagua en el Yguazú. 4°. Que la linea del límite defendida por los argentinos en la forma C D E es la misma pactada por los reyes en 1750 y dibujada desde E hasta D en el Mapa Portugues de 1749, protocolizado en 1751 por Ambas Coronas. 5°. Que la línea A B pretendida por el Brasil no tiene antecedente legal en el mapa de 1749, ni en los tratados de 1750 y de 1777.

declaration made by General Cerqueira, Minister Plenipotentiary of Brazil in the present Arbitration, who was one of the explorers of the territory as a member of the International Argentine-Brazilian Commission. It therefore seems to be demonstrated by two explorations, made with an interval of one century between them:—1°. That there exists on the ground the river adopted as an international boundary by the treaty of 1750. 2°. That said river was mapped in 1891 by an international commission, with the result that its position and general direction on this map is the same that it had on the "*Mapa de las Cortes*" of 1749, which served as the basis and the guide of the treaties, these being also the same as those found by the Demarcators of 1791. 3°. That it has close by *the counter-sources* of a river that empties into the Yguazú. 4°. That the boundary line supported by the Argentines in the direction "C D E" is the same one agreed upon by the sovereigns in 1750 and

drawn from " E " to " D " on the Portuguese map of 1749, to which the Protocol was added in 1751 by both Crowns. 5°. That the line " A B " claimed by Brazil has no legal antecedent, either on the map of 1749 or in the treaties of 1750 and 1777.

(P. 155) El artículo VIII. del tratado confirma las interpretaciones precedentes en estos términos :

Art. 8°. Quedando ya señaladas las pertenencias de ambas Coronas, hasta la entrada del rio Pequiry o Pepiry-Guazú en el Uruguay, han convenido los dos altos contrayentes, en que la línea divisoria seguirá aguas arriba, de dicho Pepiry hasta su *origen principal*, y desde éste por lo mas *alto del terreno*, bajo las reglas dadas en el artículo 6°, continuará a encontrar las corrientes del rio San Antonio, que desemboca en el Grande de Curitiba, que por otro nombre llaman Igua-zú.

(P. 164) The eighth Article confirms the preceding interpretation in the following terms :

Art. 8. The possessions of both Crowns, up to the entrance of the river Pequiry or Pepiry-Guazú into the Uruguay, having been already pointed out, the High Contracting Parties have agreed that the boundary line shall follow up the stream of the aforesaid Pepiry to its *main source* and thence by *the highest ground*, according to the rules stated in the sixth Article, shall continue to find the waters of the river San Antonio which drains into the Grande of Curitiba, otherwise called Yguazú. . . .

Los brasileiros ha pretendido hallar en este artículo cierto pueril fundamento a sus pretensiones, porque dá el nombre de San Antonio al rio, cuyas *vertientes* deben corresponder a los del *Pepiry o Pequiry Guazú*, para formar el límite. El argumento es simplemente artificioso. He dicho ya y lo comprobaré a su tiempo, que los rios pretendidos por los brasileiros, el Guarumbaca y el San Antonio de los demarcadores de 1759, no tienen sus *orígenes* cerca, ni correspondientes entre sí. Las *fuentes* del San Antonio del error de 1759, correspondían a las del rio Uruguay, que desagua como el primero en el Paraná, es decir en la misma *vertiente* y es forzoso que sus *orígenes* sean los mas cercanos, y correspondan a los de un rio tributario del Uruguay, para ser admisible en el sistema fluvial del límite.

The Brazilians have pretended to find in this Article some puerile foundation for their pretensions, because it gives the name of "San Antonio" to the river the *watersheds* of which correspond to those of the Pequiry or Pepiry Guazú, forming the boundary. This argument is simply ingenious. I have already stated, and it will be proved at the proper time, that the rivers claimed by the Brazilians, the "Guarumbaca" and the "San Antonio" of the Demarcators of 1759 do not have their *origin* near nor corresponding among themselves. The *springs* of the "San Antonio" of the mistake of 1759 correspond to those of the river Uruguay, which empties like the former into the Paraná, that is to say, it has the same *sources*; and it is required that its *sources* should be the nearest and correspond to those of a river which was a tributary of the Uruguay, to be admitted into the fluvial system of the boundary.

(P. 156) Por otra parte, se ha llamado teóricamente San Antonio, desde 1759 al río del Norte, que debe corresponder al Pepiry o Pequiry Guazú, sin que eso importe resolver su situación geográfica, que no está dada por el *Mapa de las Cortes*, como la del segundo, y sin que se pretendiera subordinar el límite a los nombres. Al contrario, he demostrado que en 1759 los Reyes acordaron que en estos casos el nombre siguiera al límite. De suerte que llamándose teóricamente San Antonio el río *contravertiente* del Pepiry o Pequiry-Guazú, hay que buscar su situación en el terreno, de acuerdo con los antecedentes: Mapa de las Cortes, texto y espíritu de los tratados. El Mapa de las Cortes, no anulado, dió clara é irrevocablemente la base de dos ríos para trazar los límites: el Uruguay-Pitá, y aguas arriba de este el Pepiry o Pequiry-Guazú. Del otro río ni dió nombre, ni le acordó importancia: quedada subordinado al Pequiry o Pepiry. Se limitó a ordenar en efecto, que hallado el río capital Pepiry o

(P. 165) On the other hand, since 1759 the river on the North that should correspond to the Pepiry or Pequiry-Guazú has been called theoretically "San Antonio," without this however solving the question of its geographical position, which is not given by the "*Mapa de las Cortes*" like that of the latter, and without any intention of subordinating the boundary to the names. On the contrary, I have demonstrated that in 1759 the Sovereigns agreed that in these cases the names should follow the boundaries; so that the river having its *sources opposite the sources* of the Pepiry or Pequiry-Guazú being theoretically called the "San Antonio," it is only needful to find its location on the ground in accordance with the antecedent facts and the "*Mapa de las Cortes*," which is the text and the spirit of the treaties. The "*Mapa de las Cortes*," never nullified, gave clearly and irrevocably two rivers as the basis by which to trace the boundaries; the Uruguay-Pitá and above

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Pequiry siguieran su curso los demarcadores hasta su *fuelle principal*, y siguieran la *fuelle* mas cercana de otro rio, que desaguara en el Yguazú, cualquiera que fuera su nombre.

this the Pepiry or Pequiry-Guazú. It gave no name to the other river, nor did it give it any importance, leaving it subordinate to the Pequiry or Pepiry. It limits itself to directing, in effect, that when the vital river Pequiry or Pepiry is found, the Demarcators shall follow its course to its *principal spring*, and then find the nearest neighbouring *spring* of another river, whatever may be its name, which empties into the Yguazú.

(P. 163) Luego el Brasil admite oficialmente el Mapa de las Cortes y trazando el límite, como este lo trae, el rio San Antonio debe ser buscado en la *contravertiente*, en el San Antonio-Guazú de Oyarvide, sostenido por los argentinos. Si se trazara el límite por el San Antonio del error de 1749, que pretenden los Brasileños, el límite resultaria quebrado.

(P. 172) Therefore Brazil officially admits the "*Mapa de las Cortes*," and tracing the boundary according to it, the river San Antonio should be sought in the *counter-sources*, on the opposite watershed, in the "San Antonio-Guazú," as it was called by Oyarvide, supported by the Argentines. If the boundary is traced along the San Antonio of the mistake of 1759, as maintained by the Brazilians, the result would be an absurd boundary.

(P. 164) Lo que arriba quedaba expresado era la línea de los límites, la raya roja del Mapa de las Cortes, que en la zona del actual litigio, siguiendo el curso del río Pequiry o Pepiry, debía buscar *el río contravertiente*, que desaguara en el Yguazú. (Artículo 25 del Tratado de 1750.)

(P. 173) That which had "already been expressed" was the boundary line, the red mark of the "*Mapa de las Cortes*," which in the zone of the present dispute follows the course of the river Pequiry or Pepiry in search of a river "*contravertiente*" (i.e. one *having its sources opposite to the former*, and adjacent thereto), which empties into the Yguazú on the counter watershed (Article XXV. of the Treaty of 1750).

(P. 177) La cuestión de Misiones consiste como se ha visto, en que el Brasil pretende por límite el río que entra al Uruguay aguas abajo del Uruguay-Pitá y busca las *vertientes* mas cercanas del río opuesto, que desagua en el Yguazú; mientras que la República Argentina, heredera legítima de la Corona de España, mantiene lo que le dan los tratados de ésta con Portugal y el Mapa de las Cortes de 1749, que sirvió para redactarlos, y ellos ordenan que el límite corra por el sistema de

(P. 188) The question of Misiones arises out of the claim by Brazil that the boundary is the river that enters into the Uruguay below the Uruguay-Pitá, and a line seeking the nearest *sources* of the opposite river flowing into the Yguazú; while the Argentine Republic, a lawful heir to the Crown of Spain, holds that which was given to the latter by the treaties made between it and Portugal, and by the "*Mapa de las Cortes*," which served as the basis in drawing up those documents; and the

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rios, situados aguas arriba del Uruguay-Pitá.

said treaties provide that the boundary shall run by the system of rivers situated above the Uruguay-Pitá.

(P. 216) . . . y continuará aguas arriba del Pepirí hasta su *origen principal* desde el cual seguira por *lo mas alto del terreno* hasta la *cabecera principal* del rio mas vecino, que desemboca en el grande de Curitiba, que por otro nombre llaman Yguazú, por las aguas de dicho rio mas vecino del origen del Pepirí, etc.

(P. 228) . . . and they shall continue up the stream of the Pepiry to its *principal source*, from which it shall continue through *the highest ground to the main headspring* of the nearest river which flows into the Grande of Curitiba, otherwise called Yguazú, through the waters of the said river nearest to the source of the Pepiry . . .

(P. 231) . . . declaramos que reconocemos éste por el río Perirí, determinado en el artículo quinto del Tratado de Límites, por frontera de los Dominios de Sus Majestades la Católica y la Fidelísima y en su consecuencia, que la demarcación empezada en el Pueblo San Xavier, y seguida aguas arriba del Uruguay, hasta la boca de éste, debe continuar, siguiendo su curso hácia sus *cabeceras* sin embargo de no hallarse su efectiva posición, conforme á

(P. 244) . . . We hereby declare that we recognize this as the river Pepiry named in Article V. of the Treaty of Boundaries as the boundary between the dominions of Their Catholic and Most Faithful Majesties; consequently the demarcation begun at the pueblo of San Xavier and followed up stream along the Uruguay up to the mouth of this river shall follow its course towards its *headwaters*, in spite of its true position not being in accordance with the

la que le da el Mapa de la Demarcación dado por las dos Cortes, no debiendo segun la declaracion signada al reverso de él, por los dos Exmos. Señores Plenipotenciarios, Don Joseph de Carvajal, y Lancaster, y Vizconde Don Thomas Da Sylva Tellez, atenderse á dicho mapa, sinó en cuanto éste se halle conforme al Tratado, y para que en todo tiempo conste este acto de reconocimiento, y lindero de la división de términos, hicimos la presente declaración firmada por todos los infrascriptos.

one given it in the Map of the Demarcators by the two Courts as we ought not to follow the declaration that appears on its reverse side, signed by their Excellencies the two Plenipotentiaries Don Josef de Carvajal y Lancaster and Viscount Don Thomas da Silva Tellez to follow the aforesaid map only in so far as it agrees with the Treaty. And in order that this act of recognition and boundary of the division of limits may be known for all time we made this present declaration, signed by all of the undersigned.

(P. 232) Si el arroyo Guarumbaca no es el rio del limite, su correlativo, su *contravertiente*, que desagua en el Yguazú, no lo es tampoco.

(P. 246) If the small stream called the Guarumbaca is not the river of the boundary, then neither is its correlative, its *counter-source* upon the opposite watershed, which empties into the Yguazú, a boundary.

(P. 233) La primera disputa sobrevino en 1759, respecto de las *nacientes* de los rios que surjen en el Estado Oriental y desaguan en el Uruguay, o sea

(P. 247) The first dispute occurred in 1759 regarding the *sources* of the rivers that originate in the Estado Oriental (Uruguay) and flow into the

en la parte del límite en que corre este río, desde el Océano.

Uruguay, or in that part of the boundary that lies between the Ocean and this river.

(P. 234) Ordena, en seguida que se busque la *naciente principal* del río mas cercano que desague en el Iguazú, al que se da el nombre de San Antonio. Los brasileiros quieren deducir de este nombre la aprobacion de los errores de la demarcacion de 1759, y sostienen que ese es el río del límite, cuyas *nacientes* deben corresponder a las del arroyo Guarumbaca o falso Pepiry. La interpretacion es violenta. Incorporado espresamente, como está, el tratado de 1750 al tratado de 1777 en el punto del límite sometido al arbitraje, lo esta igualmente el *Mapa de las Cortes*, que ambas declararon parte integrante del primer tratado, en un protocolo firmado sobre el mismo mapa. Dada por este la situacion del río del límite, el Pepiry o Pequiry, que debe ser un río grande y demostrado en 1791 y en 1891 que este río existe sobre el terreno, en la misma posicion, en que lo dibujó

(P. 248) It directs, in continuation, that there must be sought the *principal source* of the nearest river of the opposite watershed which empties into the Yguazú, to which it gives the name of "San Antonio." The Brazilians wish to infer from this name the approval of the errors of the Demarcation of 1759, and they assert that this is the boundary river *the source* of which should correspond to the "arroyo" Guarumbaca, or the false Pepiry, on the opposite watershed. This interpretation is a violent one. The Treaty of 1750 has been expressly incorporated into the Treaty of 1777 in the particular of the boundary now submitted to the Arbitrator, and so also has the "*Mapa de las Cortes*," which both Crowns declared to be an integral part of the former Treaty in a protocol signed upon the very map itself. The situation of the boundary river Pepiry or

aquel mapa, es claro que el límite debe continuar por las *vertientes principales* del río mas cercano que corra al Yguazú.

Pequiry, which should be a large river (Rio Grande) being given on that map, and it being demonstrated in 1791 and in 1891 that this river actually exists in the field in the same position in which it is delineated upon the map, it is clear that the boundary must continue by the *principal headwaters* of the nearest river upon the opposite watershed which empties into the Yguazú.

El falso Pepiry de 1759 queda rechazado espresamente por el tratado y por sus antecedentes ; luego el otro arroyo llamado entonces San Antonio, queda rechazado tambien. Mas adelante probaré que los demarcadores brasileiros y argentinos han hallado en 1891 que el falso Pepiry o arroyo Guarumbaca, y el arroyo San Antonio del error no tienen sus *vertientes* cerca, como lo exigen los tratados de 1750 y de 1777.

The false Pepiry of 1759 is therefore expressly rejected by this Treaty and its antecedents, and, of course, the opposite "arroyo," which was termed the "San Antonio," also stands rejected. Farther on it will be proved that the Brazilian and Argentine Demarcators of 1891 found that the *watershed* of the false Pepiry or "arroyo" of Guarumbaca and the *counter or opposite watershed* of the San Antonio were not near one another and did not correspond, as was strictly required by the Treaties of 1750 and 1777.

(P. 235) Acabo de decir que dos exploraciones internacionales de 1791 y de 1891, han demostrado sin discrepancia, que los arroyos Guarumbaca (falso Pepiry) y San Antonio de 1759, pretendidos por el Brasil, no tienen la condicion puesta por los tratados de correlacion y cercania de sus *vertientes*; mientras que esta circunstancia ha resultado plenamente comprobada entre los rios Pepiry ó Pepiry Guazú y San Antonio Guazú de Oyarvide, que sostienen los argentinos.

(P. 240) El rio Uruguay-piutá es bien conocido por los Indios de Misiones, principalmente de los del pueblo de San Angel, que le son los mas vecinos, y se pasan sus *vertientes* por el camino que va a la Baqueria.

(P. 243) Recomendándose a los comisarios que lleven a ejecucion esta Línea divisoria,

(P. 249) It has been clearly shown that the two international explorations of 1791 and 1891, without any discrepancy, demonstrated that the "arroyo" Guarumbaca (false Pepiry) and the "arroyo" San Antonio of 1759, claimed by Brazil as the boundary, did not fulfil the conditions required by the Treaties as to the correlation and close proximity of their respective *watersheds*; while these requirements are fully met, as has been proved by observations, by the relations found to exist between the Pepiry or Pequiry-Guazú and the San Antonio-Guazú of Oyarvide, which are maintained by the Argentines.

(P. 255) The river Uruguay-Pitá is well known by the Indians of Misiones, especially by those of the pueblo of San Angel, who are nearest to it and pass its *headwaters* by the road that goes to the Vaqueria.

(P. 259) Recommending to the Commissioners who are to lay out this line of demarcation

que sigan en toda ella las direcciones de los Montes por las *cumbres* de ellos, o de los rios donde los hubiere a propósito, y que las *vertientes* de dichos rios, y sus *nacimientos*, sirvan de Marcos a uno y otro Dominio, donde se pudiese ejecutar asi, para que los rios que nacieren en un Dominio y corrieren hácia él, queden desde sus nacimientos a favor de aquel Dominio, lo cual se puede efectuar mejor en la Línea, ( . . . ) que correrá desde la Laguna Merin hasta el rio Pepiriguasú, en cuyo paraje no hay rios Grandes, que atraviesen de un Terreno a otro, porque donde los tuviere no se podrá verificar este método, como es bien notorio, y se seguirá el que en sus respectivos casos se especifica en otros artículos de este Tratado para salvar las pertenencias y posesiones principales de ambas Coronas.

(P. 251) En la misma conformidad se me hace dificultosa la demarcacion de este rio Iguazú, en cuanto no se veri-

to follow along its entire length the direction of the mountains along their *tops* or along the rivers, if there are any suitable ; and to make of the *headwaters and sources* of these rivers the boundaries of one and the other possessions in all places where it can be done, so that all the rivers that rise within one possession and run towards it shall remain in favour of that Power ; this can be done on the line ( . . . ) that is to run from the lagoon Merin to the Pepiri-Guazú river, at which place there are no large rivers, crossing from one country into the other, because wherever such occur, this method cannot be employed, as it is evident, and such one will be followed as is specified for each respective case in other Articles of this Treaty, for the purpose of saving the properties and principal possessions of both Crowns.

(P. 268) In the same conformity the demarcation of this river Yguazú is to me very difficult, inasmuch as its

fique su union con las *cabeceras originales* de los rios Pepiri-Guazú y San Antonio, siendo tan dudosa la situacion de las del primero, como que no hay persona alguna que las conozca ; antes por el contrario no deja de haber quien diga que entre las citadas *vertientes* pasa un rio, que tiene su origen en los campos y establecimientos de Curitiba, a donde se conoce con la denominacion de rio Marombas y desagua en el Paraná con el nombre de Uruguay, en la latitud 25° 53' o" poco mas.

union with the *original sources* of the rivers Pepiry-Guazú and San Antonio is not verified, the situation of the former being so doubtful, as there is no person who knows them ; on the contrary, there were those who said that between the said *sources* passed a river that had its origin in the fields and settlements of Curitiba, where it is known by the name of the river " Marombas," and which empties into the Parana with the name of Uruguay, in latitude 25° 53' or a little more.

(P. 252) Estas dudas procedian de la sospecha de que los *orígenes* del San Antonio de 1759, no correspondian con los del Pepirí, tal como se lo imaginaron falsamente los demarcadores de aquel año, y al juicio del Jefe de los demarcadores portugueses de 1788, el San Antonio, segun el tratado mismo, no podia ser línea de frontera sino a condicion de que sus *orígenes* correspondieran con los del Pepiri o Pequiri-Guazú, es decir que sus *nacientes principales* fueran

(P. 269) These doubts arise from the suspicion that the *headwaters* of the San Antonio of 1759 did not correspond with those of the Pepiry, and in the opinion of the chief of the Portuguese demarcators of 1788 the San Antonio, according to the same Treaty, could not be the frontier line, except on the condition that its *headwaters* should correspond with those of the Pepiry or Pequiri Guazú ; that is to say, that its *principal sources* were the immediate *counter-sources*, or op-

*contravertientes* inmediatas unas respecto de otras. Nadie, según dicho Jefe de demarcadores portugueses, conocía, ni había descubierto aun las cabeceras originales del falso Pepirí, y hasta sospechaba, que entre las *vertientes* de uno y otro río, cruzara el río de las Marombas, que traía su curso desde los campos de Curitiba, según los Indios.

Adviértase que en presencia de esa negación terminante, no se explica como el Brasil haya podido afirmar, que los demarcadores de 1759 dejaron atada la frontera entre las *cabeceras* del falso Pepirí y del falso San Antonio.

(P. 253) La línea se ha de seguir, con las condiciones estipuladas, de la *vertiente* principal del río Pequirí o Pepirí-Guazú por las *cabeceras* del río San Antonio, a buscar el Yguazú en la forma que metódicamente especifica el tratado y no inversamente.

(P. 253) Seguramente no se imaginó el comisario portu-

guese ones, in respect to the other. No one, according to the said chief of the Portuguese Demarcators, knew, nor had they yet discovered, the *sources* of the false Pepirí, and it was suspected that between the *headwaters* of one river and the other crossed the river of Marombas, which took its course from the fields of Curitiba, according to the Indians.

It might be noted that in the face of this final negation it is not explained how Brazil could have asserted that the Demarcators of 1759 left the frontier fixed between the *sources* of the false Pepirí and the false San Antonio.

(P. 269) The line must follow, according to the conditions stipulated, from the principal *source* of the river Pepirí or Pequirí Guazú, by the *headwaters* of the river San Antonio, to seek the Yguazú, in the form in which the Treaty methodically specifies, and not inversely.

(P. 270) Surely the Portuguese Commissioner did not be-

gues, aunque lo suponía, que la *vertiente* reconocida como *contra-vertiente* del falso San Antonio fuera nada menos que el río Urugua-y, tributario del Paraná, es decir, el mismo río que los indígenas, pobladores de esos lugares le habían dicho que era el río de las Marombas, nacido en los campos de Curitiba. Sin embargo, los demarcadores de 1759 tomaron esas *vertientes* por las del falso Pequiry o Pepiry-Guazú. Queda, pues, la constancia, de que fué el jefe de los comisarios portugueses quien indicó y sostuvo por primera vez que el arroyo de San Antonio, falsamente explorado en 1759, no era uno de los ríos caudalosos del límite.

lieve, although he might have conjectured, that these *headwaters* recognized as the *counter-sources* of the false San Antonio were no less than those of the river Urugua-y, a tributary of the Parana, that is to say, the same river which the aborigines living in those regions had said was the "Marombas," which rose in the fields of Curitiba, and yet the Demarcators of 1759 took these *headwaters* for those of the Pepiry or Pequiry-Guazú. The fact then remains well settled that it was the chief of the Portuguese Commissioners who indicated and asserted for the first time that the "arroyo" or small stream of the San Antonio, wrongly explored in 1759, was not one of the boundary rivers "caudalosos" or of large volume.

(P. 264) Subiendo el curso del río Pequiry o Pepiry del Mapa de las Cortes, hasta las *alturas que dividen las aguas*, entre los ríos Urugua-y é Yguazú, se encuentran *vertientes* cercanas de algún río, afluente del último nombrado y en

(P. 282) Going up the course of the River Pepiry or Pequiry of the "*Mapa de las Cortes*," as far as the *high ground that divides the waters* between the rivers Urugua-y and Yguazú, can there be found the *sources* near by of any river which is

correspondencia con las del dicho Pepiry o Pequiry que desaguen en el Yguazú. El Mapa Internacional demuestra que el río en tal situación y con tales caracteres, existe en conformidad del mapa de 1749 y los tratados de su referencia, confirmando así las investigaciones de los Comisarios de 1777. En consecuencia, queda también comprobado oficial y definitivamente por el Brasil y por la República Argentina : —Que el río por el cual debe continuar el límite en las *vertientes* cercanas, que corresponden al Pepiry ó Pequiry-Guazú del Mapa de las Cortes, existe en la misma posición, en que dicho mapa y los tratados lo indicaban.

(P. 268) Los demarcadores de 1777 advirtieron que los rios Pepiry y San Antonio, erróneamente explorados por los comisarios de 1759, no tenían sus *vertientes* cerca, ni en correspondencia. El Jefe de los ingenieros por-

a tributary of the latter and corresponding upon the opposite watershed to those of the Pepiry or Pequiry, and which empties into the Yguazú? The International Map demonstrates that a river in this situation and of this description does in fact exist in conformity with the Map of 1749 and the treaties referring to it, thus confirming the investigations of the Commissioners of 1777. Therefore it is officially and conclusively proved for Brazil and for the Argentine Republic that the river which the boundary must follow at the nearest *headwaters* corresponding and opposite to the Pepiry or Pequiry-Guazú of the "*Mapa de las Cortes*" does exist in the very position in which it is indicated by that map and the treaties.

(P. 286) The Demarcators of 1777 noticed that the rivers Pepiry and San Antonio, erroneously explored by the Commissioners of 1759, did not have their *headwaters* either near each other or corresponding to one another on opposite

tugueses, creia que entre aquellas *vertientes* pasaba un tercer rio, nacido en Curitiba; y la comision de geógrafos de las dos naciones, mandada a verificar el hecho, encontró que en efecto entre aquellas *vertientes* nacia un rio el cual desagua en el mismo Parana, y que tenia sus *fuentes* cercanas de las del falso San Antonio. Hallaron, ademas, que las *vertientes* del falso Pepiry quedaban muy lejos de las *vertientes* de los dos rios anteriores; y que por consiguiente no se acomodaban, para servir de límites, a las palabras de los artículos 5° y 8° de los Tratados de 1750 y de 1777.

La esploracion internacional de 1885 a 1891, mas detenida y con mejores elementos científicos, que la de 1777, ha comprobado: que entre las *vertientes* del Pepiry y San Antonio el del error de 1759, se interponen, no uno, sinó dos rios que separan entre sí aquellas *vertientes* y les quitan los caracteres exigidos por los tra-

watersheds. The chief of the Portuguese Engineers thought that between their *headwaters* there passed a third river which originated in Curitiba; and the Commission of Geographers from the two nations sent to verify this fact found that in fact between their *headwaters* there was the source of a river that finally emptied into the Paraná and that it had its *springs* near those of the false San Antonio. They found out, besides, that the *sources* of the false Pepiry were very far from the two preceding rivers and that therefore they could by no means be made to serve as the boundary according to the terms of Articles V. and VIII. of the Treaties of 1750 and 1777.

The International Exploration of 1885–1891, made more carefully and with better scientific preparation and means than that of 1777, has proved that between the *sources* of the Pepiry and the erroneous San Antonio of 1759 are interposed not one but two rivers that separate still farther these two *watersheds* and de-

tados. Presento al Arbitro, en esta misma página, el plano internacional, firmado por los ingenieros brasileiros y argentinos, que comprueba el hecho ; y en el cual los dichos rios llevan los nombres de Capanema y Urugua-y. Adviértase que el rio Capanema fué descubierto por esta exploracion internacional, que le dió el nombre del Jefe de los demarcadores del Brasil.

Queda asi, oficial y definitivamente establecido por el Brasil y por la República Argentina : que los rios Pepiry y San Antonio, del error de 1759, no tiene sus *vertientes* cerca, ni en las condiciones de correspondencia dadas por los tratados de 1750 y 1777 y que, por último, el único sistema de rios que a ellos se acomoda, es el de los rios Pepiry o Pequiry-Guazú y San Antonio-Guazú, situados al Oriente de los anteriores.

prive them of the characteristics required by the treaties. I present herewith to the Arbitrator the International Plan, signed by the Brazilian and Argentine Engineers, which proves this fact, and in which these rivers bear the names of "Capanema" and "Urugua-y." The facsimile of the same is here enclosed. It should be also noted that the river Capanema was discovered by this International Exploration, which gave to it the name of the chief of the Brazilian Demarcators.

Brazil and the Argentine Republic have thus officially and definitively established the fact that the rivers Pepiry and San Antonio of 1759 do not have their *headwaters* either near each other or in the conditions as to correspondence upon opposite watersheds required by the Treaties of 1750 and 1777 ; and that furthermore the only system of rivers that conform to the requirements, is that of the rivers Pepiry or Pequiry-Guazú and the San Antonio-Guazú, situated to the east of the preceding rivers.

(P. 269) La Comisión Mixta de Límites, después de los trabajos de mis distinguidos y apreciados amigos los Señores Comisarios Guillobel y Virasoro, habian declarado en documentos oficiales que el verdadero San Antonio Guazú del geógrafo español Oyarvide, es el Yangada, y no el Chopin. Por los estudios de estos distinguidos profesores quedó probado que el rio mas vecino del Chapecó, denominado por los españoles ayer y por los argentinos hoy, Pequiry-Guazú y que corre para el Iguazú, es el Yangada.

Posteriormente por trabajos prolijos de delineacion y agri-mensura, hechos bajo la misma inmediata direccion y la de mi colega Virasoro, y ejecutados por los ayudantes Jardín, Rego Barros, Montes y Dousset, y en los que trazamos curvas de nivel en toda la zona para demostrar el *divortia aquarum* quedó demostrado hasta la evidencia, que el Yangada no solo es el rio mas próximo al Chapecó, que corre hácia el Iguazú, s'no que

(P. 287) The Joint Boundary Commission after the work of my distinguished and esteemed friends, Commissioners Guillobel and Virasoro was ended, declared in official documents that the true San Antonio Guazú of the Spanish Geographer Oyarvide is the Yangada and not the Chopin. By the surveys of these distinguished professors it was proven that the nearest river to the Chapecó named by the Spaniards formerly and by the Argentines to-day, Pequiry-Guazú, and which runs towards the Yguazú, is the Yangada.

Subsequently, by very full and detailed drawings and surveys made under the immediate direction of the same and of my colleague Virasoro, and executed by the Assistants, Jardín, Rego Barros, Montes and Dousset, and in which we drew curves showing the elevations throughout the zone to demonstrate the *divortia aquarum*, it was demonstrated beyond question that the Yangada is not only the nearest river to the Chapecó which

tambien es su *contravertiente*.

De igual manera que esto quedó probado, resultó tambien, por trabajos emprendidos con iguales atenciones y escrúpulos, en la zona comprendida entre las *cabeceras* del Pepiry-Guassú y San Antonio, la convicción de no ser éste el río mas vecino de aquel que corre para el Iguazú, ni ser su *contravertiente*.

Es de importancia, efectivamente, confirmar las afirmaciones de los demarcadores de la segunda época, según los cuales en el sistema de ríos de la demarcación de 1759, anulada en 1777, no se verificaban las exigencias de las instrucciones. La exploración internacional de 1885 á 1891, demostró que la *contravertiente* del falso San Antonio de 1759, no era el Pepirí o Pequiry, señalado por el indio, que desagua abajo del Uruguay Pitá, sino un tercer río, que, lejos de correr como aquel, á derramarse en el Uruguay, es afluente del Paraná. El Señor

runs towards the Yguazú, but that it is also its *counter-source*.

In like manner as this was proven, from the work carried out with equal carefulness and scrupulous attention on the zone comprised between the *sources* of the Pepiry Guazú and the San Antonio, the conviction was also arrived at that this river (the Chopin) was not the nearest to that which runs towards the Yguazú nor its *counter-source*.

(P. 288) It is important to confirm the affirmations of the Demarcators of the second epoch, according to which the system of the rivers of the Demarcation of 1759 annulled in 1777 did not fulfil the requirements of the instructions. The international surveys from 1885 to 1891 demonstrated that the *counter-source* of the false San Antonio of 1759 upon the opposite watershed, was not the Pepiry or Pequiry indicated by the Indian, which emptied down stream from the Uruguay-Pitá, but a third river, which, instead of running like that to mingle its

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Ministro del Brasil, General de Castro Cerqueira, lo explicó claramente en estos términos y en aquella misma discusión contestando á escritores brasileiros, por haber aceptado como demarcador honrado, aquellos hechos que no era posible borrar del suelo :

waters with the Uruguay, is on the contrary a tributary of the Paraná. The said Minister from Brazil in Washington, General de Castro Cerqueira, explains this clearly in similar terms, and in this same discussion, when answering Brazilian writers who attacked him for having accepted, as an honest Demarcator, these facts which it was impossible to efface from the ground, he says :

(P. 270) *La línea divisoria de las aguas que vierten, de un lado para el rio Uruguay y del lado opuesto para el Yguazú, tiene su punto terminal del lado occidental en la cabecera principal del rio Pepiry Guazú. Desde este punto para el Oeste el divisor de las aguas se bifurca de manera que la rama del Noroeste divide las aguas que corren para el Yguazú de las que corren para afluentes del Parana y la rama del Sudoeste divide las aguas que corren para los afluentes del Paraná de los que van para los afluentes del Uruguay.*

(P. 288) *The line which divides the waters which descend on one side towards the river Uruguay and on the opposite side toward the Yguazú has its terminal point on the western side in the principal spring of the river Pequiry-Guazú. From this point toward the west the divider of the waters is bifurcated in such a way that the north-west branch divides the waters that run to the Yguazú from those that flow into the tributaries of the Parana, and the south-west branch divides the waters that run into the tributaries of the Parana from those that*

Afirmo que nadie por sabio y autorizado que sea, podrá negar el hecho geográfico. Siendo así, como efectivamente sucede, y ahí están para probarlo los trabajos de la Comisión de Límites, vemos al San Antonio naciendo en la *vertiente* norte de la rama Noroeste, y corriendo para el Yguazú, y del lado opuesto de la misma sierra, en una extensión de cerca de tres leguas para el Sudeste, *las cabeceras numerosas* del río Uruguay, afluente del Paraná. La *vertiente opuesta* a aquella, en que nace el San Antonio, solamente da aguas para el Paraná y por lo tanto la *contravertiente* del San Antonio es el río Uruguay y no el Pepiry-Guazú, cuyas *contravertientes* son otro río denominado Capanema, que tiene con él *nacientes* comunes y corre en la *vertiente* opuesta que es la del Yguazú, y el río Uruguay, que nace en la *vertiente* opuesta y da aguas al Paraná.

flow into the tributaries of the Uruguay.

I assert that no one, however wise and learned he may be, can deny the geographical facts.

This being so, as the facts show, and the labours of the Boundary Commission prove, we see the San Antonio rising on the *watershed* north of the north-west branch and running toward the Yguazú, and on the opposite side of the same range, with an extension of nearly three leagues towards the south-east, the *numerous sources* of the river Uruguay, a tributary of the Parana. The *watershed* opposed to that in which the San Antonio rises only gives its waters to the Paraná, and therefore the *counter-source* of the San Antonio is the river Uruguay and not the Pepiry-Guazú, the *counter-sources* of which are those of another river called the "Capanema," which has *springs* in common with it and runs down the *watershed* opposite which is that of the Yguazú, and the river Uruguay which rises in the opposite

*watershed* and gives its waters to the Paraná.

Demonstrado por la autoridad conteste de los exploradores argentinos y brasileiros que en el sistema de los rios pretendidos por estos, como límite internacional o sea los rios occidentales, no se verifican los caracteres físicos de cercanía de las *vertientes* o de ser el uno *contravertiente* del otro como lo pedían los tratados, el mapa-base de la demarcación y las instrucciones de las Cortes, es evidente e indiscutible que esas no son las corrientes de agua descritas, como línea divisoria, y que deben ser buscadas mas al oriente.

Al contrario, todas las descripciones concuerdan con los caracteres físicos hallados en el sistema de los rios orientales o sostenidos por la República Argentina, en ejercicio del derecho heredado de España. Oigase una vez más al Señor Ministro de Brasil, general de Castro Cerqueira :

Tratemos ahora del Yangada (San Antonio Guazú de Oyar-

(P. 289) It is proved by the common authority of the Argentine and Brazilian explorers that the river of the system claimed by the latter as the international boundary, or the western rivers, do not comply with the physical characteristics required for the correspondence of their respective *watersheds*, or being one the *counter-source* of the other, as stated in the treaties, the basic map of the Demarcation and the instructions of the two Courts.

On the contrary, the international map herewith shows the characteristics of the eastern system of rivers according to the treaties, and as they in fact are located upon the ground. Let us refer once more to the Minister of Brazil, General Castro Cerqueira, who says :

We are discussing now the Yangada (San Antonio-Guazú

vide) y del Chapecó (Pepiry-Guazú de los españoles) admitiendo así mismo la definición del Señor Guillobel. La *línea de la vertiente* entre el Uruguay y el Yguazú, que comienza en las *cabeceras* del Pepiry Guazú (de 1759) corre el rumbo general del Oeste al Este, dividiendo *las aguas de las dos vertientes* después de haber dividido las que corren para el Chopin, de las que van a caer al Chapecó, pasa entre las *cabeceras* de éste y del Yangada, como viene indicado en todos los mapas, de modo que las diversas *cabeceras* de éste, están al frente de otras del Chapecó, habiendo algunas que nacen hasta en los mismos bañados. Estas *cabeceras* todas del Yangada nacen en la *vertiente del Yguazú*, y las del Chapecó nacen en la *vertiente opuesta*. Luego el Chapecó es la *contra-vertiente* del Yangada.

of Oyarvide) and the Chapecó (the Pepiry-Guazú) of the Spaniards), admitting at the same time the definition of Señor Guillobel. The *line of the watershed* between the Uruguay and the Yguazú, which begins in the *sources* of the Pepiry-Guazú (of 1759) runs with a general course from the west to the east, dividing *the waters of the two watersheds*, after having separated those that run to the Chopin from those that flow towards and fall into the Chapecó, it passes between the *sources* of the latter and those of the Yangada, as may be seen in all the maps, in such a way that the different sources of the latter are in front of the others of the Chapecó, there being some that even rise in the same basin. All these *springs* of the Yangada rise on the *watershed of the Yguazú* and those of the Chapecó rise on the *opposite watershed*. Therefore the Chapecó is the *counter-source* of the Yangada.

(P. 283) Ya en el Tratado de Enero 13 de 1750, se había

(P. 301) It was said in the Treaty of January 13, 1750,

dicho que la línea divisoria por esta parte subiera desde la boca del Ybicuy, por las aguas del Uruguay, hasta encontrar la del río Pepirí ó Pequiri, que desagua en el Uruguay por su ribera occidental, y continuaría aguas arriba del Pepirí hasta su *origen principal*, desde el cual seguiría por *lo mas alto del terreno* hasta la *cabecera principal del rio mas vecino*, que desemboca en el Grande de Curitíba, ó Iguazú, por las aguas de dicho río más vecino del Pepirí, y despues por las del Iguazú, hasta donde este desemboca en el Paraná, por su ribera Oriental.

that the dividing line in this portion of it would proceed from the mouth of the Ybicuy by the waters of the Uruguay until arriving at those of the river Pepiry or Pequiry, which empties into the Uruguay on its western bank, and would continue up the stream of the Pepiry to its *principal source*, from which it would proceed by *the highest ground* to the *principal source of the nearest river*, which emptied into the Grande de Curitiba, or Yguazú by the waters of the said river nearest to the Pepiry and afterwards by those of the Yguazú to where the latter empties into the Paraná upon its eastern bank.

(P. 283) Por el art. 8 de este Tratado ampliándose el contenido del art. 3, se repite el Contenido del art. 5. del 1750 con algunas explicaciones más. Quedando ya señaladas, dice, las pertenencias de ambas Coronas, hasta la entrada del río Pequiri ó Pepiriguazú en el Uruguay convinieron las altas partes contratantes en que la línea divi-

(P. 302) In the eighth Article of that Treaty, amplifying the matter contained in the third Article, the provisions of the fifth of the Treaty of 1750 are repeated, with some further explanations. It says that the belongings of the two Crowns having been indicated as far as the place where the river Pepiry or Pequiriguazú enters the Uruguay, the

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soria seguirá aguas arriba de dicho Pepirí, hasta su *origen principal*, y desde este por *lo mas alto del terreno*, bajo las reglas dadas en el artículo 6, continuará á encontrar las *corrientes del rio San Antonio*, que desemboca en el grande de Curitiba, que por otro nombre llaman Yguazú, siguiendo este aguas abajo hasta su entrada en el Paraná por su ribera oriental.

(P. 292) En fin, el territorio sometido al Arbitraje se estiende hasta dicho límite oriental en *la vertiente del Yguazú*. Las poblaciones brasileras halladas en 1885 por los demarcadores internacionales entre las *vertientes de los rios del Este*, San Antonio Guazú y Pepirí Guazú, cuya fundacion casual en 1840 y en 1881 he narrado no comportan un acto de dominio sobre territorio argentino.

high contracting parties agreed that the dividing line should follow up the stream of the said Pepirí to its *principal origin or source*, and from there go by the highest *land*, under the rules given in the sixth Article, until the *headwaters of the San Antonio* were met, which empty into the Grande de Curitiba, the other name of which is the Yguazú, and following this down until it falls into the Paraná on its eastern bank.

(P. 311) So that the territory submitted to arbitration extends as far as the aforesaid eastern boundary on the *watershed of the Yguazu*. The Brazilian villages found in 1885 by the international Demarcators between the *watersheds of the eastern rivers*, the San Antonio-Guazú and Pepirí Guazú, the accidental settlement of which in 1840 and in 1881 I have above narrated, did not import an act of dominion over Argentine territory.

## No. 84.

### MINISTER DOMINGUEZ' USE OF "VERTIENTES" AND OFFICIAL TRANSLATION BY "THE FALLS OF THE RIVERS."

[From Argentine official Documents as indicated below.]

(Quoted on p. 625 of the Statement.)

[Extract of "*Memoria del Ministerio de Relaciones Exteriores*," Buenos Aires, 1892, pp. 47, 48, and 49.]

El señor Dominguez aconsejó sin pérdida de tiempo á su Gobierno que entrara por estos nuevos rumbos, creyendo que podía dividirse el territorio disputado entre los *dos Pepirí por las alturas que separan las vertientes de ambos ríos* y los dos San Antonio.

El doctor Irigoyen habia sido llamado á ocupar nuevamente la cartera de Relaciones Exteriores en el Gobierno del general Roca, y reaccionando contra la inacción de sus predecesores, vigorizó la patriótica acción del señor Domínguez. El escribía al Ministro Argentino

[Misiones' "*Argentine Evidence*," pp. 674, and 675.]

Señor Dominguez advised his government without delay to enter these new fields, believing that the disputed territory could be divided between the *two Pepirí on the heights which separate the falls of both rivers and the two San Antonio*.

Doctor Irigoyen had been called to occupy again the Department of Foreign Relations, in the government of General Roca, and reacting against the inactivity of his predecessors, he strengthened Señor Dominguez's patriotic action. He wrote to the Ar-

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en Rio de Janeiro con fecha 24 de Marzo de 1881, en estos términos :

“ He recibido la nota de V. E. núm. 368, fecha 11 de Marzo, en que comunica una conversación que tuvo con el Emperador respecto de la cuestión de límites pendiente, y la conferencia que sobre el mismo asunto tuvo V. E. con el señor Ministro de Relaciones Exteriores . . .

“ El señor Presidente piensa que V. E. debe aceptar la indicación que se le ha hecho. Conviene poner término á ese asunto que puede complicarse con avances de ocupación y, por tanto, es oportuno manifieste V. E. al señor Ministro de Relaciones Exteriores que este Gobierno acepta la idea de fijar definitivamente la línea divisoria de esta República con el Imperio. Creo conveniente haga V. E. esta misma manifestación al Emperador. . . .”

gentine minister at Rio de Janeiro on the twenty-fourth day of March, one thousand eight hundred and eighty-one, in these terms :

“ I have received your Excellency's note No. 368, dated March 11, in which Your Excellency apprises me of a conversation held with the Emperor in regard to the question of limits still pending, and of the conference upon the same subject, with the Minister of Foreign Relations . . .

“ The President thinks that you ought to accept the suggestions that have been made to you. It is convenient to put an end to this matter, which may get entangled with advances of occupation, and therefore it will be proper that Your Excellency shall inform the Minister of Foreign Relations that this Government accepts the idea of fixing, definitively, the boundary line of this Republic with the Empire. I think it convenient that Your Excellency shall make the same statement to the Emperor . . . .”

El señor Dominguez escribía entre tanto, el oficio de 16 de Abril de 1881, en el cual ofrece al Ministro de Relaciones Exteriores, doctor Irigoyen, la fórmula que le pidiera para la transacción. Dijo :

“ El señor Ministro ha eludido la respuesta á la pregunta que yo le hacía, tal vez porque desea que la negociación tenga lugar en Buenos Aires. No habiendo pues, conseguido conocer el propósito que abrigaba el señor Pereyra de Souza y haciéndome ahora V. E. el honor de pedirme mi opinion, no tengo más que confirmar lo que dije en mi nota confidencial, esto es, proponer una transacción dividiendo el territorio disputado por las *alturas que separan las vertientes de los rios que lo encierran . . .* ”

In the meantime Señor Dominguez wrote the note of the sixteenth day of April, one thousand eight hundred and eighty-one, in which he offers to the Minister of Foreign Relations, Dr. Irigoyen, the forms asked of him for the compromise. He said :

“ The Minister has evaded a reply to my question. He wishes, perhaps, that the negotiation shall take place at Buenos Aires. Having been unsuccessful in knowing Señor Pereyra de Souza's purpose, and Your Excellency having done me the honour to ask for my opinion, I have only to confirm what I said in my confidential note, that is, to propose a compromise dividing the disputed territory on the *heights which separate the falls of the rivers* covering the same . . . ”

## No. 85.

### THE "URUGUAY-IGUAZÚ" WATER-PARTING.

[From Argentine official Documents as indicated below.]

(Quoted on p. 625 of the Statement.)

[*Memoria del Ministerio de Relaciones Exteriores*, Buenos Aires, 1892, pp. 114-115.]

El 9 de Setiembre (1889), dos días después de firmado el pacto, el Ministro Argentino en Río de Janeiro comunicaba las impresiones producidas en la Corte por el suceso. Sus palabras son estas :

" V. E. sabe, por mis telegramas y por los que habrá recibido seguramente la prensa de Buenos Aires, la profunda impresión que causo en esta capital la noticia de haberse firmado la Convención de Arbitraje.

" El aviso telegráfico de V.E. lo recibimos, tanto el señor Consejero Diana como yo, en la noche del 7. Llevé personal-

[Misiones' "*Argentine Evidence*," pp. 719-720.]

On the ninth of September (1889) two days after the pact had been signed, the Argentine minister at Rio de Janeiro communicated the impressions that the event had produced at the Court. His words were as follows :

" Your Excellency knows, by my telegrams and by those which the Press at Buenos Aires has surely received, the deep impression caused at the capital by the news that the convention of arbitration had been signed.

" Your Excellency's telegraphic advice was received by Counsellor Diana and by myself on the night of the seventh.

mente al Emperador el telegrama de V. E. y me pidió lo leyera en voz alta, en presencia de los Ministros de Estado y personas de la Corte que lo rodeaban en aquel momento. Cuando terminé la lectura del despacho, el Emperador me estrechó la mano efusivamente y me pidió retribuyera en el más breve plazo posible el noble saludo del Excmo. señor Presidente de la República.

“ Se notaba en el semblante del Emperador la alegría que dominaba su espíritu y esta misma observación fué hecha por todas las personas á quienes me he referido anteriormente.”

El señor Moreno agregaba noticia de una base de transacción ó arreglo directo, que le había sugerido el Consejero Diana Ministro de Relaciones Exteriores, en estos términos :

“ En una conversación que tuve ayer con el señor Ministro Diana me ha apercibido que ellos aceptarían un arreglo directo que fijara *límites naturales* y estableciera la obliga-

I took, personally, to the Emperor Your Excellency's telegram, and he asked me to read it aloud in the presence of the Minister of State and the persons of the Court who surrounded him at that moment. When I had finished reading the despatch, the Emperor pressed my hand effusively and requested me to return the noble greeting of His Excellency, the President of the Republic, with the shortest possible delay.

“ The Emperor's features revealed the merriment of his mind, and this same observation was made by the persons to whom I have just referred.”

Señor Moreno added a scheme for a direct compromise or settlement that had been suggested to him by Counsellor Diana, Minister of Foreign Relations, in these terms :

“ In the course of a conversation I had yesterday with Minister Diana I have observed that they would accept a direct settlement which would fix the *natural limits*,

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ción de indemnizarse pecuniariamente á aquel de los contratantes que, según resolución del árbitro, hubiera perdido territorio al marcarse la línea divisoria.

“ Por ejemplo : Se traza una línea que, subiendo desde la confluencia del Chapecó en el Uruguay *vaya hasta las nacientes de aquel* y continúe *por la parte más alta de la línea divisoria de las aguas hasta encontrar las nacientes del San Antonio Mini*, correspondiendo el espacio comprendido entre el Chapecó *la línea divisoria de las aguas* y el Pepiry Mini á la *República Argentina*.

“ Se fijaría un precio al kilómetro cuadrado del territorio litigioso.

“ Resuelta la cuestión de derecho por el Presidente de los Estados Unidos y averiguada con exactitud la extensión kilométrica de la totalidad del terreno litigioso y de la zona que de antemano se conviniere para cada una de las partes contratantes, la beneficiada en extensión territorial

and establish the obligation to indemnify, pecuniarily, the contracting party who, by the decision of the umpire, should have lost some territory in marking out the boundary line.

“ For instance : A line is drawn up which, going from the confluence of the Chapecó, in the Uruguay, *shall follow as far as the source of the same, and continue through the highest part of the boundary line of the waters, until the sources of the San Antonio Mini are found*, the space between the Chapecó, the boundary line of the waters, and the Pepiry Mini, to belong to the Argentine Republic.

“ A price shall be set on the square kilometre of the territory in dispute.

“ The question of right once resolved by the President of the United States, and the kilomètric extent of the whole disputed ground and of the zone which shall be agreed upon beforehand for one of the contracting parties having been accurately ascertained, the most favoured one, in terri-

Plate XV.  
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pagaría á la otra el excedente de la tierra recibida.

“ La proposición anterior es una simple fórmula. El Ministro Diana no me ha dado detalle alguno. Enuncio esa idea como un punto de partida para proyectar el arreglo que todos anhelamos y aguardo con vivo interés las instrucciones que á respecto se me envíen.”

torial extent, shall pay to the other for the excess of land received.

“ The foregoing proposal is a mere form. Minister Diana has given me no detail whatever. I only mention the idea as a starting point to project the settlement which we all desire, and I await, with great interest, the instructions which may be sent to me in this respect.”

## No. 86.

### THE PUNA ARBITRATION BOUNDARY LINE.

[Translated from Extracts of the Records of the meetings of the Demarcating Commission printed in "*Documentos relativos a la Conferencia de Buenos Aires*," Santiago, 1899, pp. 33-38.]

(Quoted on p. 756 of the Statement.)

#### *Record of Conference.*

AT Buenos Aires, on the 24th day of the month of March of the year 1899, there assembled at 10 a.m., at the residence of the Legation of the United States of America, as agreed at the third sitting, the members of the Demarcating Commission, Señor Don Enrique Mac-Iver, on behalf of the Chilean Republic, Doctor D. José E. Uriburu, on behalf of the Argentine Republic, and William J. Buchanan, Envoy Extraordinary and Minister Plenipotentiary of the United States of America to the Argentine Republic for the purpose of pursuing their labours.

\* \* \* \* \*

On these proposals [the Chilean and the Argentine] being put to the vote, the first was rejected by the votes of Messrs. Buchanan and Mac-Iver, and the second by the votes of Messrs. Buchanan and Uriburu.

Mr. Buchanan proposed that the dividing line should be fixed in the following way :

From the intersection of the 23rd parallel with the 77th meridian, a straight line to the summit of the Cerro del Rincon.

The proposal was passed by the votes of Messrs. Buchanan and Mac-Iver, Señor Uriburu dissenting.

He then proposed another straight line from the summit of the Cerro del Rincon to the summit of the Volcano Socompa.

In place of this Señor Mac-Iver proposed another line which, starting from the summit of the Cerro del Rincon, should reach the Cerro Macon.

On these proposals being put to the vote, Señor Mac-Iver's was rejected by the votes of Messrs. Buchanan and Uriburu, and Mr. Buchanan's was approved by the votes of the same Messrs. Buchanan and Uriburu, Señor Mac-Iver dissenting.

Mr. Buchanan then proposed that the dividing line should run from the summit of the Volcano Socompa and the place called Aguas Blancas on the Argentine maps, by the points and spaces called the Volcano Socompa, a point marked with No. 29 in the Argentine Expert's proposal, as is seen in the Record drawn up at Santiago de Chile on September 1, 1898, the Cerro Socompa Caipis, the Cerro Tecar, the principal point of the chain of hills between Tecar and the Cerro Inca, Cerro Inca, Cerro de la Zorra Vieja, Cerro Llullaillaco, Llullaillaco Gap, a point marked with No. 39 in the aforesaid proposal, Corrida de Cori, the volcano Azufre or Lastarria, as far as Cerro Bayo, a point south of Cerro Bayo, No. 48 of the proposal referred to, Cerro del Agua de la Falda, Cerro Aguas Blancas.

This line was approved by the votes of Messrs. Buchanan and Uriburu, Señor Mac-Iver dissenting.

Mr. Buchanan then proposed, as a continuation of the dividing line, a straight line which, starting from the summit of Cerro de Aguas Blancas, should reach the summit of the Cerros Colorados.

This proposal was put to the vote and was approved by Messrs. Buchanan and Mac-Iver, Señor Uriburu dissenting.

Mr. Buchanan then proposed another straight line from the summit of the Cerros Colorados, to the summit of the Cerros de Lagunas Bravas.

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This proposal was passed by the votes of Messrs. Buchanan and Uriburu, Señor Mac-Iver dissenting.

As a continuation of the dividing line, Mr. Buchanan proposed another straight line from the summit of the Cerros de Lagunas Bravas to the summit of the Sierra Nevada, so-called in the Argentine map and reckoned in the same map as being 6400 metres high.

On this proposal being put to the vote, it was approved by Messrs. Buchanan and Uriburu, Señor Mac-Iver dissenting.

Lastly, to bring the delimitation to a close, Mr. Buchanan proposed a straight line which, starting from the last-named point, should be prolonged as far as that which should be fixed on the parallel  $26^{\circ} 52' 45''$  by H.B.M.'s Government in conformity with the Act of September 22, 1898,—signed at Santiago de Chile by the Minister for Foreign Affairs of this [the Chilean] Republic and by the Envoy Extraordinary and Minister Plenipotentiary of the Argentine Republic—as the dividing point between these two countries at the said parallel.

The last proposal was passed unanimously.

Consequently, the dividing line between the Argentine Republic and the Republic of Chile between the parallels  $23^{\circ}$  and  $26^{\circ} 52' 45''$  S. latitude, to be fixed by the Demarcating Commission, in conformity with the second Act of November 2, 1898, is established in the following shape :

From the intersection of the 23rd parallel with the 77th meridian a straight line as far as the summit of the Cerro del Rincon, and another from the summit of the Cerro del Rincon to the summit of the Volcano Socompa. The dividing line shall continue running from the summit of the Volcano Socompa as far as the place called Aguas Blancas in the Argentine maps, by the points and stretches called Volcan Socompa, a point marked with No. 29 in the proposal of the Argentine Expert, as is seen in the Act drawn up at Santiago de Chile on September 1, 1898, Cerro Socompa Caipis, Cerro Tecar, the prin-

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cipal point of the chain of hills between Tecar and the Cerro Inca, Cerro Inca, Cerro de la Zorra Vieja, Cerro de Llullaillaco, Llullaillaco Gap, a point marked No. 39 in the aforesaid proposal, Corrida de Cori, the Volcano Azufre or Lastarria, the cordon of the Azufre or Lastarria as far as Cerro Bayo, point south of Cerro Bayo, No. 48 of the proposal already referred to, Cerro del Agua de la Falda, Cerro Aguas Blancas. As a continuation of the dividing line, a straight line which, starting from the summit of the Cerro de Aguas Blancas, shall reach the summit of the Cerros Colorados; then another straight line from the summit of the Cerros Colorados to the summit of the Cerros de Lagunas Bravas, and another straight line from the summit of the Cerros de Lagunas Bravas to the summit of the Sierra Nevada, so-called in the Argentine map and reckoned in the same map as being 6400 metres high. Lastly, a straight line which, starting from the last named point, shall be prolonged as far as that which shall be fixed on parallel  $26^{\circ} 52' 45''$  by H.B.M.'s Government in conformity with the Act of September 22, 1898—signed at Santiago de Chile by the Minister for Foreign Affairs of this [the Chilean] Republic and by the Envoy Extraordinary and Minister Plenipotentiary of the Republic as the dividing point between these two countries at the said parallel.

The members of the Demarcating Commission agreed to sign the Argentine Map referred to in the present Act.

Wherewith they regarded their mission as accomplished, the contents of this Act to be duly laid before both Governments.

*M. A. Martinez De F.*

*Juan S. Gomez.*

*François S. Jones.*

(Secretaries.)

ENRIQUE MAC-IVER.

JOSÉ E. URIBURU.

WILLIAM J. BUCHANAN.

(Commissioners.)

## No. 87.

### RESTRICTED POWERS OF THE EXPERTS DECLARED BY THE ARGENTINE EXPERT.<sup>1</sup>

[Translated from the Record of the Meeting of the Experts on April 28, 1897 .  
Printed in "*Memoria de Relaciones Exteriores de Chile*," 1896. Docs., pp. 32  
and 33.]

(Quoted on p. 779 of the Statement.)

IN the City of Santiago de Chile, on April 28, 1897, having met in the International Boundary Office, the Experts undersigned— Don Diego Barros Arana on the part of the Republic of Chile, and Don Francisco P. Moreno on the part of the Argentine Republic, dealt with the Boundary Demarcation in the southern part of the Continent, and north of Magellan Straits.

*The Argentine Expert stated that he gave his approval to the line traced by the Assistants of the 5th Joint Sub-Commission from Dungeness Point to the intersection of the 52nd parallel south with the 70th meridian west of Greenwich, according to the Records of January 8, and April 15, 1896, and that he does so with the authorization he has requested from his Government, in the sections which include the boundary between Mount Dinero and Mount Aymond, as the chain of hillocks referred to in Art. 2 of the Treaty of 1881 does not exist, and that he does not consider himself empowered as an Expert to accept, without an express authorization of the Government of the Argentine Republic, the line agreed upon by the said*

Quoted  
p. 779.

<sup>1</sup> In connection with this see Doc. No. 68.

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*Assistants, who, according to the said Expert, have on this occasion gone beyond their powers.*

The Chilean Expert, on his part stated that the previous information on the region referred to, confirmed by the details and explanations communicated by the chief of the 5th Chilean Sub-Commission in his note of January 9, 1896, with which he sent the map and Acts concerning this place, are sufficient for him to give his approval to the line, as marked by this Sub-Commission, between Dungeness Point and the intersection of the 52nd parallel with the 17th meridian of longitude west of Greenwich, and that, in his judgement this line corresponds to the correct interpretation of the Treaty of 1881. However, in view of the Argentine Expert's declaration, he thinks fit to forward the present Act to his Government, in order to request their express approval in the same sense as it has been obtained by the Argentine Expert, all of which will be duly recorded in the Minute of next Meeting.

The Expert drew up and signed the present Minute in duplicate.—DIEGO BARROS ARANA.—FRANCISCO P. MORENO.—*Alejandro Bertrand.*

## No. 88.

### STABILITY OF MAIN WATER-PARTINGS.

[Extracts from various authors.]

(Quoted on p. 790 of the Statement.)

#### Enclosure A.

[Extract from Sir Archibald Geikie's "*Textbook of Geology*," 2nd ed. pp. 940 and 941.]

WATERSHEDS are of course at first determined by the form of the earliest terrestrial surface. But they are less permanent than the watercourses that diverge from them. Where a watershed lies symmetrically along the centre of a country or continent, with an equal declivity and rainfall on either side, and an identity of geological structure, it will be permanent; because the erosion on each slope proceeds at the same rate. But such a combination of circumstances can happen rarely, save on a small and local scale. As a rule, watersheds lie on one side of a centre of a country or continent, and the declivity is steeper on the side nearest the sea. Hence, apart from any influence from difference of geological structure, the tendency of erosion, by wearing the steep slope more than the gentle one, is to carry the watershed backward nearer to the true centre of the region, especially at the heads of valleys. Of course this is an extremely slow process; but it must be admitted to be one of real efficacy in the vast periods during which denudation has continued. Excellent illustrations of its progress, as well as of many other features of land sculpture, may often be in-

structively studied on clay banks exposed to the influence of rain.<sup>1</sup>

The crests of mountains are watersheds of the sharpest type, where erosion has worked backward upon a steep slope on either side. Their forms are mainly dependent upon structure, and especially upon systems of points. It will often be observed that the general trend of a crest coincides with that of one set of points, and that the bastions, recesses, and peaks have been determined by the intersection of another set. If the rock is uniform in structure, and the declivity equal in angle on either side, a crest may retain its position; but as one side is usually considerably steeper than the other, the crest advances at the expense of the top of the gentler declivity. But, under any circumstances, it is continually lowered in level, for it may be regarded as the part of a mountain where the rate of subaerial denudation reaches a maximum. An ordinary cliff is attacked only in front, but a crest has two fronts, and is further splintered along its summit. Nowhere can the guiding influence of geological structure be more conspicuously seen than on the array of spires, buttresses, gullies, and other striking outlines which a mountain crest assumes.

Valleys are mainly due to erosion, guided either by original depressions of the ground, or by geological structure, or by both. Their contours depend partly on the structure and composition of the rocks, and partly on the relative potency of the different denuding agents. Where the influence of air, rain, frost and general sub-aerial weathering has been slight, and the streams, supplied from distant sources, have had sufficient declivity, deep, narrow, precipitous ravines or gorges have been excavated. The cañons of the Colorado are a magnificent example of this result (Fig. 439). Where, on the other hand, ordinary atmospheric action has been more rapid, the

<sup>1</sup> See on this subject M. Gilbert's suggestive remarks in the *Essay on Land Sculpture* already cited (p. 934).

sides of the river channels have been attacked, and open sloping glens and valleys have been hollowed out. A gorge or defile is usually due to the action of a waterfall, which, beginning with some abrupt declivity or precipice in the course of the river when it first commenced to flow, or caused by some hard rock crossing the channel, has eaten its way backward, as already explained (p. 362).

A pass is a portion of a watershed which has been cut down by the erosion of two valleys, the heads of which adjoin on opposite sides of a ridge. Each valley is cut backward until the intervening ridge is demolished. Most passes no doubt lie in original but subsequently deepened depressions between adjoining mountains. The continual degradation of a crest may obviously give rise to a pass (p. 941).

## Enclosure B.

[Extract of G. K. Gilbert's "*Report on the Geology of the Henry Mountains*," Washington, 1877, pp. 125 et seq.]

(P. 125) *The Instability of Drainage Lines.*

*The stability of waterways being the rule*, every case of instability requires an explanation; and in the study of such exceptional cases there have been found a number of different methods by which the courses of streams are shifted. The more important will be noted.

### *Ponding.*

When a mountain uplift crosses the course of a stream, it often happens that the rate of uplift is too rapid to be equalled by the corrasion of the stream, and the uprising rock becomes a dam over which the water still runs, but above which there is accumulated a pond or lake. Whenever this takes place, the pond catches all the *débris* of the upper course of the stream, and the water which overflows at the outlet having been relieved of its load is almost powerless for corrasion, and cannot

continue its contest with the uplift unless the pond is raised higher and higher, until finally it finds a new outlet at some other point. The original outlet is at once abandoned, and the new one becomes a permanent part of the course of the stream. As a rule it is only large streams which hold their courses while mountains rise; the smaller are turned back by ponding, and are usually diverted so as to join the larger . . .

(P. 138) *The Stability of Divides.*

The rain drops which fall upon the two sides of a divide flow in opposite directions. However near to the dividing line they reach the earth the work of each is apportioned to its own slope. It disintegrates and transports the material of its own drainage slope only. *The divide is the line across which no water flows*—across which there is no transportation. It receives the minimum of water, for it has only that which falls directly upon it, and every other point receives in addition that which flows from higher points. It is higher than the surfaces which adjoin it, and since less water is applied to its degradation it tends to remain higher. It tends to maintain its position.

Opposed to this tendency there are others which lead to

*The Instability of Divides,*

and which will be now considered.

*Ponding, Planation, and Alluviation.*

Whenever, by ponding, a stream or system of streams which have belonged to one drainage system are diverted so as to join another there is coincidently a change of divides. The general line between the two systems is shifted from one side to the other of the area which changes its allegiance. The line which was formerly the main divide becomes instead a subordinate divide separating portions of the drainage system which has increased its area, and on the other hand a line which had been a subordinate divide is promoted to the rank of a main

divide. In like manner the shifting of streams from one system of drainage to another by the extension of flood-plains or by the building of alluvial cones or deltas involves a simultaneous shifting of the divides which bound the drainage systems.

The changes which are produced by these methods are "per saltum." When a pond or lake opens a new outlet and abandons its old one there is a short interregnum during which the drainage is divided between the two outlets, and the watershed separating the drainage system is double. But in no other sense is the change gradual. The divide occupies no intermediate positions between its original and its final. And the same may be said of the changes by planation and alluviation. In each case a tract of country is transferred bodily from one river system to another, and in each case the watershed makes a leap.

But there are other methods of change, by which dividing lines move slowly across the land, and to these we will proceed.

. . .

Résumé.—*There is a tendency to permanence on the part of drainage lines and divides*, and they are not displaced without adequate cause. Hence every change which is known to occur demands and admits of an explanation.

(a) There are four ways in which abrupt changes are made. Streams are diverted from one drainage system to another, and the watersheds which separate the systems are rearranged.

(1) By "ponding," due to the elevation or depression of portions of the land.

(2) By "planation," or the extension of flood-plains by lateral corrasion ;

(3) By "alluviation," or in the process of building alluvial cones and deltas ; and

(4) By "abstraction."

(b) There are two ways in which gradual changes are effected.

(1) When the rock texture is variable, it modifies and controls by "monoclinal shifting" the distribution in detail of divides and waterways.

(2) When the rock texture is uniform, the positions of divides are adjusted in accordance with the principle of "equal declivities."

The abrupt changes are of geographic import ; the gradual, of topographic.

The methods which have been enumerated are not the only ones by which drainage systems are modified, but they are the chief. Very rarely streams are "ponded," and diverted to new courses through the damming of their valleys by glaciers or by volcanic "ejecta" or by landslips. More frequently they are obstructed by the growing alluvial cones of stronger streams, but only *the smallest streams will yield their "right of way" for such cause, and the results are insignificant.*

The rotation of the earth, just as it gives direction to the trade-winds and to ocean currents, tends to deflect rivers. In the southern hemisphere streams are crowded against their left banks and in the northern against the right. But this influence is exceedingly small. M. Ferrel's investigations show that in latitude  $45^{\circ}$  and for a current velocity of ten miles an hour it is measured by less than one twenty thousandth part of the weight of the water (*American Journal of Science*, January, 1861). If its effects are ever appreciable it must be where lateral corrasion is rapid ; and even there it is probable that the chief result is an inclination of the flood-plain toward one bank or the other, amounting at most to two or three minutes.

#### *Consequent and Inconsequent Drainage.*

If a series of sediments accumulated in an ocean or lake be subjected to a system of displacements while still under water, and then be converted to dry land by elevation *en masse* or by the retirement of the water, the rains which fall on them will

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inaugurate a drainage system perfectly conformable with the system of displacements.

Streams will rise along the crest of each anticlinal, will flow from it in the direction of the steepest dip, will unite in the synclinals, and will follow them lengthwise. The axis of each synclinal will be marked by a watercourse; the axis of each anticlinal by a watershed. Such a system is said to be "consequent" on the structure.

*If however a rock series is affected, a system of displacements after the series has become continental, it will have already acquired a system of waterways, and "provided the displacements are produced slowly," the waters will not be diverted from their accustomed ways. The effect of local elevation will be to stimulate local corrasion, and each river that crosses a line of uplift will inch by inch as the land rises deepen its channel and valorously maintain its original course. It will result that the directions of the drainage lines will be independent of the displacements. Such a drainage system is said to be "antecedent" to the structure.*

But if in the latter case the displacements are produced rapidly, the drainage system will be rearranged and will become consequent to the structure. It has frequently happened that displacements formed with moderate rapidity have given rise to a drainage system of mixed character in which the courses of the larger streams are antecedent and those of the smaller are consequent.

There is a fourth case. Suppose a rock series that has been folded and eroded to be again submerged, and to receive a new accumulation of unconforming sediments. Suppose further that it once more emerges and that the new sediments are eroded from its surface. Then the drainage system will have been given by the form of the upper surface of the superior strata, but will be independent of the structure of the inferior series, into which it will descend vertically as the degradation

progresses. Such a drainage system is said to be "superimposed by sedimentation" upon the structure of the older series of strata.

Fifth. The drainage of an alluvial cone or of a delta is independent of the structure of the bed rock beneath; and if in the course of time erosion takes the place of deposition and the alluvial formation is cut through, the drainage system which is acquired by the rocks beneath is not consequent upon their structure but "is superimposed by alluviation."

Sixth. The drainage of a district of planation is independent of the structure of the rock from which it is carved; and when in the progress of degradation other beds favourable to lateral corrasion are destroyed and the waterways become permanent, their system may be said to be "superimposed by planation."

In brief, systems of drainage, in their relation to structure, are:

(A) *Consequent*.

(a) by emergence, when the displacements are subaqueous, and,

(b) By sudden displacement;

(B) *Antecedent*; and

(C) *Superimposed*

(a) By sedimentation, or subaqueous deposition,

(b) By alluviation, or subaerial deposition, and

(c) By planation.

### Enclosure C.

[Extracts from Philippson, "*Studien über Wasserschieden*," Leipzig, 1866.]

(P. 17) It is principally the main water-partings that, by their position and conformation, are of importance in the relief of the earth's surface. The question of their course frequently coincides with the question of the factors involved in the courses taken by the waterflow. Often as rivers are treated with regard to their activity, rarely has an attempt been made to investigate

the causes of their arrangement and distribution. To the same sphere as these questions belongs the treatment of water-divides, which in literature are usually only incidentally touched upon in a few words.

If we compare their course and topographical aspect in differently constructed parts of the earth, we find an uncommonly great variety, according to the tectonic character of the country in each case. But even in districts of similar conformation the water-partings are frequently exceedingly unconformable. This indicates at once that factors of the most various kinds operate on water-partings. Besides the peculiar mountain structure showing anomalous phenomena, there are the manifold operations of the atmosphere on the solid terrestrial body, generally comprised under the terms "weathering and erosion," on which water-partings are dependent. From the mutual action of these two factors, in themselves multiform, results the multiplicity that allows no repetition of what once exists.

(P. 20) As the courses of brooks and rivers are primarily dependent on the relief of the land, so do they on the other hand to a great extent determine this relief; they indicate the lines of greatest depth, while *the dividing lines of their basins, the water-partings, represent the lines of greatest height*. The importance of both is equally great, and the history of their origin is most closely connected. When Dutton says of the river systems, "*The great rivers of a country are as a rule born with the country itself; their courses were determined by the conditions prevailing at the time of their origin; their positions once established are (with certain qualifications) immutable . . .*" all this also applies, in even greater degree, to the water-partings. For they are the older, the primary; *the watercourses group themselves around the divides*.

*Dependence of Water-partings on the Relief at the Time of the Last Emersion from the Sea.*

The river systems and their water-partings originate when the land rises from the sea. Decisive for this primary disposition, which may certainly afterwards, be variously and very considerably transformed by new formations on the land, is the position of the part of the land that first emerged or its *culminating line*. *This gives the main divide, which parts the waters of the masses of land arising at both sides ; the waters run off from it, merely obeying the force of gravitation, which brings them together in the depressions, and there causes them to collect and flow onward in channels, or rise to overflowing in basins. Between these channels, the individual branches of the chief drainage systems, subordinate watersheds are developed. The further the sea retires, the further the river systems, with the divides that separate them, grow out into the new land. Therefore, unless subsequent changes take place, the nearer the sections of a river-course lie to the water-parting, the older they are ; and again, under the above condition, among the water-partings the main divides are the oldest.*

(P. 32) *Formation in regions of folded layers.* The degree of folding may be a very varied one. There are mountains that consist of a multitude of widely placed folds, separated from one another by open troughs and arranged in a zone, which follow one another : where one nears its end and becomes narrower and flatter, another increases in height and breadth. The length and height of the individual folds is very variable.

The main water-partings will therefore run exceedingly irregularly even at their initiation, and jump from one crest to another, and their position will be determined less by the height, length, and age of the saddles than by the conditions

offered by the troughs, especially the depth of their approaches..

It is to be supposed that all folded mountains pass through this stage. Many remain in it, with others the compression proceeds.

(P. 33) Were a mountain system to rise from the sea in this state, the main water-parting would naturally lie on the culminating zone. Transverse valleys will predominate in such a mountain system. The closer and more uniform the culminating zone is, the more sharply are two main courses of waterflow separated by one fairly straight main watershed. If, on the other hand, several culminations run beside one another, we get the development of longitudinal valleys between them, and the main water-parting may jump from one to the other.

*The Displaceability of Water-partings. (A) Inclination of Water-partings to Constancy. (a) Causes of Constancy.*

(P. 35) *The primary disposition of water-partings retains such great importance through all further ages, because it requires very potent forces to displace them from places once occupied. For the water-parting possesses a very considerable passive, self-preserving power.* The cause is very easily understood. The water-parting receives only the rain-water from the atmosphere, but no afflux of collected waters from other districts. The erosion of water flowing in channels is therefore *nil* on the water-parting line itself, and increases the further we go from it, through the growing force of the volumes of waters. If therefore the lines of the water channels are the lines of maximum erosion, and this in higher degree the more powerful the mass of water collected in them, then the divides, on the contrary, represent the lines of minimum erosion. Both the river-lines and the watershed-lines possess, in consequence of these properties, the tendency to maintain with great tenacity a position they have once occupied.

*Contradiction, Produced by Constancy, between the Course of Water-parting and the present Configuration of the Ground.*

(P. 36) This property possessed by water-partings and river-courses, of keeping as much as possible to the place once assigned to them when they rose from the sea, helps to explain many phenomena of the earth's surface. For we find so frequently that water-parting and the directions taken by waterflow are in contradiction to the present relief of the land. In very many cases we have to assume that the present relief is different from that existing at the time when the divides originated, and that although the changes that have been going on have thoroughly transformed the relief, they have developed so slowly and unintensively, that *the hydrographic lines were able to obey their inclination to constancy and to maintain their positions through all changes*. These changes of relief may be caused both by erosion itself and by tectonic processes.

(P. 38) *Rivers overcoming dislocations.* It is a much doubted assertion that rivers can also overcome changes in the relief produced by tectonic movements in the earth's crust. It is a question of explaining a kind of breach valley differing from those just discussed. *Mountains are frequently found that, although numbered among the greatest of the earth as regards extent and height, yet HAVE NO WATER-DIVIDE OF ANY IMPORTANCE, they being traversed by one or several rivers which rise in lowlands, or at any rate lower highlands, behind them.*

(P. 42) *Effects of dislocations on river-systems.* Even if it is possible, as we attempted to explain, for rivers to overcome dislocations, it is inconceivable that a river-system should come out of such a contest unchanged. The river-system certainly adapts itself in a way to the relief conditions, and that from two causes. In the first place the river-courses of a district subjected to a tectonic re-formation are very unequal in erosive

power ; they will therefore behave differently towards dislocation. If, for instance, a fold crosses several water-arteries, of these probably only a few chief rivers are able to keep their courses, while the weaker ones succumb. The latter therefore follow the new slopes, either only until they come to the rivers that have remained constant and unite with them, or they are brought to quite different drainage-systems. But in the second place the dislocations are also of different strength in different places ; the watercourses that cross the weaker places are able to hold their own, while perhaps in places of stronger dislocation the rivers are overcome and thus brought to the more fortunate ones, that were able to hold their own, as a welcome reinforcement. Accordingly we frequently find that the breaches made by rivers through dislocations are at the weakest parts of the latter. So that in such a struggle between dislocations and rivers a kind of natural selection takes place among the latter, in consequence of which, in districts where such a struggle took place, is *a peculiar contrast in the courses of the larger rivers and of the smaller tributaries*. The former run in the direction of the former slope, long since effaced, while the smaller follow the present relief. Such contrasts may be observed in many districts, for instance in the plateaus south of the Uintah Mountains. The same contrast is also mostly seen in the sections of a large river. Whereas the lower course holds its own, we find the upper course, where of course the erosion is weaker, dependent on the present relief. It is easily seen that by such a selection among rivers the *formation of large rivers* is favoured, as the weaker rivers that adapt themselves to the dislocations are brought by these themselves to the large ones, whereas previously they were probably independent.

(P. 100) *Von Richthofen* gives a characterization of *Scandinavia* in the following few words : " The whole mass of the peninsula appears as a trunk which has been formed and

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organized by the abrasion of large mountains, and which has undergone much further transformation partly by the deposit of sediments, and partly by faults, erosion, and probably also, at least in parts, later abrasion." The abraded folded mountains that compose the Scandinavian highlands run from south-south-west to north-north-east in northern Norway, parallel to the coast; but south of the Trondjhem-Fjord they run from south-west to north-east, until south of the Hardanger Fjord and Lake Miösen a more northerly trend again sets in. The surface of these great abraded trunk mountains depends only very indirectly on its geological structure. It does not form, as *Keilhau* supposed, a sloping plain inclining eastward, but according to *Helland* a plateau sloping west and east from the "crest-line," the western slope being the steeper. This crest-line, or perhaps better *culminating-line*—as there can be no question of a real crest—forms at the same time the water-parting between the two chief drainage-courses that govern the whole peninsula north of Lakes Mälär and Wener. These are a short westerly one to the ocean, and a longer south-easterly one to the Baltic Sea and the Skagerrak. If for the present we exclude Sweden south of the two lakes we have mentioned, where quite different conditions prevail, *we may say that the main divide generally follows the culminating line, and the drainage-systems the general declivity of the ground.* Here, at the place of their origin, where they received their motive impulse, the ice masses of glaciation naturally followed, on the whole, the pre-existing slopes in their movement. Therefore, however highly we may estimate their power, they may probably have had a grinding action, but cannot have produced any great change in the arrangement of the river-courses. *Kjerulf* regards the valleys of Norway throughout as gaping fissures torn open by tectonic processes, while *Helland* and *Hartung* do not ascribe to fissures any influence on the formation of valleys and the distribution of rivers. According to the more

modern views on valley formation the greater probability is probably on the side of the latter authors.

Let us look at the course of the water-parting line somewhat more closely. *In the north of Norway the main divide follows a direction from north-north-east to south-south-west, but with many minor bends.* From the Trondjhem Fjord however it turns sharply to south-west and follows the direction of the gneiss mountains, that bear the great elevations of the Dovrefjeld and Langfjeld, to the background of the Isefjord. *In consequence of these gneiss mountains being broken by the fjords cutting into them from the west, the water-parting is forced to pass south-eastwards to the next range of heights,* the Jotun Fjeld, the highest elevation in Norway and an old eruptive mass (granite and gabbro). As the Sogne Fjord cuts deeply into these mountains, it cannot follow them south-westwards, but passes across them ; the slate range of the Hardangerfjeld is the next ; it follows in this direction, but not long, as it soon turns finally southward, while the strata also take this strike. We see therefore that the water-parting is not at all affected petrographically by zones of harder rocks ; that it runs across the strike of the strata where this crosses with the direction of the slopes ; that, on the other hand, it everywhere follows the culminating line of the land, with the exception of those places where the deep indentation of the fjords, which is probably secondary, caused it to shift slightly eastward. We must therefore assume that the highest elevation of the abraded surface, which determined the divide, lies where the formerly lofty mountains were last reached by marine abrasion. Almost throughout the divide is flat, and therefore often irregular in its course ; peat-bogs, accumulations of glacier-drift and so forth, frequently decide its local course. Hence the Scandinavian highlands represent that type of a region of abrasion in which the water-parting does not depend on the nature of the rock, but on the primary relief weakened by abrasion.

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(P. 149) A structure very analogous to the Swiss Jura, apart from its north end, is possessed by the *eastern Cordillera of Columbia*, especially north of Bogotá. Here too there are independent folds, striking from south to north, with tectonic trough-valleys lying between them, which are drained by short transverse valleys sometimes to the right, sometimes to the left; here too the divide jumps frequently and irregularly from one fold to the other.

(P. 152) Thus we find *throughout the whole Tien-shan the main water-parting, which parts the affluents of the lowlands of Turkestan and Siberia from those of the steppes of Central Asia*, passing always from a more southern to a more northern crest in the direction from south-west to north-east; a change from a more northern to a more southern crest seems to occur scarcely at all, or only quite locally. Thus *the main divide* intersects the whole fold-system from the Pamir to the sources of the Ili with a course fairly constant in the main, although broken in places, and at an angle of some  $15^{\circ}$ – $20^{\circ}$  to the direction of the folds. It then recedes a long way to the north-west, to the river Alatau. From here north-eastward to Lake Baikal the chains take a more south-easterly course. Here therefore the contrast between the direction of the whole (west-east) and of the individual elements (north-west-south-east) becomes still more marked. At the same time the latter become much further separated, so that between them the high steppes of the interior open on to the Siberian lowlands in several broad gates. Here too the chief water-divide between the northern rivers and the southern rivers of the steppes goes from west-south-west to east-north-east with several bends.

(P. 153) *Mountains bordering highlands.*

*Himalayas and others. If we wished to construct a priori the hydrographical conditions of a plateau-land walled round*

by *folded mountains*, we should presuppose in the interior of this plateau either an undrained region with a dry climate, or a lake discharging itself over the lowest part of the border. Perhaps this discharge would have already drawn off the whole lake by its incision. At any rate we should separate a central and peripheral basin from one another by a water-parting following the highest crests of the border mountains.

These are, however, not at all the conditions we actually find on plateaus provided with border mountains. Here we either see the divide between central and peripheral basins far in the interior of the plateaus instead of on the border-mountains, or, as is sometimes the case, the central system is entirely absent, and the interior is also drained by peripheral rivers, which break through the border mountains on all sides. This formation admits of two possibilities; either *the divide has always been in the interior of the plateau, and has kept there in spite of the rising of the border-mountains*, or it was originally formed on the border mountains and then shifted into the interior by one-sided erosion.

This phenomenon is developed on the largest scale in the Asiatic highlands, from Tibet to Asia Minor. In Tibet the northern border mountains, the *Kwenlun*, are pierced by several rivers, e.g. the rivers of Yarkand and Khotan. The southern border mountains, *the Himalayas, although the highest mountain range of the earth, have no main water-parting*. We have here to distinguish two water-flow systems. The southern one consists of waters of which a large number reach the Indian plain independently. In the eastern Himalayas they flow chiefly in transverse valleys, while in the western part of the range they form large longitudinal valleys, which are connected by short transverse breaches. On the north side, on the other hand, some large longitudinal valleys are developed, in which the waters collect to form a few large rivers, which, after long running parallel to the range, also break through to the south

Quoted  
p. 173.

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(Brahmaputra, Indus, Setledj). Thus the main water-parting between the Indian rivers and the undrained region of Tibet falls quite outside the Himalayas proper, on the plateau of Tibet, where it has a very irregular course.

## No. 89.

### POWERS OF THE COMMISSIONERS. For the Franco-Spanish Delimitation, according to the Treaty of the Pyrenees (1659).

[From DUMONT'S "*Corps Universel Diplomatique du Droit des Gens*," La Haye, 1728, vol. vi. partie ii.]

(Quoted on p. 820 of the Statement.)

#### Enclosure A.

[Article XLII. of the "*Traité de Paix nommé des Pyrénées entre les Couronnes de France et d'Espagne*. Fait dans l'Isle des Faisans, le 7 Novembre 1659." *Loc. cit.* p. 264.]

Art. XLII. Et pour ce qui concerne le Pays et Places que les armes de France ont occupez en cette guerre du coté d'Espagne : Comme l'on auroit convenu en la négociation commencée à Madrid en l'année 1656, sur laquelle est fondé le présent *Traité que les Monts Pyrénées, qui avoient anciennement divisé les Gaules des Espagnes, seront aussi dorénavant la division des deux mêmes Royaumes*, il a été convenu et accordé que le dit Seigneur Roy Très Chrestien demeurera en possession et jouira, etc. . . .

Bien entendu, que s'il se trouve quelque lieu du dit Comté et Vignerie de Conflans seulement et non du Roussillon qui soient dans les dits Monts Pyrénées du coté d'Espagne, ils demeureront aussi a Sa Majesté Catholique : Comme pareillement s'il se trouve quelques lieux du dit Comté et Vignerie de Cerdaña seulement et non de Catalogne qui soient dans les dits

Monts Pyrénées du côté de France, ils demeureront à Sa Majesté Très Chrestienne. Et pour convenir de la division seront présentement députez des Commissaires de part et d'autre, *lesquels ensemble de bonne foi declareront quels sont les monts Pyrénées.*

### Enclosure B.

[Extract from the "*Convention entre les Commissaires de France et d'Espagne en exécution du Quarante deuxième Article du Traité des Pyrénées*, du douzième Novembre, 1660." *Loc. cit.* p. 344.]

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Tous lesquels villages, avec leurs juridictions, limites et dépendences, demeureront à Sa Majesté Très Chrestienne. Et parce que le territoire de Iz est de l'autre côté de la Rivière qu'on appelle Régur et qui vient de Ur, nous Commissaires Députés avons déclaré et declaronç que quoi qu'à l'égard de tous les autres *villages de France et d'Espagne la division s'en doive faire par leurs limites et jurisdiction* néanmoins pour ce qui regarde le village de Iz seulement la séparation de la France d'avec l'Espagne se fera par la dite Rivière en suivant toujours son cours naturel jusques à ce qu'on rencontre le Territoire d'Aye qui appartiendra a l'Espagne, de sorte que la moitié de la Rivière et la moitié du Pont appelé vulgairement de Livia sera à l'Espagne, c'est à savoir la moitié qui regarde Puycerda ; et l'autre moitié appartiendra à la France. . . .

## No. 90.

### Customary Sense of the Terms "PRINCIPAL CHAIN" AND "PRINCIPAL CORDILLERA"

as derived from the Treaty of Bayonne, 1856.

[Translated from the Spanish text in "*Coleccion de Tratados, Convenios i Documentos Internacionales*," etc., publicada de Real Órden i con autorizacion de los Exmos. Señores Ministros de Estado por el MARQUES DE OLIVART, Madrid, 1893, vol. ii. page 418 et seq.]

(Quoted on pp. 820 et seq. of the Statement.)

Art. 1.—The line of separation between the sovereignty of the Kingdom of Spain and that of the French Empire, from the point in which the Spanish Provinces of Huesca and Navarra are conterminous with the French Department of the Low Pyrenees, to the mouth of the river Vidasoa, in the harbour of Higuer, shall start from the col of Añalarra in direction by the heights of the hills which trend by Murlan and the Peak of Arlas to the Piedra de San Martin, also called Muza de Bearne, in accordance with the line of landmarks (*amojonamiento*) existing at present. Quoted  
p. 821.

Art. 2.—From the Piedra de San Martin the frontier line runs to the col of Erayce and to the Pass (*portillo*) of the same name on the principal Cordillera of the Pyrenees (Sp. *Cordillera principal del Pirineo*, Fr. *chaîne principale des Pyrénées*) over whose summit it shall run by Lacura, Urdaite, the port of Guimbeleta and the gap of Belay, as far as Baracea-la-Alta or Barceta-Goitia, these demarcations being in conformity with Quoted  
p. 821.

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the part corresponding to it of the demarcation (*amojonamiento*) agreed upon between the valleys of Roncal in Spain and Sola in France.

Art. 3.—From Baracea-la-Alta or Barceta-Goitia the boundary shall be *the line of crests* (Sp. *será la divisoria la línea de crestas*; Fr. *suivra les crêtes*) determined by the hill-tops of Ochogorria, Mulidoya, Iparbacocha, Ory and Alupeña.

Art. 4.—*At Alupeña, the frontier departs from the principal chain of the Pyrenees* (Sp., *abandonará la cadena principal del Pirineo*; Fr. *quittera les crêtes des Pyrénées*) in order to seek, in conformity with the tracing which exists at present, the Errecaidorra (*stream*) or Regata seca and follow this stream until it joins the Urbelcha.

Art. 5.—The international boundary, from the junction of the Errecaidora and the Urbelcha, shall ascend by the course of the latter, until it meets the prolongation of the line of crests (*la línea de crestas*) of Aunsbide; shall continue by the said crests to the origin of the stream Contracharro, and descending down stream by the same, and by Ugasagua, shall join the Egurgoa.

Art. 6.—From the confluence of the Ugasagua and the Egurgoa the landmarks between the two countries, in conformity with the Act of Demarcation of the boundaries drawn up in 1556 by the valleys of Alzcoa in Spain and Cisa in France, shall ascend successively by the Arroyos Egurgoa, Bagachea or Igoa, and passing by the *scel* of Eroizate, Arlepoa, Vagartea, Iparraguirre, Salvatea, Orgambidea, Idopil, Lecea and Urcullu shall reach the col of Iriburieta or Jasaldea.

Art. 7.—From Iriburieta the boundary line shall run over the col of Bentartea, to seek the origin of the stream Orellacorreca and shall descend by this and enter the river Valcárlos, down which it shall follow as far as Pertote, situated some distance south of the village of Arnegui.

At Pertote the line shall turn to the west and ascend the

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peak of Mendimocha ; shall run south by the summits which separate the valley of Valcárlos from that of Alduides as far as Lindusbalsacoa, passing afterwards by Lindusmunua, and from thence straight to the Peak of Izterbequi and straight again to Beorzubustan, following the heights (*los altos*), to reach the col of Izpegui.

Art. 8.—Starting at Izpegui, the frontier shall follow the international demarcation of 1787 which runs to the Mount Iparta by *the crest of separation between the valleys* of Baigorri and Baztan, running by the heights of Irusquieta and Gorospil to Fagadi, from whence it runs south ; it passes by the Mount of Añatarbe and follows the stream of the same name and Otsabialo as far as the origin of the latter : between this point and that called Chapitelacoarria, on the right bank of the river Vidasoa and a little lower than Endarlaza, *the demarcation follows almost constantly the division of the waters* which flow, on one side towards the five cities of Navarra, and on the other towards San Juan de Luz.

## No. 91.

### Customary Sense of “PRINCIPAL CREST” AND “PRINCIPAL CHAIN” as Derived from the Treaty of Bayonne, 1862.

[Translated from the Spanish text in “*Coleccion de Tratados, Convenios i Documentos Internacionales*, etc., publicada de Real Órden i con autorizacion de los Exmos. Señores Ministros de Estado por el MARQUES DE OLIVART,” Madrid, 1893, vol. ii. page 373.]

(Quoted on p. 821 of the Statement.)

Art. 1.—The boundary line between the sovereignties of Spain and France from the eastern extremity of Navarra to the Valley of Andorra, shall start from the apex of the Tabla de los Tres Reyes, this being the last point designated in the Act of demarcation drawn up in conformity with Art. 10 of the Boundary Treaty of December 2, 1856, and *shall follow by the principal crest of the Pyrenees* (Sp. *seguirá por la cresta principal del Pirineo*; Fr. *suivra la crête principale des Pyrénées*) as far as the Peak of Gabedallo, running from west to east as far as the Spanish valley of Ansó and the French valley of Aspe.

Quoted  
p. 821.

Art. 2.—It shall continue by the Escalé de Aguatuerta as far as the Chorrot de Aspe, following the boundary now existing between the territories of Ansó and Barce.

Art. 3.—Beginning in Chorrot de Aspe, the existing line shall serve as a frontier as far as the port of Sompart, leaving the mountain of Aspe under Spanish jurisdiction.

Art. 4.—The international line shall continue to the east

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by *the crests of the principal Cordillera of the Pyrenees* (Sp. *las crestas de la Cordillera principal del Pirineo*; Fr. *les crêtes de la chaîne principale des Pyrénées*) without any interruption as far as the hill tops of Escaleta, where the great spur becomes detached, whose waters flow (Sp. *el grande estribo que vierte sus aguas*; Fr. *le grand contrefort qui verse ses eaux*), on one side to the valley of Aran and on the other to that of Luchon.

Art. 5.—The boundary shall follow by the summit of this mountain branch as far as the place near its northern extremity called Turan de la Tua or Cap de Touête, so as to leave in Spanish territory the mountain of Poilané and the Clot de Barecha.

Art. 6.—At the Turan de la Tua the frontier line shall abandon the summits and descend by the Arroyo del Termino to the river Garonne, and up stream by this and by the ravine called rio Argelé to the Cap de las Raspas or Mall Usclat, situated on the summit, and to the western extremity of the mountain branch (*contrafuerte*) which encloses by the north *the hydrographic basin of the valley of Aran*. Quoted  
p. 821.

Art. 7.—From the Cap de las Raspas the line of separation between the two States shall follow the *water-parting of the branch* until it meets again *the principal chain of the Pyrenees*, by whose summits it shall run as far as the frontier of the Valley of Andora.

Art. 8.—The demarcation of the international frontier summarily indicated in the foregoing Articles shall be proceeded to as soon as possible, by means of convenient landmarks and monuments easy to identify, the delegates of the French and Spanish respective Municipalities concurring in this operation. An official Act of this Demarcation shall be drawn up, and its provisions shall have the same force and vigour as if they were textually inserted in the present Treaty.

## No. 92.

### THE HYDROGRAPHICAL BOUNDARY ON THE "PRINCIPAL CREST" OF THE PYRENEES.

[Extracts from the "Act of Delimitation" appended to the foregoing Treaty of 1862.]

(Quoted on p. 822 of the Statement.)

No. 273.—Starting from the Tabla de los Tres Reyes the international frontier line follows *the water-parting of the principal Cordillera of the Pyrenees* (Sp. *la divisoria de aguas de la Cordillera principal del Pirineo*; Fr. *la ligne de partage des eaux de la chaîne principale des Pyrénées*) and reaches the port of Ansó or Petrachema . . . Quoted  
p. 821.

From thence the boundary follows *the same water-parting* as far as the summit called in Spanish Pico de Arri, situated at the intersection of the crests of Banasa and of Cuecq.

No. 296 . . . From the Chorrota the demarcation follows the slope (*la ladera*) of the mountain of Aspe by a strip of white rocks called El Calcinar, which abuts on an enormous vertical rock 1900 metres east of No. 296.

No. 297.—At the foot of this rock situated on the water-parting, a cross was cut, looking north.

The line trends north, seeking the top of the mountain of Candauchu or Coma de la Leña, where it meets again *the hydrographic divide* (Sp. *la divisoria hidrográfica*; Fr. *la ligne de partage des eaux*).

No. 298.—Before reaching Candauchu there is a rocky hill where a cross was cut at 1080 m. from the last.

## No. 92.

( 623 )

No. 299.—At 400 m. a landmark in the line of Candauchu, or Coma de la Leña. From this point the international line is completely determined by *the crest of the great Cordillera (la ligne de faite de la chaîne principale)*, until beyond the port of Benasque, marked with No. 332; nevertheless it has been deemed convenient to erect landmarks on *the said divide of watersheds* (Sp. *la misma divisoria de vertientes*; Fr. *la dite ligne de faite*), at the points enumerated . . .

No. 332.—On the perpendicular wall of the cliff which has been cut to form the pass of the port of Benasque a cross has been cut east of the path.

The frontier continues by *the crest of the Pyrenees* as far as the Peak of Peson or de la Frèche, where it abandons this crest to follow that of *the great spur which divides the waters of the valley of Aran from those of that of Luchon*.

No. 339.—Here begins the mountain of Poilané, which, in conformity with Article 5 of the Treaty to which this Act is annexed, must remain in Spain, in virtue of which provision the line of demarcation departs from the highest summits of the spur, and runs over all the less elevated summits which from the Cap de la Tua form a semicircle with its convexity to the west until it meets again *the divide of the watersheds (la divisoria de vertientes)* at the Peak of Poilané.

No. 343.—On the top of Tuc or Peak of Poilané. From this point the division of both countries coincides again with *that of the waters* which flow east to the valley of Aran and west to that of Luchon.

No. 359.—From this point the international line abandons the water-parting as far as the Portillon . . .

No. 366.—At the Portillon *the international division and the water-parting coincide again (vuelven aquí a confundirse la divisoria internacional i la de las vertientes)*.

No. 407.—Landmark on the Turon de la Tua. *The international line leaves aside the divide of the watersheds.*

**No. 92.**

( 624 )

No. 413.—At the Cap del Roc de la Serra. From this point the division between both countries follows that of the waters along *the great spur of the Pyrenees, which encloses on the north the hydrographic basin of the Valle de Aran.*

## No. 93.

### Customary Sense of the Term "LA CRÊTEDES MONTAGNES," according to the Treaty of Bucharest, 1887.

[From British State Papers, vol. 78, pp. 97, 101 et seq.]

(Quoted on pages 824 and 826 of the Statement; see Plates xix. and xx., same pages.)

*Convention between Austria-Hungary and Roumania, defining the Boundary between the two Countries.*—Signed at Bucharest, November 25, December 7, 1887. Ratifications exchanged at Bucharest, April 16, 1888.

SA Majesté l'Empereur d'Autriche, Roi de Bohême, etc., et Roi Apostolique de Hongrie, et Sa Majesté le Roi de Roumanie, également animés du désir d'établir d'une manière définitive et stable la ligne de frontière entre leurs États, ont dans ce but *institué une Commission Mixte chargée des travaux préliminaires.*

Cette Commission ayant accompli sa tâche et le tracé futur de la ligne de frontière ayant été fixé d'un common accord, leurs dites Majestés ont résolu de *conclure une Convention sur la base des propositions élaborées par la Commission*, et ont nommé à cet effet pour leurs Plénipotentiaires, savoir :

Sa Majesté l'Empereur d'Autriche, etc. . . .

Sa Majesté le Roi de Roumanie, etc. . . .

Lesquels, après s'être communiqué leurs pleins pouvoirs,

trouvés en bonne et due forme, sont convenus des Articles suivants :

Art. 1. La frontière entre l'Autriche-Hongrie et la Roumanie est et demeure établie telle qu'elle est indiquée dans les Articles suivants et marquée sur les Cartes annexées à la présente Convention (Annexe A) et qui en font une partie intégrante.

Ces Cartes, ainsi que les stipulations de la présente Convention, formeront à l'avenir l'unique base pour régler tous les différends qui pourraient s'élever à l'égard de la ligne de frontière.

\* \* \* \* \*

#### DÉLIMITATION ENTRE LA HONGRIE ET LA ROUMANIE.

V. La ligne frontière entre la Hongrie et la Roumanie partant du triplex confinium entre la Bucovine, la Hongrie, et la Roumanie, point situé sur la Montagne Pietrile rosii (sur l'ensellement Podul de Piatrâ), descend à la source du ruisseau Tâeturile, qu'elle suit jusqu'à son embouchure dans le ruisseau Scafa, ensuite celui-ci jusqu'à son embouchure dans le ruisseau Haïta, et la Haïta jusqu'à son embouchure dans le ruisseau Neagra, traverse ce dernier et monte *en suivant la crête du pied de la montagne Cserebükk*, à son sommet, cote 1455.

De ce point la ligne *suivant toujours la crête* va jusqu'au point coté 1762, d'où elle prend le sentier tracé sur le versant nord du Caliman-Kelemen, passe par le point coté 1808 et au Dealul Bucinis, d'où *suivant la crête de cette montagne* va jusqu'au Dealul Drâgoeasa, cote 1354.

De là elle va directement au sommet Prislopul, passe à la Poiana Prislopul, et sur l'ensellement entre Prislopul et Paltinis, d'où elle descend à la source du ruisseau Paltinis (apa lui Zâban), qu'elle suit jusqu'à son embouchure dans le ruisseau Drâgoeasa, et celui-ci jusqu'à son embouchure dans le ruisseau Neagra, et la Neagra jusqu'à l'embouchure du ruisseau Cristisoara au point nommé Fântina Vinului.

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A partir de ce point la ligne remonte ce dernier ruisseau jusqu'à sa source, d'où elle monte à l'ensellement qui se trouve entre les montagnes Tibles mic et Tibles mare, et *suivant la crête* passe aux sommets de Tiblesul mic, Dealul verde (cote 1601), Albiuta, Cheteria (cote 1595), Obcina Albilor, Streaja, Prislopul, Preluca ursului, Piciorul lui Sfirdea, et Piatra rosie d'où elle descend à la source du ruisseau Prisecarul, qu'elle suit jusqu'à son embouchure dans la Bistricióra (Tölgyes).

De là elle suit la Bistricióra jusqu'à l'embouchure du ruisseau Pintecul-Péntek patak, remonte celui-ci jusqu'à sa source, d'où elle monte à l'ensellement de la Curmatura Píntekului.

De ce point la ligne passe sur le dos du pied de la montagne Kicerul (Kicsere), d'où elle descend vers l'est suivant la crête de ce pied à l'embouchure de la Bistruta dans la Bistra, suit ce dernier ruisseau jusqu'à l'embouchure du ruisseau Frínturíle, d'où elle monte au sommet de la montagne Fagetelul (cote 1166) en suivant la crête du pied nord-ouest.

Du sommet de Fagetelul la ligne va à l'ensellement entre cette montagne et la montagne Verde, d'où elle descend à la source du ruisseau Kitirigul (Köszörükö patak), qu'elle suit jusqu'à son embouchure dans le ruisseau Bicz (Békas patak), suit celui-ci jusqu'à l'embouchure du ruisseau Tikos (Tikos patak), remonte ensuite ce dernier jusqu'à sa source et va de là à l'ensellement entre les montagnes Ivános et Floarea, d'où elle descend à la source d'un petit ruisseau qui se trouve au sud de cet ensellement, qu'elle suit jusqu'à son embouchure dans le ruisseau Ivános, remonte ensuite celui-ci jusqu'à sa source, d'où elle monte sur l'ensellement d'Obcina Cepkesului.

De ce point la frontière descend au ruisseau Ata, qu'elle suit jusqu'au point cote 847, d'où elle monte vers le sud sur la montagne nommée Piciorul Kerekhavas, et *descend* ensuite vers l'est *au ruisseau Ata mare, qu'elle traverse* et monte *suivant la crête* du Piciorul Icoanei, au sommet du Torogles (Toroklyás) (cote 1266).

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De là la ligne *suit la crête des montagnes*, passant par la Poiana Crucea rosie jusqu'au sommet de la montagne Bitca de piatra, d'où elle *descend au ruisseau Bratos* (Barátos) (cote 840), *le traverse et monte sur la crête* du Meleg-havas, qu'elle suit jusqu'à l'ensellement de Curmătura Lâzâroai.

De ce point elle va en ligne droite vers le sud-est jusqu'à la jonction du ruisseau Bolohanos (Bálványos) avec le ruisseau Földtiszt patak, suit ce dernier jusqu'au pied nord de l'Arsita Tarcutii, d'où elle monte *suivant la crête* de ce pied au sommet de cette montagne (cote 1372). De là *suivant toujours la crête elle descend* dans la direction du sud *au ruisseau Târcuta* (cote 1007), *qu'elle traverse pour remonter sur la crête* et passer sur les sommets Grindús (Tarhavas), et du Ciudomir (Csudamér), d'où elle *descend à la source du ruisseau Ciudomir* (Csudamér patak), qu'elle suit jusqu'à son embouchure dans le Trotus (Tatros) (Gymes).

A partir de ce point la ligne, traversant le Trotus, suit le mur d'enclos des bâtiments de la quarantaine et de la douane Hongroises et *monte ensuite sur la crête de la montagne Aldamas* (Aldomâs sorka) (köcsup), passe à son sommet et à ceux du Popoi (pipás) (cote 1272), Poiana arsâ (Egett mező) (cote 1271), et passant audessous du sommet Apahavas, elle va à mi-côte sur le troisième mamelon d'Apahavas à l'est et de là vers le sud-ouest directement au sommet Voica (cote 1304).

Du sommet Voica la ligne *descend suivant la crête* du pied de cette montagne *au ruisseau Cuiges* (Csuges), le traverse au point coté 855, d'où elle monte en ligne droite sur le sommet du Kerekbükk (cote 1096). De là elle *descend au ruisseau Agapiósa* (Gypecze patak) (cote 872), qu'elle suit jusqu'à son embouchure dans le ruisseau Sulta (Szulcza) et ensuite celui-ci jusqu'à l'embouchure du ruisseau Solintarul (Solvomtâr) (Prickske), et de là elle remonte celui-ci pour aller à l'ensellement du Solintar (Solyomtâr) et puis à son sommet.

De ce point la frontière descend *au ruisseau Ciobanul*

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(Csobános), le suit jusqu'à l'embouchure du ruisseau Magyaros, remonte ce dernier pour aller à l'ensellement qui se trouve près du sommet du Magyaros entre les cotes 1366 et 1342. De là *suivant la crête des montagnes* elle passe par les points cotés 1342, 1219, 1216, et 1173, et *sur la crête* de l'Obrejescul (Magyarossorka) cotes 1098, 1063, 906, 823, d'où elle descend au ruisseau Uz à l'endroit nommé Gardul de Piatrâ (Kökert).

De là elle suit le ruisseau Uz jusqu'à l'embouchure du ruisseau Barzântu (Veres patak) (Bardocz), et ensuite celui-ci jusqu'à l'embouchure du ruisseau Nemira (Fekete patak) (Kecskés), qu'elle remonte jusqu'à sa source. De ce point la ligne monte sur l'ensellement entre Nemira mare (Nagy Nemere) et Nemira mica (Kis Nemere) (Tiganea), *suit la crête des montagnes* et passe sur les sommets de Nemira mica (Kis Nemere) (Mikestetö), Sandru mic (Kis Sándor), et va jusqu'au sommet du Sandru mare (Nagy Sándor).

Du sommet Sandru mare la ligne prenant la direction de nord-est *suit toujours la crête* et passe sur le sommet du Kecskés et va jusqu'au point cote 970, d'où elle descend *suivant la crête* du pied sud-est de cette montagne au ruisseau Kecskés, qu'elle suit jusqu'à son embouchure dans le ruisseau Slânic (Szaláncz patak), remonte celui-ci jusqu'à l'embouchure du ruisseau Pescarul, et ensuite ce dernier jusqu'au pied de la Poiana la Tablâ, d'où elle monte en angle droit sur cette Poiana, et de là *suivant la crête* du Dealul Brezoiul à son sommet (cote 1001). *Reprenant ensuite la crête* des montagnes elle passe au sommet du Dealul Cernica (cote 1005), d'où elle descend à l'ensellement cote 975, et de là à la source du ruisseau Cernica, qu'elle suit jusqu'à son embouchure dans le ruisseau Oituz à Soosmezö (poiana Saratâ).

La ligne, *traversant le ruisseau* Oituz (Ojtos), *monte sur la crête des montagnes* et passe aux sommets Runcul alb (cote 981), Halas, Coarnile (cote 1235), d'où en suivant toujours la crête descend au ruisseau Leany patak, qu'elle suit jusqu'à

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( 630 )

son embouchure dans le ruisseau Kasin (Kàszon patak) et remonte ensuite celui-ci jusqu'à l'embouchure du ruisseau Clâbac (Kalabics patak), et après celui-ci jusqu'à l'embouchure d'un petit ruisseau descendant du Clabuc (Kalabucs alya), et enfin ce dernier jusqu'à sa source, d'où passant par le point cote 1223 elle monte au sommet du Clabuc cote 1370.

De ce point la frontière descend suivant le ravin du milieu au ruisseau Lipsea, qu'elle suit jusqu'à l'embouchure du ruisseau Harangbércz (cote 804), et monte *suivant la crête* du pied nord-est du Jahorosbércz au sommet de cette montagne (cote 1211), de là elle descend vers le sud suivant un ravin jusqu'au ruisseau Paltin, qu'elle traverse et va en remontant un autre ravin situé vis-à-vis du premier au sommet du Sobércz (cote 1290).

Du sommet de cette montagne *la ligne-frontière suit la crête* jusqu'au sommet Mesteacânul (Mesztáktető), d'où elle descend vers le sud, *suivant toujours la crête*, en passant aux points cotés 1139 et 844 jusqu'au ruisseau Putna Vrancii (Putna patak) au point où le ruisseau Mârului (Jáhoros patak) se jette dans la Putna. De là elle remonte la Putna jusqu'à sa source, passe sur le dos de la montagne Haray oldala, cote 1671 et va à la source du ruisseau Zâbala (Zabola putna), qu'elle suit jusqu'à l'embouchure du ruisseau Gorul (Gor patak) et remonte ensuite celui-ci jusqu'à sa source, d'où elle va sur l'ensellement entre Girugiu et Dealul Negru (Fekete halom) (cote 1535).

De ce point la frontière monte vers l'ouest sur le dos du Dealul Negru (Fekete Halom) à une distance de 700 mètres approximativement, d'où elle descend vers le sud suivant un ravin au ruisseau Giurgiu (Gyergyó patak), qu'elle suit jusqu'à l'embouchure du ruisseau Stina Giurgiului, remonte ensuite celui-ci jusqu'à sa source, traverse l'ensellement de la Tâetura au point coté 1336 et descend à la source du ruisseau Magyarósbokor, qu'elle suit jusqu'à son embouchure dans le ruis-

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( 631 )

seau Bisca mica (Kis Baczka) et ensuite celle-ci jusqu'à l'embouchure du ruisseau Cilianos (Csilyános patak) (cote 1036), d'où elle remonte ce dernier jusqu'à sa source et de là au sommet de la montagne Bălescul (cote 1561) passe sur l'ensellement entre Bălescul et Coriul et va de là à la source du ruisseau Coriul (Tamás patak), qu'elle suit jusqu'à l'embouchure du ruisseau Băsculita (Kis Baczka) (cote 1142).

De là la frontière va vers le sud-ouest, traverse en ligne droite la montagne Hosszaböz pour aboutir au ruisseau Pitak (Petak patak) qu'elle suit jusqu'à l'embouchure du ruisseau Bisca mare (Nagy Baczka), remonte celui-ci jusqu'à l'embouchure du ruisseau Surduc (Szurduk patak), et ensuite celui-ci jusqu'à sa source, d'où elle monte sur l'ensellement nommé Surduk—Poiana cu peitrie (Döngökő).

De ce point la ligne *suivant la crête des montagnes* passe sur les sommets Bota mare (Nagy Bota), Bota mica (Kis Bota), Zimbrul, Tabla Chei, jusqu'au rocher la Cheia (Szent-László-Király-Köve), d'où elle descend à la rivière Buzeul (Bodza), qu'elle remonte jusqu'à l'embouchure du ruisseau Crasna, ensuite celui-ci jusqu'à sa source, d'où elle va à la Curmatura Crasnei.

De là la ligne *reprenant la crête des montagnes* passe sur les sommets Tâtarul mic (cote 1413), Kikisan, Tâtarul mare (Nagy Tatár) (cote 1471), Tabla Buzeului (cote 1345), et aux points cotés 1323, 1183, 1082, 1211, 1442, Bokirna (cote 1463), Laptele, Valea Stinei, Curul Pâmîntului (Pirosca), Tigaia, Bratocea, Babesul, Bobul mic, Bobul mare, Piciorul Caprii, Valea Negră, Zănoaga Mortului, Zănoaga lui Martin, Cióra, Orlata, Ratoslovul, Priseaca, sur l'ensellement du Prédélut, aux sommets Musita, Paltinul, Dealul Turcului Lacul rosu, Găvana, Tot Pălető, Auderbércz tető, Piatra mare (cote 1841), Poiana judetului, Susaiul, Poristoc (Csáplyateto), d'où elle descend *suivant la crête* de cette dernière montagne à la grande route empierrée de Predeal à Temes.

A partir de ce point la frontière monte *de nouveau sur la crête des montagnes* et passe sur les sommets Vlâdetul, Fetifoi, puis par la crête Sibot, Piatra Arsâ, sur les sommets Dealul Forban, Căpatina Porcului, par la Curmătura-armăsarului, sur le sommet Baiul, par la Curmătura morarului, sur les sommets Dealul morarului, et la Om (sommet du Bucegiu). De là en suivant toujours la crête elle passe à l'ensellement de Valea Doamnei et aux sommets Bătrina, Coltul Tapului, Coltul Grohotis, Strunga mica, Strunga mare, Dudele, Pietrele albe, Sfântul Ilie, Plaiul mindrului, à l'ensellement de Padina Ursului, sur le sommet Paicului, à l'ensellement de Seremet, sur les deux mamelons de Dilma lui Drăgan, aux sommets Mosoiului et Padina Lungă, à l'ensellement de Gura Padinii lungi, où se trouve la croix en pierre de Jon Flanta, sur le sommet Gruiful lui Lăstun, à l'ensellement Padina cu drumul, sur les sommets Piscul Berlindoa (Bocărta), piscul Guivelei et Ruiul, d'où elle descend à la grande route empierrée au point nommé la Cruce (Törzburger Pass).

De la Cruce la ligne monte de nouveau et *reprenant la crête des montagnes* passe aux sommets Predealul, Rogoasa, Sirnei, Galbina, Clabucetul, Poiana Soacă, Piatra lui Craiu (Baiul-Királykö, Königstein), Tamasul mic, Tamasul mare, Fâgetul Caprei, et Lerescul, à l'ensellement de celui-ci aux sommets Comisul et Lutele, Berevoescul mare, Berevoescul mic, Valea Radului (Vladului), Brătîla, et à son ensellement en y côtoyant les lacs, sur les sommets Ludisorul, Zirna et son ensellement, sur le sommet de Leaota, et à son ensellement. Sur les quatre sommets de Bîndea, sur les deux sommets de Galesescul, sur ceux de (Vultoarea), Coltul Vista mare, Moldovanu (Ucea mare), Podragul, Vertopul, Virtoapele, Vinătura lui Boteanu, Budi, Căprăretul, Paltinul (Lespezilor), et Negoiu, à l'ensellement de Scara ou Scărisoara, Fundul Boiul, Valea Caldărilor, sur les sommets Galbenul, Budislavul, Surul, Lacustelor, Cocoricul, à l'ensellement Cumpâna, sur les sommets Tătarul, Kika Fede-

lesului, redescend par sa crête à la Piatra Socului d'où en passant obliquement sur la Piatra Albă va jusqu'à la Strunga Sarci, et de là *elle descend à la source du ruisseau Valea lui Frate qu'elle suit jusqu'à l'Oltul.*

*De ce point la frontière suit l'Oltul jusqu'à l'embouchure du Riul Vadului,* remonte ensuite celui-ci jusqu'à sa source, et de là *elle monte* à l'Obirsia Ghircului, point situé entre les cotes 2011 et 2001, *et suivant la crête* passe sur les sommets Piatra Ghircului (cote 2001), Forgaci, Curmătura Purgis, Sterpul (Dealul Negru), Voinăsita, Curmătura Voineagului, Voineagul Catanesei (cote 1853), *et suivant toujours la crête des montagnes* elle va jusqu'à l'ensellement de Curmătura Tiganului (cote 1581).

De la Curmătura Tiganului elle descend à la source du ruisseau Tiganului, qu'elle suit jusqu'à l'embouchure du ruisseau Jidului, remonte ensuite ce dernier jusqu'à l'embouchure du ruisseau Izvorul lui Dobrun, et celui-ci jusqu'à source, d'où elle monte sur les dos du Dealul lui Dobrun ; de là suivant la crête de cette montagne elle descend par la Culmea Turnerelele (cote 1433) au ruisseau Valea Dobrunului, qu'elle suit ensuite jusqu'à son embouchure dans le ruisseau Lotrul (point nommé Lacul lui Dobrun).

A partir de ce point la ligne remonte le Lotrul jusqu'à l'embouchure de l'Isvorul Balului, et celui-ci jusqu'au pied sud du Dealul Larg, d'où, passant sur le dos de cette montagne, monte à son sommet (cote 1928), et de là elle descend à l'ensellement de Dealul Larg et Dealul Praja (cote 1882) *et suivant la crête* du Cracul Praja va jusqu'au point coté 1767. De là elle descend vers l'ouest au ruisseau Isvorul Praja, qu'elle suit jusqu'à son embouchure dans le ruisseau Riul Frumos, suit ensuite celui-ci jusqu'au pied est de la montagne Slimoiu, d'où elle va en montant sur le dos de ce pied, passe par le point coté 1453 et va au point coté 1527, descend ensuite *suivant la crête* du pied ouest du Slimoiu au ruisseau Salanile, qu'elle traverse

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et continue d'aller en ligne droite vers le sud-ouest sur le dos de la montagne Smida mica (cote 1508). De là elle descend au deuxième ruisseau Salanile, le traverse et remonte ensuite le ruisseau Smida mare jusqu'à sa source, d'où elle va à l'ensellement de Gura Potecului.

De ce point la frontière *suivant la crête des montagnes* passe aux sommets Salanile (cote 1734), Poiana Muerei, Pravatul (cotul ursului), Bufta, au point coté 1833 et sur le mamelon est de Dealul Caprei, sur l'ensellement cote 1801, sur le sommet Dealul Fometescul (cote 1871), par la Curmatura Groapa-Seaca, sur les sommets Cibanul, Coasta-lui-Rus, Jasul, Paclita, Gruicul et Paringul (Prislop ou Mindra), cote 2520, 4.

Du sommet de Paringul la ligne-frontière *suit la crête de la montagne Surpatele*, va sur le sommet de Grivele (cote 2016, 9) passe aux points cotés 1779, 1536, 7 ; Prislopul (cote 1373), descend suivant le dos du pied de la montagne Poiana Ascunsă jusqu'au point situé en face de l'embouchure du ruisseau Gropanul dans le ruisseau Polatistea, de là elle descend en angle droit au ruisseau Polatistea, qu'elle traverse et remonte de là le ruisseau Gropanul jusqu'à sa source, d'où elle monte sur l'ensellement entre Gropul et Tapa, entre les cotes 1481 et 1564, 5, et de ce point elle va en ligne droite sur le sommet Petriceea (cote 1438), d'où suivant le pied nord-ouest de cette montagne nommée Petricel elle descend au ruisseau Stolojoia, qu'elle suit jusqu'à son embouchure dans la rivière de Jiul (Zsil) (à ce point le ruisseau Stolojoia se nomme aussi Polatistea).

La frontière traverse le Jiul, monte par les rochers Paretele sur le sommet Candetul, sur la crête Murgile et passe sur les sommets Dragoilul et Dumitru, sur l'ensellement Obirsia Merisori, Sesul Dimitrei, Obirsia Diului, sur les sommets Draganul, Sesul Diului, Vulcan, Cârteanul, et son ensellement et les sommets Futetul, Streaja, Mutul, Dealul Piscul Rusc (cote 1630). De ce point elle va en ligne droite vers l'ouest en traversant la vallée Bréa, sur le sommet Virful Negrului, d'où

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suivant la crête passe sur le Cornul Zânoaga et sur le sommet Dealul Cornilor, de là elle descend dans la direction sud-ouest à la source du ruisseau Zânoaga, qu'elle suit jusqu'à son embouchure dans le ruisseau Valea Balomir, traverse ce dernier et remonte le ravin qui se trouve en face de ce ruisseau jusqu'à son origine et *de là suivant la crête* elle monte sur les sommets du Sigleul mic et mare.

De ce dernier point elle descend dans la direction sud-ouest *suivant la crête* et le pied de la montagne nommée Cracul Pietrei Maurului au ruisseau Valea de Pesti, qu'elle traverse et va en ligne droite en passant le Pribeagul sur le Dealul Galben au point situé à 775 mètres au sud de la cote 1223, qui se trouve sur le sentier du Dealul Galben. De là elle passe par les points cotés 1174, 1296 (Piatra Negrului), 1344 (Restovanul), sur la Smida Bâtrinâ, d'où elle descend à l'embouchure du ruisseau Valea Boului dans le Jiul.

De ce point elle remonte le Jiul jusqu'à l'embouchure du ruisseau Valea Seacă, ensuite celui-ci jusqu'au pied de Piatra Albă, d'où *elle monte sur la crête de cette montagne*, passe sur les sommets Soarbele, Paltina, Fetele Manesii, à l'ensellement et le sommet de Sturul (Scurlele), Galbenul, les crêtes Scârisoara Galbenii et Curmatura Galbenii, les sommets Stîna mare, Micusa (Vlasia), Bulzul, et sur l'ensellement de Scârisoara.

A partir de ce point la ligne-frontière *suivant toujours la crête des montagnes* passe sur les sommets Morarul, Glodeanul et Tutila, d'où elle descend sur le pied sud-ouest de cette dernière montagne en passant par les points cotés 1974 et 1897, au ruisseau Rusece à l'embouchure du ruisseau Pârîul Dragomir ; de là elle remonte celui-ci jusqu'à sa source, d'où elle monte à l'ensellement au point coté 1916. De ce point *reprenant la crête* elle passe sur le sommet Isvorul, aux points cotés 1823, 1815, 1733, sur le sommet Curereste (cote 1772), sur la crête du Cracul Maticului, sur les sommets Dobrovir, Dealul Mlecului (cote 1725), Cupanul (cote 1455), Gâsca (cote 1138), sur les points

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cotés 980, 896, 882, et par la Poiana Schitul descend au ruisseau Cerna.

Elle suit ensuite le cours de la Cerna jusqu'au point coté 254, d'où suivant le sentier qui se trouve tracé sur le versant ouest de la montagne Secul va jusqu'au ruisseau Tesna (cote 492), qu'elle remonte jusqu'à la Poianagaura Fetei, où elle quitte ce ruisseau et va en ligne droite dans la direction sud-ouest, à la Poiana Balta cerbului, et de là à la Curmătura intre plaiuri et *suivant la crête* passe sur les sommets Preseaca (cote 1094), Coseiul (cote 1071), par les Poiana Rotatâ et Coseiului (cote 1050), sur les sommets Lunca Camena (Piatra Vinâtâ) cote 1228 et 1126, Piatra lui Cosei, Poiana Cosei, Grebenicul (cote 1143), Poiana Sulita, Plostina-Mosorului, cotes 827, 894, 927, Virful Cocosului (cote 920), Poiana Rachelei, Predealul mare, cotes 763, 636, 647, et sur l'ensellement du Meteres. De ce point elle descend à la source du ruisseau Cerovât, qu'elle suit jusqu'à son embouchure dans le ruisseau Bachna, et ensuite celui-ci jusqu'au pied sud-est de la montagne Cióca nommément jusqu'au point qui se trouve dans le lit actuel de la Bachna en ligne droite cers l'est vis-à-vis du mamelon de cette montagne, coté 164.

De ce point la frontière suit une ligne qui se trouverait tracée dans le lit de la Bachna à égale distance des deux anciennes rives jusqu'à la grande route empierrée de Verciorova à Orsova, d'où elle va en ligne droite jusqu'au point où les lignes de chemin de fer de la Roumanie et de la Hongrie se touchent (savoir, à 132 mètres nord-ouest du point sur sa Bachna du chemin de fer Roumain), traverse le chemin de fer pour aller directement au Danube.

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### WATER-PARTING BOUNDARIES IN THE TREATY OF BERLIN, 1878.

[Arts. II., XIV. and XXXVI., of *the Treaty of Berlin*, signed July 13, 1878, from *Blue Book* (C. 2108) Turkey No. 44 (1878), pp. 15-23.]

(Quoted on page 827 of the Statement.)

ARTICLE II.—The Principality of Bulgaria will include the following territories :

The frontier follows on the north the right bank of the Danube from the former frontier of Servia up to a point to be determined by a European Commission to the east of Silistria, and thence runs to the Black Sea to the south of Mangalia, which is included in Roumanian territory. The Black Sea forms the eastern boundary of Bulgaria. On the south the frontier follows upwards from its mouth the mid-channel of the brook near which are situated the villages of Hodžakiöj, Selam-Kiöj, Aivadžik, Kulibe, Sudžuluk, crosses obliquely the valley of the Deli-Kamcik, passes south of Belibe and Kemhalik and north of Hadžimahale, *after having crossed the Deli-Kamcik* at  $2\frac{1}{2}$  kilom. above Čengei ; *reaches the crest* at a point situated between Tekenlik and Aidos-Bredza, and *follows it* by Karnabad Balkan, Prisevica Balkan, Kazan Balkan, to the north of Kotel as far as Demir Kapu. *It proceeds by the principal chain of the Great Balkan, the whole length of which it follows up to the summit of Kosica.*

There *it leaves the crest of the Balkan*, descends southwards between the villages of Pirtop and Dužanci, the one being left

to Bulgaria and the other to Eastern Roumelia, as far as the brook of Tuzlu Dere, follows that stream to its junction with the Topolnica, then the latter river until it meets the Smovskio Dere near the village of Petricevo, leaving to Eastern Roumelia a zone with a radius of 2 kilom. above that junction, ascends between the brooks of Smovskio Dere and the Kamenica, *following the line of the watershed* so as to turn to the south-west at the level of Voinjak and reach directly the point 875 of the Austrian Staff Map.

The frontier line cuts at right angles the upper basin of the brook of Ichtiman Dere, passes between Bogdina and Karaúla, so as to rejoin *the line of the watershed separating the basins of the Isker and the Marica*, between Čamurli and Hadžilar, follows that line by the summits of Velina Mogila, the " col " 531, Zmailica Vrh, Sumnatica, and rejoins the administrative boundary of the Sandjak of Sofia between Sivri Taš and Čadir Tepe.

From Čadir Tepe, the frontier, taking a south-westerly direction, *follows the watershed between the basins of the Mesta Karasu on the one side and the Struma Karasu on the other*, runs along the crests of the mountains of Rhodope called *Demir Kapu, Iskoftepe, Kadimesar Balkan, and Aiji Gedük up to Kapetnik Balkan*, and thus joins the former administrative frontier of the Sandjak of Sofia.

*From Kapetnik Balkan the frontier is indicated by the watershed between the valleys of the Rilska reka and of the Bistrice reka*, and follows the ridge called Vodenica Planina, descending into the valley of the Struma at the junction of this river with the Rilska reka, leaving the village of Barakli to Turkey. It ascends then south of the village of Jelešnica, and reaches by the shortest line the chain of Golema Planina at the summit of Gitka, and rejoins there the former administrative frontier of the Sandjak of Sofia, leaving, however, to Turkey the whole of the basin of the Suha reka.

From Mount Gitka the western frontier goes towards Mount Crni Vrh by the mountains of Karvena Jabuka, following the former administrative limit of the Sandjak of Sofia in the upper part of the basins of Egrisu and of the Lepnica, ascends with it the crests of Babina Polana, and reaches Mount Crni Vrh.

*From Mount Crni Vrh the frontier follows the watershed between the Struma and the Morava by the summits of the Strešer, Vilogolo, and Mešid Planina, rejoins by the Gacina, Črna Trava, Darkovska, and Drainica plan, then the Deščani Kladanec, the watershed of the High Sukowa and of the Morava, goes straight to the Stol, and descends from it so as to cut the road from Sofia to Pirot, 1000 metres north-west of the village of Seguša. It ascends in a straight line the Vidlic Planina and thence Mount Radočina in the chain of the Kodža Balkan, leaving to Serbia the village of Doikinci, and to Bulgaria that of Senakos.*

From the summit of Mount Radočina *the frontier follows towards the west the crest of the Balkans* by Ciprovec Balkan and Stara Planina up to the former eastern frontier of the Principality of Serbia, near to the Kula Smiljova Čuka, and thence that former frontier as far as the Danube, which it rejoins at Rakovitza.

This delimitation shall be fixed on the spot by the European Commission, on which the Signatory Powers shall be represented. It is understood—

1. *That this Commission will take into consideration the necessity for His Imperial Majesty the Sultan to be able to defend the Balkan frontiers of Eastern Roumelia.*

2. That no fortifications may be erected within a radius of 10 kilometres from Samakow.

\* \* \* \* \*

Article XIV.—Eastern Roumelia is bounded on the north and north-west by Bulgaria, and comprises the territories included by the following line :

Starting from the Black Sea the frontier follows upwards from its mouth the mid-channel of the brook near which are situated the villages of Hodžakiöj, etc., as in Art. II.

\* \* \* \* \*

The frontier of Roumelia leaves that of Bulgaria at Mount Cadir Tepe, *following the line of the watershed between the basins of the Marica and of its affluents on one side, and of the Mesta Karasu and of its affluents on the other*, and takes the direction south-east and then south *along the crest of the Despoto Dagħ Mountains*, towards Mount Kruschowa (whence starts the frontier line of the Treaty of San Stefano).

From Mount Kruschowa the frontier is the same as the line laid down by the Treaty of San Stefano, that is to say, the chain of the Black Balkans (*Kara Balkan*), the mountains Kulaghy-Dagħ, Eschek-Tschepellü, Karakolas, and Ischiklar, from whence it descends due south-east till it reaches the River Arda, and follows the mid-channel of this river up to a point close to the village of Adacali, which remains to Turkey. . . .

Article XXXVI.—Servia receives the territories included in the following delimitation :

The new frontier follows the existing line ascending the mid-channel of the Drina from its confluence with the Save, leaving Mali Zwornik and Sakhar to the Principality, and continues to follow the former boundary of Servia as far as *the Kopaonik, leaving it at the summit of the Kanilug*. From that point it follows at first the western boundary of the Sandjak of Nisch by the southern spur of the Kopaonik, *by the crests of the Marica and Mrdar Planina, which form the watershed between the basins of the Ibar and Sitnica on one side, and that of the Toplica on the other, leaving Prepolac to Turkey*.

It then turns to the south by the watershed between the Brvenica and the Medvedja, leaving the *whole of the basin of the Medvedja to Servia* : follows the crests of the *Goljak Planina*

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*(which forms the watershed between the Kriva-Rjeka on one side, and the Poljanica, Veternica, and Morawa on the other), as far as the summit of the Poljanica.* It then follows the spur of the Karpina Planina as far as the confluence of the Koinska and the Morawa, crosses this river, and ascends *by the watershed between the Koinska brook and the stream which falls into the Morawa near Neradovce*, to reach the Sv. Ilija Planina above Trgoviste. Thence it follows the crest of the Sv. Ilija as far as Mount Kljuc, and passing by the points marked 1516 and 1547 on the map, and by the Babina Gora, it reaches Mount Crni Vrh.

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### PRINCIPLES APPLIED AND TERMS USED IN THE DEMARCATIÖN OF THE BALKAN FRONTIERS.

#### Enclosure A.

[From *Blue Book* (C. 2471), Turkey No. 2 (1880), pp. 266 et seq.]

(Quoted on page 829 of the Statement.)

#### ACT OF DELIMITATION BETWEEN BULGARIA AND EASTERN ROUMELIA.

LE Congrès de Berlin a stipulé dans l'Article 11 du Traité conclu le 13 Juillet, 1878, que les frontières de la nouvelle Principauté de Bulgarie seraient fixées sur les lieux par une Commission Européenne, où les Puissances Signataires seraient représentées.

Leurs Majestés l'Empereur d'Allemagne, l'Empereur d'Autriche Hongrie, M. le Président de la République Française, leurs Majestés la Reine du Royaume Uni de la Grande Bretagne et de l'Irlande, Impératrice des Indes, le Roi d'Italie, l'Empereur de Toutes les Russies, et le Sultan, Empereur des Ottomans, ont à cet effet nommé pour leurs Commissaires, savoir :

Sa Majesté l'Empereur d'Allemagne : le Sieur Carl Comte von Wedel, Major d'Etat-Major, Attaché Militaire à l'Ambassade d'Allemagne à Vienne.

Sa Majesté l'Empereur d'Autriche-Hongrie : le Sieur Charles Chrétien Henry Baron de Ripp, Colonel d'Etat-Major.

M. le Président de la République Française : le Sieur Jules Victor Lemoyne, Chef d'Escadron d'Etat-Major.

Sa Majesté la Reine du Royaume Unis de la Grande Bretagne et de l'Irlande, Impératrice des Indes : le Sieur Edward Bruce Hamley, Général-Major.

Sa Majesté le Roi d'Italie : le Sieur Balthasar Alexandre Orero, Lieutenant-Colonel d'Etat-Major.

Sa Majesté l'Empereur de Toutes les Russies : le Sieur André Bogolubow, Colonel d'Etat-Major, Aide-de-Camp de Sa Majesté l'Empereur de Russie.

Sa Majesté le Sultan, Empereur des Ottomans : son Excellence Mehemed Tahir Pacha, Général de Brigade d'Etat-Major.

Lesquels, munis de leurs pouvoirs et instructions, se sont réunis en Commission à Constantinople.

*Se sont mis d'accord sur les principes à appliquer dans le tracé de la frontière et particulièrement sur la stipulation de l'Article 11 du Traité, leur enjoignant de prendre en considération la nécessité, pour Sa Majesté Impériale le Sultan, de pouvoir défendre les frontières du Balkan de la Roumélie Orientale,*

Et après la reconnaissance des localités pouvant donner lieu à discussion,

Ont fixé la frontière entre la Principauté de Bulgarie et la Province de Roumélie Orientale dans les conditions ci-après :

Article 1<sup>er</sup>.—Au sud, la frontière de Bulgarie remonte depuis son embouchure dans la Mer Noire, le thalweg du Tchiveté-Déré, laissant à la Bulgarie les villages de Hodjakioi, Aivadjik, Djéferli, et Goulitza (Sudzuluk) et à la Roumélie Orientale ceux du Gések, Jenikioj et Karmandja.

De la tête de ce thalweg a 2500 mètres sud-est de Belibe, elle descend, par un petit ravin orienté de l'est à l'ouest, dans le Dermen-Déré dont elle suit le cours jusqu'au coude, où ce ruisseau, coulant précédemment du sud-est au nord-ouest, se redresse vers le nord. La frontière se prolonge ensuite par une

suite de ravins et de cols orientés dans une direction générale du sud-sud-est au nord-nord-ouest, entre le Balaban-Déré et le Délédji-Déré, jusqu'au pied du Pilav-Tépé ; elle monte, toujours dans la même direction, sur le sommet de cette montagne, elle en suit la crête et redescend directement au Déli-Kamtchik, qu'elle coupe en un point situé à 2850 mètres en amont et à l'ouest de Tchengi, à 1825 mètres en aval et au nord-est de Hadji-Mahalé. Le village de Belibe, et les ruines de Kemhalik restent ainsi à la Bulgarie, les villages de Tchovankioj, Kaïrak-Mahalé, et Kosik à la Roumélie Orientale.

De la rive gauche du Déli-Kamtchik, et par l'arête rocheuse qui aboutit au point indiqué précédemment, la frontière monte sur la crête du Kapi-Bair. *Elle se prolonge alors sur la ligne de partage entre les eaux du Deli-Kamtchik et du Bouyouk-Kamtchik*, laissant à la Bulgarie les villages de Aidos Bredja, Kaïardi, Lopouchna, Bektchi, et à la Roumélie Orientale ceux de Hadji-Mahalé, Tikenlik, Dokhankioj, Karaveliler, Dérékioj, et Aïvadjik. Elle suit ensuite le Karnabad-Balkan entre Bairam-Déré et Kérémetli jusque près du chemin qui mène de Tchali-Kavak dans l'Ak-Déré à Kamtchi-Mahalé. La terrasse s'étendant jusqu'à 500 mètres au nord du col que traverse ce chemin, et qui porte le nom de passe de Dobral reste à la Roumélie Orientale ; puis la frontière rejoint, au nord d'une batterie abandonnée, *la crête du Débélitch-Balkan et se prolonge sur la ligne de partage des eaux* par Tioula-Bair, Monainar-Bair et Tépékioch jusqu'à ce qu'elle rencontre la route de Verbitza à Sungurlar et Jousouflou. De là et sur un parcours d'environ 3 kilom., *la frontière s'écarte de la ligne de partage* pour suivre le bord oriental de la dite route, partout où cette route se développe sur le versant est d'une série de petits mamelons. Elle traverse la route à l'embranchement d'un sentier qui mène directement à une karaoula ruinée, sise à 1 kilom. au nord-ouest ouest, et court alors par la ligne de faite dénommée Prisevica et Asap-Balkan sur la Carte Autrichienne.

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A 2600 mètres a l'est-nord-est de la passe de Kotel, la ligne-frontière rencontre un petit plateau dont elle contourne sur le versant nord la crête extérieure, puis par la ligne de partage et par un coude à angle droit elle atteint à 500 mètres de ce coude la tête d'un ravin profond, où la route de Kotel à Osman-Bazar descend, en pente raide ; de là elle gagne le tournant voisin de la route, la traverse, en suit le bord occidental pendant 1 kilom., s'en détache à la tête d'un autre ravin escarpé pour contourner le Koulé-Tépé, longe de nouveau le bord extérieur de la route jusqu'à l'ensellement du col, et après avoir suivi *la crête militaire* de façon à laisser successivement à la Roumélie les sommets des 3 hauteurs situées à l'ouest de la passe reprend à 2½ kilom. de cette passe *la ligne de faite du Kazan-Balkan*.

A 9 kilom. à l'ouest de la Passe de Kotel la frontière se confond, *dans la chaîne principale des Balkans, avec la grande ligne de partage, généralement orientée de l'est à l'ouest qui sépare les eaux des affluents du Danube au nord et celles qui, au sud, se rendent dans la Mer Noire par les sources de Déli-Kamtchik, et bientôt après dans la Mer Egée par les vallées de la Toundja, de la Strena (Giopsou-Déré) et de la Topolnitza*. Elle ne s'en écarte sur le versant nord que dans les endroits désignés ci-après :

*Passe de Démir-Kapou.*—Crête militaire depuis le point où la route escarpée montant de Stara Riéka (à la Bulgarie) atteint cette crête, jusqu'à 825 mètres à l'ouest du point où elle descend sur Slivno (à la Roumélie Orientale). Puis ligne de partage par Zoupantzi-Mesari, Biéla Krava, Tchoumourna (727).

## Enclosure B.

ACT OF DELIMITATION BETWEEN BULGARIA AND TURKEY  
(MACEDONIA).

[From C. 2471, pp. 319 et seq.]

Art. 7.—Du Manchou, point situé entre Sivri-Tach et Cadir-Tépé, où la frontière entre la Bulgarie et la Roumélie Orientale va, conformément à l'Acte du 14 Août dernier, rejoindre *la Crête principale du Rhodope* marquée sur la Carte Autrichienne comme la limite de l'ancien Sandjak de Sofia, la frontière Méridionale de la Bulgarie, se dirigeant d'abord vers le sud, *suit par la chaîne principale du Rhodope la ligne bien marquée du partage des eaux entre les bassins du Mesta-Karasu* (Ropolnitsa et Granitchar) *d'un côté et de l'Isker de l'autre*, par Routchkaia-Tchal et Kalbant ; à hauteur de Kourdjalik, elle prend la direction de l'ouest par Tchabirna, et Demir-Kapiia (Demir-Kapou) jusqu'à Kadinitza-Gora (à peu près le Kadimezar-Balkan de la Carte Autrichienne), où elle s'infléchit vers le sud-ouest et par Kodja-Koritzza-Gora elle atteint l'Ai-Gedik (sommet de la montagne au nord de la passe du même nom).

Là elle tourne de nouveau vers l'ouest et suivant la ligne de partage des eaux entre les bassins de la Rilska-Rieka et de la Bistrizta-Rieka, affluents du Struma-Karasu, elle rencontre sur le contrefort de la *Vodenica-Planina* les sommets de Merdjik-Tépé, Kadiitza, Markovascala, Tzarev-Vrh, Mousovra, Derezlitzza, Kirelo, et Fetir. Elle laisse à la Bulgarie le Monastère de Rilo et les villages de Pastra, de Riloselo, et d'Istop, à la Turquie les villages de Bistrizta et Dobrava et la ville de Djouma.

À 2300 mètres au sud-est de Barakovo (*Barakli*), *la frontière quitte la ligne de partage* pour descendre vers la Rilska-Rieka par la crête bien accentuée du second contrefort à l'est de Barakovo, au pied duquel elle s'engage dans un torrent desséché qui la mène à la rivière à 850 mètres en amont du pont

de la chaussée. Cette ligne sépare à peu près le gros des possessions de Barakovo laissé à la Turquie d'une part, et de Paraminovo (Paromin) laissé à la Bulgarie de l'autre.

La frontière descend ensuite le thalweg de la Rilska-Rieka jusqu'à son confluent avec la Struma, et tournant au nord remonte le cours de la Struma jusqu'à 600 mètres de ce confluent. Elle se dirige alors de nouveau à l'ouest dans le ravin qui sépare les villages de Tekia (Jelesnica) appartenant à la Bulgarie et de Boutchina (Bucinova), appartenant à la Turquie. Par la tête de ce ravin elle gagne deux mamelons rocheux et par ceux-ci le sommet de Tchordak-Kamik ; puis *elle continue par la crête de la Vlaina, qui contourne le bassin de toutes les eaux tombant dans la Struma au sud de Boutchino* ; ce bassin reste dans sa totalité avec les villages de Lisia, Drenovo, Klissoura, à la Turquie, le territoire de Froloch et de Tcherveritza reste au contraire à la Bulgarie.

### Enclosure C.

#### ACT OF DELIMITATION OF THE SOUTHERN BOUNDARY OF EASTERN ROUMELIA.

[From *Blue Book* C. 2471, Turkey No. 2 (1880), pp. 410, 411.]

Depuis le col d'Arpa-Guédik jusqu'à un point situé au nord-ouest de la hauteur connu sous le nom de Baïram-Yéri, et correspondant à celui qui est appelé Kruchova-Dagh sur la Carte Autrichienne, *la frontière suit constamment*, dans une direction générale ouest-sud-ouest, *la ligne de partage des eaux entre la Maritza* au nord et l'Arda au sud. En partant de ce col elle gagne le sommet d'Akva-Tépé, passe au nord du village d'Ambar-Déré qui reste à la Turquie, et après avoir suivi la crête du Karakolas-Dagh, atteint successivement les hauteurs d'Eiri-Tépé, Inaham-Baba, Tchil-Tépé, Bourjof-Pojar, Svéta-Douha, Mamina-Voda, Svéti-Géorgi, Karamanetz, Satchou-Mékat et Boukovak-Tépé, le village de Dolna-Dérékeui restant à la Tur-

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quie. Elle gagne ensuite le sommet de Djibrail-Tépé, au sud de Tchépéli-Dagh ; puis ceux de Tcheina-Gora, Karadja-Evress, Kotlitzza, Echeck-Koulagh, Touzla-Tépé et Kouzou-Yataghi. De là elle atteint le col de Mézar-Guédik, puis la hauteur de Tchuruk-Tépé où la chaîne du Karlik-Dagh se *détache de la ligne de partage* ; gagne les sommets de Moussa-Yataklar et de Kartal-Kaya et arrive à *un point de la crête qui est l'origine commune des trois bassins*, savoir : celui de la Maritza au nord, celui de l'Arda au sud-est, et celui du Mesta-Karason au sud-ouest. Le point dont il s'agit appartient à un massif montagneux d'où descendent : vers le sud-est, le Kara-Déré qui se rend à l'Arda ; vers le sud-ouest, le Bairam-Yéri-Déressi qui se rend au Mesta-Karasou. *Il est situé au nord-ouest de la hauteur appelée Bairam-Yéri, et correspond à celui qui est désigné sur la Carte Autrichienne sous le nom de Kruchova-Dagh. La hauteur que les gens du pays désignent sous ce dernier nom* (Kruchova ou Kirchova-Dagh) appartient à une *chaîne secondaire*, qui se détache de la ligne de partage par le Vlasko-Dagh, au sud-ouest de Torsoundja-Tépé.

Du point ci-dessus défini jusqu'à sa jonction avec la frontière de Bulgarie, la frontière *suit constamment la ligne de partage des eaux entre la Maritza au nord et le Mesta-Karasou au sud*. Continuant, à partir de ce point, à se diriger vers l'ouest-sud-ouest, elle gagne le sommet de Daliboska, le col de Souvan-Guédik et le point culminant de Torsoundja-Tépé ; puis, changeant de direction vers l'ouest, elle suit les crêtes de Méchat-Guédik, Sari-Yer, Dikili-Tach et Arak-Mézar, et atteint ensuite les hauteurs de Ĥadji-Osman-Yailassi, Débeklitzkaia-Goria et Kaintchal-Tépé. Arrivée en ce point, elle s'infléchit vers le nord ; gagne le sommet de Kartal-Tépé où la chaîne du Kaintchal-Kartal-Dagh se détache de la ligne de partage ; suit les crêtes de Kouzou-Yataghi, atteint successivement les hauteurs de Keur-Issa, Avliko, Tchairli-Yailassi, et après avoir suivi les crêtes de Chahin-Kiran, gagne les points culminants de Gueuz

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Tépé et de Tchali-Yailassi-Sirtlari, puis le col d'El-Guédik et les hauteurs de Veternitza et de Kara-Mahmoud, le village de Jilandji restant à la Turquie. De là elle atteint le col de Koulaous-Guédik, puis le sommet de Pernardar-Tépé et le col de Kirdja-Déré-Bachi-Guédik ; suit les crêtes d'Abdoullah-Bair et d'Ouman Bair ; gagne les hauteurs de Kutchukli-Yailassi, Séléna-Yailassi et Kavaldji-Dagh, et arrive au point où commence la chaîne du Djinevra-Dagh. Changeant alors de direction vers l'ouest, elle suit la crête du Djinevra-Dagh, dont le point le plus remarquable est la hauteur de Yanik-Tépé, puis la crête de Soudjak-Bair, dont elle atteint l'extrémité occidentale à Soudjak-Tépé. Arrivée en ce point, elle prend une direction nord-ouest, et suivant la crête du Dagħ, gagne les hauteurs de Telli-Tépé, de Kara-Tépé et de Bélébrek ; puis, s'infléchissant vers l'ouest, celles de Kourou-Tépé et de Tchéresna-Tépé.

De là, prenant une direction générale vers le nord, elle arrive au point culminant de Gueul-Tépé, gagne le sommet de Lupova-Bair, laissant à la Turquie les habitations isolées de Hussein-Tépé, Keur-Oglou, et Ozoun-Ibarhim ; puis celui de Krastova-Tchal, laissant à la Turquie le hameau de Durlu-Koulébéléri, à la Roumélie Orientale celui de Konou ; atteint le point culminant de Vélitcha-Bair, le village de Tchémerna restant à la Turquie, les hameaux ou maisons de Bouzgo, Pétro, Diremko, Islam, Débeftzi restant à la Roumélie Orientale. Elle gagne ensuite la hauteur d'Abramova, laissant à la Turquie les hameaux ou maisons de Redjen-Moustapha, Moustapha-Bey, Téber, et Khirli, à la Roumélie Orientale ceux de Boulout et Kandi-Moustapha ; puis elle atteint les sommets de Lazova-Tépé, et de Paschova, le village de Paschova, restant à la Roumélie Orientale, et gagne successivement les hauteurs de Tchista-Tépé Kotosch kovitza, et Kara-Tépé, laissant à la Roumélie Orientale le village Valaque d'Oulah-Koulébéri ; puis celles de Kutchuk-Tchadir-Tépé, Ostovitza, et Sungurlu.

A partir du point culminant de Sungurlu, la frontière se

dirige vers l'ouest par les hauteurs de Ravni-Tchal, Sivri-Tach, Daouditza, Orta-Tchal, Tchinguiané-Tchal, et Mantcho, où elle rejoint la frontière de Bulgarie. *La hauteur de Mantcho est l'origine commune de trois bassins*, savoir : celui de la Maritza au nord-est, celui de l'Isker au nord-ouest, et celui du Mesta-Kara-Sou au sud. Elle correspond à la hauteur désignée sur la Carte Autrichienne sous le nom de Tchadir-Tépé ; mais en réalité la hauteur connue sous ce nom dans le pays est située à 5 kilom. et au nord de celle de Mantcho, et se trouve sur la ligne-frontière de la Bulgarie. Ainsi qu'il a été dit plus haut, il existe également une hauteur de ce nom à 8 kilom. au sud de celle de Surgurlu.

Art. 3.—*Dans la description qui précède, lorsque la frontière suit une ligne naturelle, telle qu'une crête, un partage d'eau, un thalweg, il est toujours entendu qu'il s'agit de la ligne mathématique.* Toutefois les parties intéressées auront la faculté d'y substituer d'un commun accord, dans la pratique, un tracé formé par une ligne polygonale, ou s'appuyant sur des clôtures, sentiers, et chemins existants, pourvu que le dit tracé ne s'écarte pas sensiblement de la ligne mathématique, et qu'il laisse de part et d'autre de celle-ci des surfaces équivalentes. . . .

KRAHMER. — WURMBRAD. — L. NICOLAS. — R. GORDON. — D. TORNAGHI. — PHILIPPOFF. — CHAKIR.

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### **Mountains erroneously mentioned as POINTS OF THE WATER - PARTING, left outside of the Servian Boundary.**

#### Enclosure A.

[From Correspondence relating to the Congress of Berlin with the Protocols of the Congress, in *Blue Book* (C. 2083), p. 123.]

(Quoted on pages 832 and 833 of the Statement.)

*Annex 1 to Protocol No. 8. Frontier for Servia.*—(Map of the Austrian Staff.)

The line will follow the actual frontier by the thalweg of the Drina, leaving to the Principality Mali-Zwornik and Sakhar.

It will then continue to run along the old limit of the Principality as far as Kopaonik, from which it will separate at the summit of Kanilug. From there it will become identic with the western limit of the Sandjak of Nisch as far as the village Konçul, on the Morava, passing first by the crest of the southern counterscarp of Kopaonik, then by that of Maritza and Mrdar Planina (*forming the watershed between the basin of the Ibar and the Sitnica on one side, and of that of the Toplica on the other*), leaving the defile of Prepolat to Turkey, as far as Mount Djak, turning then towards the south by *the crest of the watershed between Brveniça and the Medvedja-Rjeka*, whence it will descend in an easterly direction between the villages of Petrilja and Dukat, to cross there the River Medvedja, and ascend the crest of the Goljak-Planina (*forming the watershed between the Kriva-*

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*Rjeka on one side, and the Poljanica, the Veternica, and the Morava on the other*), whence it will descend in a southerly direction to Končul, on the Morava, leaving that village to Servia. From this point the frontier will follow the Valley of the Morava, as far as Lusan, leaving that village to Turkey, whence it will proceed by Borovce and Novoselo, leaving these villages to Turkey as far as the summit of Mount Kujan. From that point the frontier will again become identic with the southern and eastern administrative boundary of the Sandjak of Nisch, *forming the watershed between the basins of the Vardar, of the Strouma, of the Isker, and of the Lom on one side, and of that of the Morava and of the Timok on the other.*

This administrative boundary is especially marked out by the crest of the S. Ilia-Planina, the summit of Mount Kljuc, the crest of the Babina Glava, the summits of Mounts Crni Vhi, Streser, Vilo Golo, Mesid, Ravna Siba, and Ogórelica, the crest of the mountains of Kosturnica-, Ljubas, Grloska-, and Visker-Planina. It then crosses the pass of the Sophia-Nisch road, near the village of Soline, whence it passes by the environs of the villages of Malovo, Murgas, and Gedic, and then in a straight line as far as the Ginci Pass, which would remain to Bulgaria. From that point it follows the crest of the mountains Kodza and Ciprovac-Balkan, then from the Stara-Planina, as far as the ancient eastern frontier of the Principality, near the Kula-Smiljova Čuka.

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### Enclosure B.

[From *Blue Book*, C. 2471 p. 254.]

*Captain Anderson to the Marquis of Salisbury.*—(Received  
September 2.)

SERVIAN BOUNDARY COMMISSION,  
BELGRADE, August 18, 1879.

MY LORD,—

With reference to my despatch of the 6th instant, I beg to submit the following report on some points which have arisen in the delimitation of the Turco-Servian frontier between Crni Camen and the Kopaonik :

I. MOUNT DJAK.—*In accordance with Article XXXVI. of the Berlin Treaty, the new frontier between Crni Camen, on the Poljanica Planina, and Prepolac follows the line of watershed between the basins of the Brvenica on the Turkish side, and the Medvidja on the Servian side.* The boundary, as shown on the Austrian Staff Map (see tracing No. 1), intersects Mount Djak, which is not mentioned in the Treaty. *On examining the ground it was found that Mount Djak was incorrectly marked on the map, and that its true position was as indicated in red, about 6 miles north-east of the principal line of watershed. The Commission were unanimously of opinion that the new frontier, in order to avoid crossing a valley, must follow strictly the watershed line, thus leaving Mount Djak in Servian territory.* The district of Mount Djak includes about twenty Albanian villages, the inhabitants of which had been led to believe that the new frontier would intersect Mount Djak, as shown in the map, and leave these villages to Turkey. Much discontent was expressed by the Albanians when it was found that the delimitation of the new boundary assigned these villages to Servia.

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### QUESTIONS RAISED AS TO THE WATER-PARTING IN THE DEMARCATION OF THE BALKAN FRONTIERS.

[From "Further Correspondence respecting the European Commissions appointed for the Demarcation of Frontiers under the Treaty of Berlin" in *Blue Book* (C. 2471).]

(Quoted on pages 832 to 836 of the Statement.)

(P. 126) *Captain Anderson to the Marquis of Salisbury.*  
(Received June 30.)

SERVIAN BOUNDARY COMMISSION, IN CAMP, SLAVINIA, 20 MILES  
EAST OF PIROT.

June 15, 1879.

MY LORD,—

With reference to my first despatch of this day's date, and the notes of the meetings of the 6th and 13th June therein enclosed, I beg to submit the following report on some points which have arisen in the delimitation of the Servo-Bulgarian frontier between the Stol and Mount Radocina, on the chain of the Kodja Balkan.

1. *The frontier has been marked along the watershed between the Upper Sukowa and the Morava, as specified in Article XXXV. of the Berlin Treaty, but it was found impossible to reach the Stol without leaving the watershed, the Stol being incorrectly marked on the Austrian Staff Map, and situated west of the watershed. Under these circumstances the Commission*

*have traced the frontier to the point where the watershed approaches nearest to the Stol.*

2. The Commission agreed that the frontier from the Stol to the intersection of the Sophia and Pirot road should follow natural features, approaching as nearly as possible to the direct line between the terminal points. In tracing this portion of the frontier it was found that the village of Goindol fell to Bulgaria. The Servian Commissioner was alone of opinion that Goindol should be assigned to Servia, in consequence of being so shown on the Treaty Map. On examining the ground, it was found that the position of this village was incorrectly marked on the map, and all the other Commissioners were of opinion that the line of frontier could not be traced so as to give this village to Servia without making a *détour* decidedly unfavourable to Bulgaria, Servia having already gained the villages of Cherevdal and Planinitza in this district by the adoption of a line following the natural features in lieu of a rigidly straight line. . . .

(P. 181) *Major-General Hamley to the Marquis of Salisbury.*—(Received August 11.)

BUYUKDRÉ, August 5, 1879.

MY LORD,—

I have the honour to inform you that the 24th séance of the Bulgarian Boundary Commission was held at Therapia on the 2nd August with the following results :

The western extremity of the frontier from Cadir Tepe to the frontier of Servia, visited lately by a delegation of the Commission, was discussed, and the following trace was adopted :

From Cadir Tepe to the valley of the Struma no difficulty exists in following the terms of the Treaty of Berlin. A ravine divides entirely the village of Jelesnitza from the one next south of it, and the frontier ascends there. *But, if "la ligne la plus courte" were followed from thence, the heads of two or three small valleys, constituting what the Treaty appears to have in-*

*dedicated by the "bassin de la Suha Reka," would have been cut across. It was, therefore, agreed to follow the line of watershed, which runs in a curve about 2 miles north of the shortest line to the summit of the hill named in the Austrian map Mont Gitka, but which has really another name, Mont Gitka being at a considerable distance.*

From the so-called Mont Gitka the line follows the watershed which approximates to the ancient frontier of the sandjak, and which is very erroneously represented on the Austrian map. After crossing the road from Kostendjil to Egri-Palanka, it still follows the line of watershed, diverging from the frontier line, as marked on the Austrian map, by making a loop to the westward of about two miles in depth. After including the basin of the Lepnica (extended in the Austrian map some 10 miles too far to the westward) it reaches Mont Crni Vrh by the crest of the Babina-Palona.

Thus the whole of the line, with the delimitation of which the Commission has been charged in the present year, from the Black Sea to Crni Vrh, has been unanimously fixed and described.

The two gaps left in the western portion of the Russian map are :

1. The chain of the Rhodope from Cadir Tepe to the point where *the frontier leaves the crest* to descend to the valley of the Struma ; and
2. From the middle of the crest of Karvena Jarbuka to the valley of the Lepnica.

In the first portion, as stated in a former despatch, the frontier line, concurrent with the watershed, lies along a mountain crest which for many months is covered deeply with snow, which is crossed by no roads, and is uninhabited. Should, therefore, the Russian map of this part be still unfinished when the work of the Commission is otherwise brought to a close, we may not consider it necessary to await its completion.

The second portion was that in which it was found so difficult and inexpedient to follow the old frontier of the sandjak, and where a new trace has been adopted in a populous district, and this is the part on which the topographical party sent by me is now engaged. I learnt by telegram from Uskup that they quitted that place on the 1st August, and no doubt reached the frontier, at latest, next day, arriving several days sooner than if they had gone by Philippopolis and Samakow. For this saving of time they were in a great measure indebted to the promptitude of Captain Pusey, who commands Her Majesty's ship *Bittern*, in which they were conveyed.

I have, etc.

E. B. HAMLEY.

(P. 186) *Captain Anderson to the Marquis of Salisbury.*—  
(Received August 12.)

SERVIAN BOUNDARY COMMISSION,

BELGRADE, August 6, 1879.

MY LORD,—

In continuation of my despatch of the 2nd July, I have the honour to transmit herewith notes of the proceedings of the Commission at the meetings of the 14th July, the 16th July, the 20th July, the 30th July, and the 6th August, drawn up by Lieutenant Ross of Bladensburg.

On the 7th July the Commission commenced the delimitation of the Servo-Turkish frontier northward from Crni Camen, to which point the frontier was marked last year. *The delimitation of the new frontier following a line of watershed, as laid down in Article XXXVI. of the Berlin Treaty*, was completed on the 12th July to a point about 2 miles south of Prepolac.

Several proposals as to the trace of the new frontier at Prepolac were examined on the ground and discussed on the 13th July and two following days, but without definite result,

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the Commission having failed to come to an unanimous decision. Arrangements were accordingly made for a survey of Prepolac on a sufficiently large scale to admit of the several proposals being accurately recorded on the survey plan.

On the 16th July the Commission proceeded with the tracing of the new frontier from a point 2 miles north of Prepolac, and followed the watershed line to Vralo, about 10 miles south of the Kapaonik. From Vralo the new frontier was traced to the Kapaonik, where junction was effected on the 20th July with the old Servian frontier.

On the same day the Commission arrived at an unanimous agreement respecting the trace of the new frontier at Prepolac, the Turkish, Austrian, and Servian Commissioners giving their acceptance conditionally, *ad referendum*, to their respective Governments. Acting on this agreement the Commission returned to Prepolac on the 23rd July, and marked the frontier there provisionally.

Since that date the Austrian and Servian Governments have signified their acceptance of the frontier marked at Prepolac, and the Turkish Commissioner has informed the Commission that the answer from the Porte may be expected within the next three days.

The Commission having completed the delimitation of the new Servo-Turkish frontier returned to Belgrade on the 28th July, and proceeded with the preparation of the record plans of the new frontier. The series of maps illustrative of the new Servo-Bulgarian boundary having been completed, a duplicate set was forwarded on the 3rd instant to the Bulgarian Commission, in accordance with the agreement reported to your Lordship in my despatch of the 15th June.

I have, etc.

S. ANDERSON, Captain R.E.,  
Her Majesty's Commissioner.

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(P. 187) *Notes of the 18th Meeting* (Servian Commission).

Meeting held at Prepolac, the 16th July, 1879.

All the Commissioners were present.

The proposition submitted by the French and Austrian Commissioners was discussed.

*The Italian and Russian Commissioners were of opinion that the watershed should be accepted as the frontier at Prepolac, modifying it only in so far as the road to Pristina was concerned, so that the communication there should be left free to the inhabitants.*

Major Velini produced the Report of the Italian Military Attaché at Berlin, who formed part of the Military Commission which sat at that capital during the Congress of Berlin. *This document formed part of his instructions, and it affirmed that the Austrian proposal for the frontier at Prepolac was the crest line.* Major Velini therefore believed that Count St. Vallier in his speech (Protocol No. 19, Congress of Berlin) *referred to the watershed*, when he explained that "Le Congrès n'a pas entendu pousser la concession au-delà du retour pur et simple à ligne Autrichienne."

The British Commissioner said that he had no knowledge of this document, nor of the view taken by his Italian colleague, that Count St. Vallier referred to the Austrian proposal made in the Military Commission at Berlin. *If the Congress had meant to embody that proposal in the Treaty they would have described the frontier as a watershed (as they had always done), and they would not have added "laissent Prepolac à la Turquie"; words which, according to Major Velini's explanation, appear to be superfluous. In fact, the Congress of Berlin must have been of opinion that Prepolac was either to the north or to the south of the crest line. If to the south, why is there any mention made of that village in the text of the Treaty, when it would naturally remain Turkish by tracing the frontier on the watershed? But if to the north, then the frontier would have*

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*to cross the crest in order to give the village to Turkey ; and if so, the Austrian line, according to Major Velini's interpretation, would no longer be an exact watershed, as it ought to be, to carry out the words of Count St. Vallier in the sense indicated by the Italian Commissioner. It seems to Captain Anderson, therefore, that the interpretation given by his colleague of Count St. Vallier's words involves a difficulty ; and that allusion was made instead to the Austrian Project printed as an Appendix to No. 8 Protocol, and defined with greater precision in No. 15 Protocol of the Congress of Berlin.*

Several modifications to the Franco-Austrian line were adopted. These were minor amendments, with a view to secure to Turkey the whole of the houses of Prepolac, and to give to Servia a pathway situated north of the crest line, as well as a site for a custom-house (see Sketch No. 2 annexed to the Notes on the 17th Meeting, the 14th July, 1879).

The proposition was then submitted to a vote, and accepted by the whole Commission except by the Ottoman Commissioner, who referred to his Government.

In the meanwhile it was decided to proceed towards Kanilug, and there to await the answer from the Porte.

### *Extract of Protocol of the Proceedings of the Commission for Eastern Roumelia ; Meeting of June 1, 1879.*

(Page 212) La Commission passe ensuite à la discussion du tracé de la frontière entre le Mont Vosna et Kara-Evren.

M. le Commissaire de Turquie fait la proposition suivante :

Du Mont Vosna jusqu'à un point situé à l'ouest du village de Kara-Evren, au croisement des routes Kara-Evren-Belevren, Tekenzio-Evreneskeui, la frontière suit la ligne géométrique de partage des eaux entre les affluents qui vont à la Mer Noire au nord et le bassin du Karanlik-Déré, les villages de Karanlik et de Kara-Evren restant à la Turquie. La ligne qu'il propose n'est que la continuation de celle qui a été suivie jusqu'à présent ;

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c'est une ligne naturelle qui réunit toutes les conditions voulues pour constituer une bonne frontière géographique.

M. le Commissaire de Russie accepte cette ligne jusqu'au point marqué A sur le plan ; de ce point, il propose de tracer la frontière suivant une ligne qui passerait entre les villages de Karanlik et de Kara-Evren, en laissant à la Roumélie Orientale ce dernier village ainsi que *la tête du bassin* de Karanlik-Déré, et aboutirait du point terminus du tracé proposé par M. le Commissaire de Turquie. Il justifie sa proposition par les considérations suivantes :

Le texte du Traité de Berlin dit que la frontière passe entre Belevrin et Alatli et rejoint le Mont Vosna en laissant le village de Karanlik au sud ; il se borne, comme on le voit, à donner des points de direction sans spécifier le moins du monde que la frontière doive suivre le partage des eaux entre le Karanlik-Déré et le Faki-Déré.

Le tracé qui semble à M. le Commissaire de Russie le mieux répondre aux conditions énoncées dans le texte qu'il vient de rappeler est celui qui, contournant au nord et à l'ouest le village de Karanlik, passerait entre ce dernier village et celui de Kara-Evren et prendrait ensuite une direction dont le prolongement irait aboutir au point de partage situé entre les villages de Belevrin et d'Alatli. La ligne qu'il propose satisfait à ces conditions.

M. le Commissaire de France fait observer que la ligne de partage proposée par M. le Commissaire de Turquie se continue depuis le point de croisement de route où s'arrête le tracé actuellement en discussion jusqu'au village d'Alatli, où elle rejoint la ligne de partage, que, d'après le Traité, la frontière doit suivre jusqu'à Buyuk-Derbend. Suivant toute probabilité, la Commission adoptera comme frontière le prolongement dont il s'agit entre le point de croisement et Alatli. Dans ces conditions, en se plaçant au point de vue invoqué par M. le Commissaire de Russie, il faudrait, pour que les intérêts des deux parties fussent sauvegardés, que la ligne-idéale tirée du point de part-

age entre Belevrin et Alatli tangentiellement à un cercle ayant Karanlik pour centre et un rayon de 3 ou 4 kilom., laissât de chaque côté d'elle des surfaces équivalentes. Or, il suffit d'examiner la Carte Autrichienne pour se convaincre que le tracé proposé par M. le Commissaire de Turquie satisfait pleinement à ces conditions : et c'est au point de vue de M. le Commissaire de France une raison de plus pour l'accepter.

M. le Commissaire de la Grande Bretagne se rallie à la proposition de M. le Lieutenant-Colonel Chakir Bey pour les raisons suivantes :

1. *D'une manière générale, toutes les fois que la frontière quitte un partage d'eau, il en est fait expressément mention dans le text du Traité : or, celui-ci n'en dit pas un mot pour le cas qui nous occupe.* D'ailleurs, quelle raison auraient eue les auteurs de ce Traité pour délaisser partiellement, sur une longueur de quelques kilomètres, *une ligne naturelle* qui s'étend sans interruption de Buyuk-Derbend à la Mer Noire ?

2. Le tracé proposé par M. le Commissaire de Russie, qui attribue à la Roumélie Orientale la tête du bassin de Karanlik, serait à son avis une mauvaise solution au point de vue administratif ; car une pareille ligne de démarcation sera toujours difficile à retrouver sur le terrain et pourra donner lieu à des contestations entre les populations intéressées.

M. le Commissaire de la Grande Bretagne croit donc rester à la fois dans la lettre et dans l'esprit du Traité, en votant pour la ligne de partage.

M. le Commissaire d'Autriche-Hongrie dit qu'à son avis le Traité de Berlin n'oblige nullement la Commission à suivre la ligne de partage ; car, d'après lui, si les auteurs du Traité avaient eu l'intention formelle de prendre cette ligne pour frontière, ils n'auraient pas manqué d'en faire expressément mention. La ligne proposée par M. le Commissaire de Russie est nettement indiquée par des accidents topographiques, puis-qu'elle suit des partages d'eau secondaires ou des fonds de vallées. A ce titre elle lui paraît pratiquement acceptable.

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M. le Commissaire de Russie développe des considérations analogues et arrive aux mêmes conclusions.

M. le Commissaire d'Italie reconnaît que le texte du Traité peut à la rigueur être interprété dans le sens indiqué par M. le Commissaire d'Autriche-Hongrie ; mais il se demande quelles sont les raisons majeures qui peuvent faire préférer à une ligne naturelle formant une limite excellente, une ligne artificielle qui ne saurait donner, à son avis du moins, qu'une frontière pratiquement mauvaise. *On ne pourrait, suivant lui, justifier l'adoption de cette dernière, que par le désir de laisser à la Roumélie Orientale le village de Kara-Evren. Or, comme le texte du Traité ne dit rien à ce sujet et laisse toute liberté à la Commission, il vote pour la solution qui lui paraît la meilleure au point de vue pratique et qui lui semble le mieux répondre à l'esprit du Traité, c'est-à-dire pour la ligne de partage.*

M. le Commissaire d'Autriche-Hongrie objecte que si l'intention du Traité de Berlin avait été de laisser Kara-Evren à la Turquie, on aurait mis dans la texte que la frontière passe au nord de Kara-Evren et non pas au nord de Karanlik.

M. le Commissaire de France répond que si l'intention formelle du Traité avait été de faire passer la frontière entre Karanlik et Kara-Evren de façon à laisser ce dernier village à la Roumélie, cette intention aurait été énoncée explicitement, comme dans le cas des deux villages de Belevrin et de l'Alatli.

La discussion étant close, M. le Président met aux voix la proposition de M. le Commissaire de Turquie, qui a été faite la première. Cette proposition est acceptée à la majorité de 4 voix contre 2.

Ont voté pour : MM. les Commissaires de France, de la Grande Bretagne, d'Italie, et de Turquie.

Ont voté contre : MM. les Commissaires d'Autriche-Hongrie et de Russie.

A déclaré s'abstenir du vote, M. le Commissaire d'Allemagne.

KRAHMER.—WURMBRAND.—L. NICOLAS.—R. GORDON.—  
D. TORNAGHI.—COUMMERAU.—CHAKIR.

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(P. 252) *Captain Anderson to the Marquis of Salisbury.*  
(Received September 2.)

SERVIAN BOUNDARY COMMISSION,  
(Extract.) BELGRADE, August 18, 1879.

With reference to my previous despatch of this day's date, informing your Lordship that the line of frontier marked by the Commission at Prepolac had been accepted by all the Commissioners, I have now the honour to submit the following details on this subject.

I received at Prepolac, on the 14th July, your Lordship's despatch dated 5th July, 1879, instructing me to give Serbia in the settlement of that portion of the frontier which had not been already fixed a means of defence against the population of the border territory. I was also in receipt of a copy of your Lordship's despatch to Mr. Gould dated 19th June, 1879, transmitted to me for my information, expressing the wish of Her Majesty's Government " that the settlement should be equitable and satisfactory to all parties concerned, so as to remove all occasion or opportunity for future conflicts."

In order to effect that result with the greater certainty, it was necessary to give to the Servians a defensive line at Prepolac to enable them to oppose the inroads of the Albanians, and at the same time to ensure that such a line should not prove a menace to the inhabitants of the valley of the Lab.

*The watershed line drops almost into the plain about 6 miles south of Prepolac.* The military position of the Turks in the upper valley of the Lab is, therefore, liable to be turned, and the only natural position for defending this portion of the Ottoman Empire is to be found 15 miles to the south where the Lab flows through a narrow defile to the north of Pristina. If then the Turks possessed no position at Prepolac, it would inevitably happen that their troops would never be stationed in the upper valley of the Lab, and the whole country bordering on Serbia, as far as the defile near Pristina, would be evacuated.

Now the plain of the Lab is inhabited entirely by Albanians who have no fear of the Servians, and who will avail themselves of every opportunity to invade the territory assigned to Servia by the Berlin Treaty. They have some respect for the Ottoman troops, and, therefore, while the Servians should have ample means to prevent a wild but brave population from invading their territory, it was also necessary to give the Turks the means of establishing troops at Prepolac for the maintenance of proper order in the valley of Lab.

It is also to be observed that if an offensive military position were given to the Servians at Prepolac, in the event of a war with Turkey, they would be able to advance almost without opposition to a position in dangerous proximity to Pristina and to the Salonica-Mitrovica railway.

There was a very strong feeling among several of the Commissioners, namely, the German, the Russian, and the Italian, that *the frontier should follow the strict watershed line*, avoiding the latter only where it cuts the road from Kurshumlie to Pristina, for the benefit of the inhabitants at Prepolac, and this view was fully shared by the Servian Commissioner. I have already informed your Lordship, in the notes of the meeting of the 16th July, enclosed with my despatch dated the 6th August, that the Italian Commissioner based his opinion on the Report of the Military Commission at Berlin, copy of which Report was not in the possession of any of the other Commissioners. The German Commissioner was also of a like opinion, believing that, if the Congress had wished to give to Turkey the southern débouché of the defile or the position of Prepolac ("la place" mentioned in the Protocols at Berlin), the words "la place" would have been inserted in the text of the Treaty. This view received some support from the line drawn on the Treaty map, the scale of which was, however, too small to establish this opinion conclusively.

Such a trace would have entirely prevented the Turks from

occupying any territory near Prepolac, while the Servians, who have positions in rear of the crest line, would, in case of war, be able to seize at once the crest, and commence the offensive movements towards Pristina previously mentioned. My French and Austrian colleagues agreed with me in the opinion that such a frontier was inadmissible.

The Austro-French proposal given in the notes of the meeting of the 16th July embodied the idea of completely freeing the road, and enabling thereby the Porte to establish troops at Prepolac. It gave to the Turks a useful knoll which, while serving as a screen for the higher and more important position, overlooked the northern slope of the defile.

This project, after some difficulty, was accepted by the whole Commission, excepting the Ottoman Commissioner, who referred the question to his Government.

On the 20th July, when the Commission had completed the delimitation of the new frontier on the Kopaonik, the Turkish Commissioner proposed a new line, which, being accepted by the Servian Commissioner, was also agreed to by the whole Commission and marked on the ground provisionally, the Turkish, Austrian, and Servian Commissioners giving their vote conditionally *ad referendum* to their respective Governments.

These Governments have now definitely accepted the votes of their Commissioners.

This new line follows the watershed for a certain distance, and then leaves it so that the road from Prepolac to Pristina is completely freed. It is preferable to the Austro-French line in not being tortuous, in avoiding the descent into a deep and wooded valley to the north-west of Prepolac, and in leaving the Albanian village Chishniak to Turkey, which is a gain to both sides. Both have a fairly defensive position, where they can maintain themselves with less cost or warlike preparation. In time of war both sides would have equally the chance of

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seizing and establishing themselves on the crest, without which the Servians have, by the configuration of the ground, no facilities for massing troops in this neighbourhood.

The line as now marked on the ground is, therefore, in my estimation, a fair determination of the frontier as stipulated in the Berlin Treaty. It is the best for both parties concerned, and gives all necessary facilities, at this important point of the boundary, for the repression of those incursions which have led to constant conflicts between the Albanians and the Servians on the border.

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### THE TURCO-GREEK BOUNDARY AS DECIDED BY THE DELEGATES OF THE POWERS ON JULY 15, 1880.

[From Correspondence respecting the Rectification of the Greek Frontier,  
*Blue Book* (C. 2760), p. 42.]

(Quoted on page 839 of the Statement.)

*Mr. Goschen to Earl Granville.*—(Received July 16.)  
(Telegraphic.)

CONSTANTINOPLE, July 15, 1880.

The German Ambassador at Doyen presented the following  
collective note to-day :

“ Constantinople, le 15 Juillet, 1880.

“ Les Soussignés, Ambassadeurs ou Ministres, etc., près  
Sa Majesté l'Empereur des Ottomans, ont l'honneur de remettre  
à son Excellence le Ministre des Affaires Etrangères de la  
Sublime Porte la note ci-après, d'ordre de leurs Gouvernements.  
Le Congrès de Berlin, ayant indiqué dans son 13<sup>e</sup> Protocole les  
points principaux de la ligne-frontière qu'il jugerait néces-  
saire d'établir entre la Turquie et la Grèce, les Puissances ont  
fait appel d'abord à des négociations directes sur cette base entre  
les deux Etats. A deux reprises, dans les Conférences de Preveza  
et de Constantinople, les Commissaires Turcs et Grecs, après de  
longs pourparlers, n'ont abouti qu'à constater leurs diver-  
gences; en présence de ces tentatives infructueuses, les Puissances

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désignées par le Traité de Berlin ont jugé nécessaire d'interposer leur médiation.

“ Cette médiation, pour être efficace, devait s'exercer dans toute sa plénitude, et les Cabinets, en présence des dispositions réciproques des deux Etats intéressés, ont prescrit à leurs Représentants réunis en Conférence à Berlin, de fixer, en se conformant aux indications générales du Protocole No. 13, une ligne qui constituât entre la Grèce et la Turquie une bonne et solide frontière défensive.

“ Les Plénipotentiaires, après la discussion la plus attentive, éclairés d'ailleurs par les avis des Commissaires Techniques délégués par leurs Gouvernements, ont voté à l'unanimité, suivant les termes de leur mandat, le tracé contenu dans l'Acte suivant qui résume et clôt leurs délibérations :

“ Les pourparlers engagés entre la Turquie et la Grèce pour la rectification de leurs frontières, n'ayant point amené de résultat, les Soussignés, Plénipotentiaires des Puissances appelés par les prévisions de l'Acte du 13 Juillet, 1878, à exercer la médiation entre les deux Etats, se sont réunis en Conférence à Berlin, conformément, et après mûre délibération, s'inspirant de l'esprit et des termes du Protocole No. 13 du Congrès de Berlin, ont adopté à l'unanimité le tracé suivant :

*“ La frontière suivra le thalweg du Kalamas depuis l'embouchure de cette rivière dans la Mer Ionienne, jusqu'à sa source dans le voisinage de Han-Kalibaki, puis les crêtes qui forment la ligne de séparation entre les bassins.*

*“ Au nord de la Wouitza, de l'Haliacmon, et de Mavronéri et leurs tributaires.*

*“ Au sud, du Kalamas, de l'Arta, de l'Aspropotamos et du Salambryas (Pénée ancien), et leurs tributaires, pour aboutir à l'Olympe, dont elle suivra la crête jusqu'à son extrémité orientale sur la Mer Egee.*

“ Cette ligne laisse au sud le Lac de Janina et tous ses affluents, ainsi que Metzovo, qui resteront acquis à la Grèce.

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“ Les Soussignés ont l'honneur de soumettre aux Puissances dont ils sont les Représentants et les mandataires la présente décision, afin qu'elles veuillent bien l'approuver et la notifier aux parties intéressées.

“ Fait à Berlin, le 1<sup>er</sup> Juillet, 1880.

“ HOHENLOHE.—ST. VALLIER.—LAUNAY.—SZÉCHÉNYI.—ODO  
RUSSELL.—SABOUROW.”

## No. 99.

### THE TURKO-GREEK BOUNDARY AS FIXED BY CONVENTION ON MAY 24, 1881.

[From the Despatch from Mr. Goschen forwarding the Convention for the Settlement of the Frontier between Greece and Turkey," in *Blue Book* (C. 2912), p. 7.]

(Quoted on page 840 of the Statement.)

THE new frontiers of Turkey and Greece are fixed as follows :

The new frontier line starting from a point near the defile of Karalik-Dervend, between the mouth of the Salamvrias and Platamona, about 4 kilom. to the south of the latter point, follows in a westerly direction the crest of the mountains, passes first between Krania and Avarnitza, then between Nezeros and Analipsis, arrives at the summit of Mount Godaman, then descends towards the south, *following the crest of Olympus*, reaches the summit of Kokkinopetra, and, taking *a westerly direction from this point without leaving the same crest*, passes between Ligara and Derveni-Melona, and arrives at the summit of Mount Kritiri. Thence turning towards the south the line gains the right bank of the Xeraghis, and, following *the line of watershed towards the south-west*, gains the summit of the heights situated to the north of the village of Zarko, then turns to the north-west in the direction of Diminitza *and keeps to the line of watershed*, leaving to Turkey the village of Elevtherokhorion. Before reaching Diminitza, at a distance of about 18 kilom. from that place, the frontier line turns towards the west, *still on line of watershed*, and passes by the villages of Flamouristi, Gavranon and Georgitza to the summit of Mount Kratchovo.

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Then *turning southwards by the crest*, it passes by the summits of Mounts Zygos, Dokini, and Peristeri, and gains the River Arta, following the stream which carries off by the shortest way the rainfall from the summit of Mount Peristeri to this river, and passing near the villages of Kalarhytes and Mikalitzì. Beyond these last points the line follows the thalweg of the River Arta to its mouth.

This delimitation will be fixed on the spot by a Commission composed of the Delegates of the Six Powers and of the two parties interested.

The Delimitation Commission will pass their resolutions by a majority of votes, each Power having but one vote.

It should meet within eight days after the ratification of the present Convention, or sooner if possible, so as to commence its labours.

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### IDENTITY OF "CRÊTE" WITH "THE MATHEMATICAL LINE" OF THE LINE OF WATER-PARTING.

#### The "Scientific Water-Parting" in the Turco-Greek Delimitation.

[From *Blue Book C.* 3137 ; Correspondence respecting the rectification of the Greek Frontier, pp. 129, 130, 133, 134, 135, 136, 137, 138, 139, 140.]

(Quoted on pp. 840, 844, 845 of the Statement.)

*General Report by Major Ardagh on the Delimitation of the  
new Turco-Greek Frontier.*

(P. 129). THE new Turco-Greek frontier is described in Article 1 of the Convention between the Six Great Powers and the Sublime Porte, signed at Constantinople on the 24th May, 1881.

That document, in so far as the description of the line is concerned, is a transcript of the proposition of the Sublime Porte, dated 23rd March, 1881, with the sole exception of the paragraph relating to the line between Mount Fritiri and Zarkos, which in the Ottoman note ran as follows :

" . . . et arrive au soumet du Kritiri. De là se dirigeant vers le sud, la ligne-frontière passe à la rive droite du Xeraghis, en la coupant perpendiculairement à la distance la plus courte, et suivant *la ligne de partage des eaux* vers le sud-ouest, elle gagne le soumet du mont situé au nord du village de Zarkos."

This text was communicated by the Representatives of the

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Powers to their respective Commissioners for the delimitation of the frontier, with the recommendation to follow, as far as possible, *the crests of the mountains* between the River Xeraghis and the heights north of Zarkos.

The Porte subsequently sent to the Representatives of the Powers a description drawn up by the Ottoman General Staff.

This was likewise communicated by the Ambassadors to their respective Commissioners, with the recommendation to conform to it in so far as it was not in contradiction with the original text already quoted.

No map is referred to in Article I of the Convention, but a map with the line of the frontier marked upon it was prepared by the Ottoman Plenipotentiaries, and attached to the Annex relating to the evacuation of the ceded territory.

(P. 133) The summit of Peristeri is the culminating point of the mountain mass from which descend the higher affluents of the Aspropotamos and the rivers of Metsovo and Kalarrytais, the two last falling into the Arta. This western branch of Mount Pindus, as it passes southwards, breaks up into the Kakardista and Djumerka ranges, both of which have summits exceeding 7000 feet in height.

The new frontier on leaving Peristeri *follows the water-parting* between the Aspropotamos and the river of Metsovo along a series of very steep and rugged crests, whose *arêtes* are almost impassable. It then descends to the col of Hodja Mandria, on the road from Metsovo to Khaliki, a road only passable for pack animals. It then ascends by a series of elevated spurs with rounded grassy summits and steep slopes, covered in parts with beech forests, to the summit of Mount Dokimi, where it attains the *main chain of Pindus on the water-parting between the Egean and Ionian Seas*, which separates Thessaly from Epirus. Thence, turning northwards between the basins of the Salamvrias (Peneus) and Arta (Aracthus), it traverses

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the col of Zygos, over which passes the main road between Thessaly and Epirus. The name of Zygos, or Yoke, is applied to all cols generically with a locative epithet, *but the Zygos of Metsovo is too widely known to require this qualification*. It will be seen from the map that it is the sole point where only a single range of mountains intervenes between Thessaly and Epirus, and the route therefore possesses such advantages that long détours are made on either side to arrive at it. For instance, to reach Arta from Larissa, it is customary for travellers and pack convoys to cross by Metsovo, instead of taking the shorter but more mountainous track across the valley of the Aspropotamos. The highest point of the road lies in a natural gap between two steep declivities. On the side of Epirus the slopes are very rapid, and the road is artificially revetted with stone and timber near the summit. Towards Thessaly a series of spurs project from the principal range, forming numerous valleys, whose *waters* descend into the Salamvrias, whose *source* may be placed at an abandoned han close to the col. While the Epirote side is almost denuded of timber, the Thessalian is in parts thickly wooded with both umbrageous and coniferous trees. This is mainly attributable, on the former side, to the steepness and rocky character of the flank of the mountain, and to the absence of movements of ground affording shelter from sun and wind, and likewise to the large quantity of fuel required by the population of Metsovo; while, on the latter, the spurs running out to the eastward furnish shade and protection to the intervening valleys, and the woodcutter has a longer distance to traverse.

The road from Janina to Trikala is said to have been made carriageable by the celebrated Ali Pasha. Traces of ameliorations still exist, but of the numerous bridges scarcely one remains; and it certainly was never, even for a short period, generally used for wheeled vehicles. It is at the present time only adapted for pack traffic, and a very large expenditure,

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and indeed a completely new trace, would be requisite to render it carriageable, the difficulties being greatest on the Epirote side.

The Zygos col is not the only point of passage. At a short distance on either side there are other tracks, of which, however, only that to the north, which leads from Metsovo to the Malakassi district, appears to be much used. All three, however, pass by Metsovo, and hence arises the importance of this post from a military point of view, as it commands them all. The fort of Metsovo, a mere defensible enclosure formed by indifferent masonry walls of no great height, standing in the middle of the town, is completely commanded by the adjacent hills, and is rather a military dépôt than a work of defence. The favourable position of the locality will, however, always preserve for it a certain amount of value.

At the col of Zygos the rounded grassy summits of Dokimi are replaced by rugged crests, sparsely wooded and rising to conical summits, of which Mount Zygos is the most lofty (5780 feet). At this point a range diverges to the north-west, forming the *water-parting between the basins of the Arta and the Voiussa*, and extending through the Zagori district towards the sources of the Kalamas, by the line proposed as a frontier at the Conference of Berlin. From Mount Zygos to the village of Tchouka the Conference line is identical with that of the Convention of Constantinople.

Two miles northward, at the summit called Tabouria Athanasaki, the new frontier leaves the *main water-parting of the Pindus range*, which, continuing in a north-westerly direction by the summits of Samarina and Palimayero, separates the basins of the Voiussa and the Haliakmon, while the frontier *divides that of the latter* river from the Salamvrias. On this mountain chain most of the villages are Vlach, the principal being Perivolia, Avdela, and Samarina. Their male population is largely non-resident during the greater part of the year, their avocations of shepherds and carriers inducing a sort of

nomad existence dependent on pasture and trade. These villages are consequently more exposed to brigandage than the purely agricultural ones, and have suffered more severely.

The boundary now takes a westerly direction by the wooded summits of Mavrovouni and Pade Skunta, crossing the road from Malakassi to Perivolia. It mounts to 5000 feet at the southern summit of Sdriannou, which is cultivated, and thence follows a ridge to the north of the village of Kutchevleni, to the north of which it passes over a col (3740 feet) by which a stream, derived from the Perlana, an affluent of the Haliakmon, is led in an artificial channel across the frontier to furnish water to the village.

Pursuing a devious course over features rising but slightly above the adjacent valleys, it passes successively the col of Stavro-Dromi (cross-roads), Tsigan Klisia (gypsy's church), the Bimbashi's grave, and leaving the village of Boltinon to the north, ascends Mount Katafiki, the most western spur of the Kratchovo or Gribovo Mountains, which extend from hence in a south-westerly direction between the Generaliotiko and the river of Kapoplevri. Both flanks are covered with forest, and the principal summits are about 5000 feet above the sea.

The Convention makes no mention of any name between the summits of Kratchovo and Zygos, *merely specifying that the frontier follows the crest southward*. The Ottoman Commissioner submitted *an interpretation* of this portion of the description, according to which the name of *Mount Zygos was to be attributed to a summit to the east of Mount Dokimi, called Evmorphi Rakhi (the well-shaped ridge)* near a col named the Zygos of Kastania. From this point a line was to be drawn by a mountain called Kizil Tépé (the red hill) across the Salamvrias near Malakassi Han, and thence to Mount Kratchovo. In compliance with his request, I included all the ground over which his line might pass, in the survey. *The fact of its crossing the Salamvrias valley was evidently a fatal objection, which*

the map, when completed, only demonstrated more decisively, and this proposition was subsequently withdrawn. While engaged on this portion of the work near Kizil Tépé, Lieutenant Levenson's escort perceived a band of brigands and fired on them, but without effect.

Reverting now to Mount Kratchovo, it appears that the point to which this name is attributed, on the Austrian and other maps, is *by no means the highest summit*. *The line of water-parting* between the Salamvrias and Haliakmon leaves the range at a hill called Fonika, *and follows a series of ridges of but slight elevation over the adjacent country*, passing by a church called Agios Elias ; to the south of the village of Bozovo ; to the west of the village and monastery of Saghiades ; across a col on the Nostrovo-Georgitza road ; after which it mounts to a summit named Djumanalta, and follows a series of wooded ridges to the village of Velimisti, *where it descends to a broad col with gentle slopes on either side*, over which passes the principal road from Kalabaka to the Haliakmon Valley. The gradients on either side are very gentle, and the road might very easily be made carriageable.

(P. 135) From the col of Velemisti the frontier mounts to a series of wooded hills between the villages of Tchapurnia and Kerasia, leaving to the south the Valley of Mikhani, beyond which rises the rock-bound promontory which projects southward to the Salamvrias at Kalabaka, and terminates in the remarkable pinnacles on which are perched the monasteries of Mekteora, opposite to which, on the south bank of the river, rises the great chain of Kodjaca, which separates the upper plain of Thessaly (Thessalotis) from the basin of the Aspropotamos.

At Aspri-Klisia (white church) *the frontier crosses another open col*, forming an easy communication with the Plain of Philuria, watered by the Soutza, one of the affluents of the Haliakmon. This plain, containing the villages of Snitza,

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Kommati, Katakali, Nubanitza, Ismiatch, Greosi, and Kalapodi, extends northward to the foot of Mount Diskata, one peak of which is called Bounassa, from a monastery of that name. This mountain, forming the western abutment of the ancient Cambunian range, is situated at the point where the Haliakmon, after flowing southward from the Lake of Kastoria for a distance of 45 miles, turns sharply to the north-eastward towards the head of the Gulf of Salonica.

Passing the churches of Agia Paraskevi, Agios Athanasios, and leaving the villages of Klitzotades and Kerasia Sinon to Greece, and that of Tchuka to Turkey, the frontier arrives at the church of Agios Elias, on a bare rounded hill 4100 feet in height, conspicuous for many miles around. *At this point it leaves the watershed between the basins of the Haliakmon and Salamvrias to follow that between the latter and the Xeraghis.* A gently sloping saddle between the villages of Agios Georgios and Pertchounia forms the continuation of the former *watershed northwards* in the direction of Diskata, and corresponds with the line of frontier proposed at the Conference of Berlin.

From Agios Elias, the new boundary passes westward, over a series of rounded, grassy summits, with a few scattered trees to a mountain called Mitritza, leaving to Greece the ruined church Agios Elias, and the villages of Mavreli, Akhelnada, and Longos. At Mitritza it enters a thickly-wooded region, and curves to the southwards in a semicircle about 5 miles in diameter, to arrive on a lofty forest ridge extending transversely across the general line of watershed, and shutting out the view along it. Leaving this ridge at Mount Barberi, it passes southwards over a col marked by an ancient beech tree with innumerable stems called "Evdominda Adelphi" (the seventy brothers), and mounts a wooded conical hill called Mamoli, beyond which it pursues an irregular descending line to the west of Simolia, and drops into a valley south of that

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village at *the water-parting* between the streams Smoliotiko and Mavrovero, the former of which falls into the Xeraghis, near Vlachogianni, and the latter, turning southward, into the Salamvrias below Trikala. Ascending to the crest of another transverse ridge called Tsevrekho, whose northern slopes are wooded, it turns eastward along it to the village of Panissa, overlooking the valley of the Xeraghis, with the villages of Amouri, Demeniko, and Mologousta at the western foot of the mass of Mount Kritiri. *The water-parting cuts off* the northern house of the village from the rest which lie on the Greek side. The Commission considered itself justified in including the detached house within the ceded territory ; *but the villagers, nevertheless, had determined to move it* across the strict line of frontier, and, I understand, have since carried out their intention.

South of Panissa, *the frontier follows a number of bare knolls by the ruins of the churches of A. Athanasios and A. Elias, to descend southwards into the plain of Elevtherokhorion*, and follow some gentle undulations towards the ruins of an ancient fortress, apparently Byzantine, standing on a promontory overlooking the village of Gritzianon, which is situated below in the Thessaliotic plain. At this point it again turns eastward along rounded features of little elevation, separating the plain of Elevtherokhorion from the steep slopes descending southwards to the Salamvrias Valley, and having passed the Church of Agios Elias, mounts the rugged marble slope of Mount Koutra, which corresponds with the "*heights north of Zarkos*" named in the Convention.

Mount Koutra forms the northern, and Mount Babou the southern, extremity of an elevated ridge abutting on the Salamvrias near Zarkos, which lies in the Thessaliotic plain at the foot of its western slope. *The range is continued on the southern bank of the river, under the names of the Dobrudji Dagh, Kara Dagh, etc., to the chain of Othrys, on the old frontier ;*

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and it forms the division between the upper Thessalian plain (Thessaliotis) and the lower Thessalian plain (Pelasgiotis). *The Gorge of Zarkos*, between Mount Baboo and the Dobrudji Dag, is, for the Thessaliotic plain, what the Vale of Tempé is for the Pelasgiotic, the sole exit for its waters, and a compulsory point of passage towards which all the principal lines of communication converge.

In the middle of this gorge a small knoll, projecting from the northern side, affords an excellent position for watching the road in either direction. Some masonry ruins show that it is the site of an extensive ancient building, and in modern times it has revived in importance under the name of the Kulé, or guardhouse of Zarko, mentioned in the communication from the Sublime Porte dated 4th July, 1881.

The road connecting the Thessaliotic and Pelasgiotic plains bifurcates here, one branch of it passing southwards to a ford or ferry on the Salamvrias, from whence it arrives, by the south bank, at Larissa; the other continuing along the north bank, and affording the only road practicable at all seasons, irrespective of floods in the rivers. A branch of this latter road crosses into the valley of the Xeraghis below Damasi, and forms the communication with Turnavo.

*The importance of this defile of Zarkos, both from a commercial as well as from a military point of view, cannot be over-estimated.* If a railway is ever constructed from the Aegean coast to Larissa, Trikala, and the interior, it is by this gorge that it must pass; and in winter, when snow lies on the mountains, and when the plains are flooded, it is the sole communication on the north bank.

Descending the Salamvrias through the defile, the plain of Larissa lies open to the east; but the river, instead of taking what would seem to be the natural direction eastward, passing to the south of Kotzokhero, turns northwards towards the Xeraghis, and, arriving at the middle of the connecting valley,

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by another freak of nature, resumes its original direction, and makes its final débouché *through a narrow gorge* bounded by cliffs rising 1200 feet above it close to the village of Gounitza, which corresponds with the Goumtcha of the Turkish note. This second gorge, called the defile of *Kalamaki*, lies between *two independent mountain masses called Sidheropaloukhi and Gounitza*.

To the north of Sidheropaloukhi a similar gorge forms the débouché of the Xeraghis, beyond which rises another mountain mass enclosed on the south and west by that river, on the north by the plain of Ellassona, and connected with the lower Olympus by the col of Meluna. On all previously existing maps the name of *Kritiri* has been assigned to this group of mountains, or to its highest point. The Austrian map indicated as well another summit named Gavani, and the map of Khrysokhoos yet a third named Losfaki. Both the latter names are identified without difficulty on the ground, but with reference to *Kritiri* a controversy arose which has given rise to very divergent opinions.

The Ottoman Commissioners indicate as *Kritiri* a small knoll situated on a spur close to the north of Turnavo. The name *Kritiri* in this case is, the Greek Commissioner avers, but a vulgar corruption of *Akroterion* (promontory). In any case it was regarded by myself and by my colleagues, with the exception of the Ottoman Commissioner, as not being identical with the *Kritiri* of the Convention. The Greek Commissioner on the other hand maintains that *Pappalivadho*, the highest summit of the mountain mass between the plains of Ellassona and Turnavo, and the great bend of the Xeraghis, correspond to the *Kritiri* of the Convention. I share his opinion ; but my other colleagues, while abstaining from pronouncing absolutely in favour of another locality, have not accepted as proved beyond dispute the allegation that *Pappalivadho* corresponds with *Kritiri*.

(P. 138) Reverting now to the frontier between Mount Kritiri and the heights north of Zarkos: there were three lines before the Commission—the Turkish proposal, the Greek proposal, and the line proposed by some of the neutral members.

The Turkish line is that described in the communication from the Sublime Porte dated the 4th July, 1881: “ De Kritiri à Tripmeni, et de là traversant la Rivière de Xeraghis par Bey Dermeni, elle monte au sommet de Chidropaluiki, et suivant la chaîne de Ortadjiler et Tschatallar au mont de Goumtcha, elle passe par le défilé de Kalamaki, pour arriver directement au Koulé du corps de garde de Zarkos, et de là elle gagne le sommet du mont situé au nord du village de Zarkos.”

*This description makes no mention of the River Salamvrias, which it crosses twice, and is in such glaring contradiction with both the original Ottoman declaration and the text of the Convention that it is unnecessary here to recapitulate the objections opposed to it by the Commission, and endorsed by the Ambassadors in their note dated November 1881.*

The Greek line started from the summit of Pappalivadhō and followed a line of crest in the direction of Damasi, crossing the Xeraghis immediately to the south of that town, and mounting at once to the line of crest which runs thence in a south-westerly direction to Mount Koutra (or the summit north of Zarkos).

The line adopted by the majority of the Commission follows the Turkish line as far as the summit of Sidheropaloukhi, where it turns along *the line of water-parting* between the Salamvrias and Xeraghis, joining the Greek line near Damasi, and thence coinciding with it to the heights north of Zarkos. It is therefore a compromise between the two extremes, the Greek Commissioner approving of the southern portion of it, and the Turkish Commissioner of the northern portion; *the central portion, too, having the theoretical advantage of being an*

*exact continuation of the water-parting between the Xeraghis and Salamvrias, a principle which regulates the rest of the frontier between these rivers.* The divergence between the Greek line and the Commission line is essentially confined to the part north of the Xeraghis. The Greek line is the shortest, the most difficult to pass, and the most easy to defend, and in these respects is superior to any other that could be chosen, irrespective of other considerations, between Kritiri and Zarkos. It diverges a little to the west of the southerly direction prescribed for the frontier between the summit and the river, but not so much as the other line diverges to the east. It should, however, not be forgotten that most of my colleagues do not commit themselves to the acceptance of Pappalivadho as Kritiri. I, who am thoroughly convinced of it, was consequently unable to concur in their arguments against the Greek line. Finding, however, that all my colleagues of the Mediating Powers were of accord, and recognizing, moreover, the recommendation of the Plenipotentiaries to conform to the indications of the communications of the Porte dated the 4th July, 1881, in so far as they were not in contradiction with the original text of the Ottoman proposition, I accepted the proposition of my colleagues, sacrificing for the sake of unanimity my own views.

The next controversy which arose was on the subject of Kritzovali (or Gurtchova of the Ottoman Commissioner). The foundation of the Ottoman claim is based on the fact that this village lies *in a hollow basin with no superficial outlet, and therefore has as crest on either side, its surface drainage finding an exit by a subterranean channel, as is not uncommon in Greece and Albania. As such areas of depression strictly belong to the river basins into which their waters would flow, were the subterranean outlet closed, there was no difficulty in determining that the basin in question belonged to the Salamvrias river system, and consequently fell to Greece.* Irrespective of this, the line adopted by the Commission follows the obvious con-

tinuation of the mountain range, the low features enclosing the basin on the eastern side being in comparison insignificant.

It may be added that the allegations of the Ottoman Commissioner as to the water-supply of the village are at variance with our information procured on the spot, and I was camped close to the village for two days.

These arguments are set forth in detail in the notes on the subject, and need not be repeated here.

The next point to which I shall call attention is the use of the word "*crête*" in the description of the frontier from Agios Elias (Tripmeni) to the sea. *Conceiving this term to be ambiguous, and apprehending future divergences of opinion as to its interpretation*, I was desirous of substituting the expression "*ligne de partage des eaux*," which has an exact and definite meaning. After much discussion, the matter was settled in the following way :

The word "*crête*" is left in the text, but *Article V. of the Final Act declares that whenever it occurs it is to be held to mean "the mathematical line."* This, I conceive, establishes its identity with the line of water-parting.

My object in contending the question was to provide against the contingency of either party claiming the whole of the top of a ridge to the exclusion of the other, as I had reason to suppose might be the case.

These points which I have just recounted were the only ones of any consequence upon which I differed with my colleagues, and both, as I have explained, were arranged so that the whole line, as described in the Final Act, was voted unanimously by the Representatives of the Mediating Powers.

Before continuing the description of the frontier, I may here observe that the whole survey from Arta up to Zarkos depended upon a triangulation extended from a base at the former place, and that the restrictions imposed upon the triangulation by the absence of signals and the limitations to a

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zone of  $2\frac{1}{2}$  kilom. on either side of the line very greatly increased the difficulty of carrying it on without a break of continuity.

A new base was therefore measured in the plain of the Salamvrias, near Zarkos, and was connected with the network of triangulation.

From the summit of *Mount Koutra the line of frontier takes a north-easterly direction along the watershed, in exact conformity with the text of the Convention.* Arrived near Damasi, instead of continuing this natural feature until it falls into the Xeraghis near that village (as I should have preferred), it turns eastward, and, crossing the valley connecting the villages of Damasi and Koutsokhero, *ascends to the summit of Mount Sidheropaloukhi along the continuation of the watershed.*

Between Sidheropaloukhi and the opposite summit of Agios Elias, it makes a curved line, leaving the mill of Bey Deirmeni to Turkey (though I should have preferred a direct line across the gorge).

From Agios Elias it follows the crest of a ridge comprising Mounts Tripmeni and Losfaki, the latter situated immediately above the small hill near Turnavo, called Kritiri by the Turks.

It thus passes along the edge overlooking the plain of Turnavo, and within rifle-shot of that town, conditions which are certainly unfavourable to Greece. On the other hand, I must admit that a line passing directly south from the summit of Pappalivadho would have separated the plain of Damasi from the village, and thus have given rise to great economic inconvenience, as is the case at Arta.

From Losfaki the line passes by the summits of Mavroi and Drepani, leaving Gavani to Turkey; whereas, according to the indications of the Austrian and other maps, that mountain ought to lie on the Greek side of the frontier.

The boundary line then mounts to the summit of Pappalivadho, and crosses a ravine to that of Agios Elias, from whence

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it descends, passing immediately to the north of Kritzovali, and thence following a ridge separating the plains of Turnavo and Ellassona to Mount Moluna.

Passing to the south of the guardhouse on the col of Moluna, which is actually situated on the Greek *side of the water-parting*, but which has, with the consent of the Greek Commissioner, been left to Turkey, it ascends the steep slope of Mount Menexé, the western abutment of the chain of Lower Olympus (Octolophos). This chain is separated from the main mass of the Thessalian Olympus by the plains of Karya and Konispoli, and the gorges of Davia and Kanalia, whose streams have their origin in these plains. Its principal summits, along which the line of the frontier passes, are : Menexé, Valetskou, Psilorekh, Souvlismenos, Godaman, Tabouria, Strouti-Gourdsa, Agios Elias, Analipsis, and Metamorphosis. Their usual height is between 4000 and 5000 feet above the sea. The summits, with the exception of the last two, are not very bold ; (p. 140) the southern slopes, which terminate abruptly in the Pelasgiotic Plain are generally covered with brushwood, and the northern thinly interspersed with groves of inconsiderable growth. Analipsis and Metamorphosis are steep and rocky. At each of the numerous cols along this range there are paths passable for pack animals.

The sources of the Ziliana, which flows through the gorge of Kanalia, and of the torrent of Davia, which flows into the river of Ellassona, and thence into the Xeraghis, are situate close together on the plain of Konispoli, about 3000 feet above the sea. From the north of this plain, near the village of Karya, the principal mass of Mount Olympus rises steeply towards its southern culminating point, Agios Elias, which can be reached in four or five hours from that village. Flocks of sheep are pastured by the Vlach shepherds on the summit of Mount Olympus in summer.

The highest summit of Godaman is not on the watershed

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line, but lies a kilomètre to the south of it ; and another locality mentioned in the Convention, Kokkinopetra, is not a principal summit, but a ridge of remarkable rocks on the southern flank of Mount Godaman.

At the Lake of Nezeros (called Livadaki on some maps) another controversy arose between the Ottoman Commissioner and his colleagues as to which side of the lake the frontier should pass.

This lake, like the village of Kritzovali, lies in a basin of depression with no superficial outlet, its waters finding their exit by a gully-hole, or "*katavothron*," where they are utilized to drive a mill.

*The lowest col in the encircling chain of hills lies on the south side, and consequently the scientific water-parting follows the mountains on the north side.* The claim of the Ottoman Commissioner was that the frontier should pass on the south side of the lake.

According to the terms of the Convention, it should pass between Analipsis and Nezeros, and the controversy depends on the identification of Analipsis, which the Ottoman Commissioner represents to be a mountain called Analipsis Rapsaniotikos, close to the village of Rapsani. The other Commissioners entertain no doubt that the greater Mount Analipsis, close to Nezeros, and on the north side of the lake, is the locality intended by the Convention.

As all the arguments are set forth in the Protocols, and in the despatch dated the 27th November, which I addressed to His Excellency the Earl of Dufferin, upon the subject, it is unnecessary here to recapitulate them. The question is decided as far as the Commission is concerned, and is now the subject of diplomatic correspondence.

From Metamorphosis and Analipsis, the Lower Olympus range descends towards the Aegean, its slopes being still covered by woods representing the ancient forest of Callipeucé at the

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southern extremity of the Pierian Plain, which it separates from the delta of the Peneus, bounded on the southern side by Mount Ossa. . . .

J. C. ARDAGH.

S

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### Question raised as to the CUTTING OF THE RIVER SALAMVRYAS in the Turco-Greek Boundary.

[From "*Correspondence respecting the Rectification of the Greek Frontier*"  
in Blue Book (C.-3137, Greece No. 1 (1882)).]

(Quoted on page 842 of the Statement.)

#### *The Representatives of the Powers to Assim Pasha.*

(P. 77) THE Undersigned, Ambassadors of Austria-Hungary, France, Great Britain, Italy, and Russia, and the Chargé d'Affaires of Germany, have received the note which His Excellency the Minister for Foreign Affairs of His Majesty the Sultan did them the honour to address to them on the 19th instant relative to the divergence of opinion that has arisen in the Delimitation Commission as regards the Turco-Greek frontier between the River Xeraghis and the heights situated to the north of Mount Zarkos.

His Excellency Assim Pasha asks at the same time that any information which the Undersigned may possess on this subject may be communicated to him. They accordingly hasten to call his attention to the following facts:—

The Ottoman Commissioners proposed to carry the whole line from the Xeraghis as far as Gonitza, situated in the south of the country. It is only necessary, however, to examine the acts fixing the new frontier in order to convince oneself that

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*this line would be contrary to the spirit as well as to the terms of the agreement arrived at. The Convention of the 24th May contains the following description of this frontier: "It arrives at the summit of Mount Kritiri. Turning thence towards the south, the line reaches the right bank of the Xeraghis, and following the line of the water-parting towards the south-west, gains the summit of the heights situated to the north of the village Zarkos."*

Quoted  
p. 841.

During the negotiations, nevertheless, the Ottoman Plenipotentiaries observed that these terms did not exactly correspond with the Turkish proposal. The Representatives of the Powers, acknowledging that their intention had indeed been to adopt the proposal put forth by the Turkish Government, consented to sign a Declaration containing an engagement to submit the text of the Turkish proposal to the Delimitation Commission. And this Declaration was signed at the same time as the Convention. But this part of the Turkish proposal, which was communicated to the Representatives of the Powers on the 23rd March, was in the following terms: "*It arrives at Kritiri. Turning thence towards the south, the frontier-line reaches the right bank of the Xeraghis, cutting it perpendicularly at the nearest point, and following the line of the water-parting towards the south-west, reaches the summit of the mountain situated to the north of the village of Zarkos.*"

Plate XXIII.  
p. 841 in the  
Statement.

Nor is that all. At the request of the Ottoman Plenipotentiaries, the Representatives of the Powers also undertook, by the Declaration of the 24th May, to recommend the Delimitation Commission to follow, between the River Xeraghis and the heights situated to the north of Zarkos, as far as possible, "*the crests of the mountains.*"

*All the acts recognized as determining the new frontier state, therefore, that the line between the Xeraghis and the heights to the north of Zarkos must follow the line of the water-parting. How, therefore, under these circumstances, can it be*

Quoted  
p. 842.

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*brought down as far as the Peneus, and even carried to the other side of this river?*

Article 1 of the Convention states, moreover, that "the Delimitation Commission shall pass its resolutions by a majority of voices." In the present instance, all the Commissioners of the Powers voted for the line adopted.

The Undersigned do not doubt that these explanations will suffice to put an end to the misunderstanding in question, and that His Excellency the Minister for Foreign Affairs will be good enough to take the necessary steps for the definitive adoption of a decision which is in entire conformity with the stipulations agreed upon.

The Undersigned, etc.

\* \* \* \* \*

*Protest of the Greek Delegates against the decision of the Delimitation Commission respecting the portion of the new Turco-Greek frontier-line between the summit of Mount Kritiri and that of the Heights to the north of the Village of Zarkos.*

(P. 83) The Undersigned, deputed by His Majesty the King of the Hellenes to assist at the International Commission for the delimitation of the new frontier between Greece and Turkey, have the honour to submit to the friendly judgment of the Commission the considerations which have prevented them from accepting the frontier proposed between Mount Kritiri and the summit of Zarkos, which has been fixed by the five present members of the Commission, and from signing the Protocol relating to it, and entirely to reserve the right of the Greek Government to decide upon this portion of the new frontier-line.

By the Convention of the 12/24th May, 1881, the portion of the line of the frontier in question is settled in the following manner :—

*"Starting from this point, without leaving the same ridge, it passes between Ligara and Derveni Melonna and reaches the*

*summit of Mount Kritiri. The line turning southwards from there arrives at the right bank of the Xéraghis, and following the line of watershed towards the south-west, reaches the summit of the heights situated to the north of the village of Zarkos."*

The Ottoman Government has proposed, in a further Declaration, to modify this as follows :

" The frontier-line proceeding thence in a southerly direction arrives at the right bank of the Xéraghis, cutting it perpendicularly at the shortest distance, and following the line of watershed to the south-west, reaches the summit of the mountain situated to the north of the village of Zarkos."

Their Excellencies the Representatives of the Mediating Powers at Constantinople recommended this new text to the Delegates of the powers on the Commission of Delimitation to replace the corresponding passage in the Convention of the 12/24th May.

The Government which the Undersigned have the honour to represent on the Commission has not sent to them up to the present time any communication concerning this modification. Nevertheless, as the Commissioners of the Mediating Powers have had the goodness to communicate it to them, they have not hesitated to accept it also as a guide for the determination of this portion of the frontier-line, the more willingly as this modification of the text did not change anything in the stipulations of the Convention which related to this subject, but rendered the spirit of them in a far clearer manner than the original text.

*The ridge of Olympus, which had been settled by the Convention as the base of delimitation as far as the summit of Mount Kritiri, passing by Malonna, borders undoubtedly on the summit of Pappalivado, which is the highest summit of the group of mountains called Kritiri on the Austrian maps, as well as on all the others. It has been confirmed that the position*

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of this group of mountains on the map was sufficiently accurate to serve as a guide to the Commission, and that the word Kritiri was found written on the spot which corresponds exactly with the highest summit of this group. It is from this summit that the Commission, according to the stipulations of the Convention and of the new text, was to quit the ridge of Olympus, to commence from that point the settlement of the frontier-line between the summits of Mount Kritiri and the heights of Zarkos.

Several spurs proceed from the above-mentioned summit of Pappalivado. One of them, the most decided, and the loftiest of all, called Samari, runs southwards, and terminates near the village Damassi. Another, which runs at first eastwards as far as the summit of Mount Losfaki, and then south, terminates in the summit Trypiméni, above the River Xéraghis.

As may be seen in the Austrian map, a line of 10 kilom. is wanted to join the summit Pappalivado and the River Xéraghis by the spur Samari, while the line which joins the summit Pappalivado and the River Xéraghis, passing by the summits of Losfaki and Trypiméni, is 19 kilom. long.

On the Turkish map of the frontier assigned to the Convention of the 12/24th May, the sketch of the frontier-line between the summit of Mount Kritiri and that of the heights situated to the north of the village of Zarkos follows the chain Samari, between two ravines of considerable size, in the group of mountains which bears the name of Kritiri on this map.

Instead of following this line, and ascending the heights to the north of the village of Damassi, in order to ascertain the highest point of this group of mountains, the Commission proceeded to Turnavo, where they were shown a small hill situated on the east of the foot of these mountains, and not more than 50 metres high, as the Mount Kritiri of the Convention, whereas this hill was called Acrotirion (promontory), and, by abbreviation, Acrotiri, and Kritiri (Tribunal). The Commission had no hesitation in declaring that this hill was by no means the

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summit mentioned by the Convention ; but they decided that the summit of Mount Losfaki, situated a little above this hill, must be the summit of Mount Kritiri, from which point the stipulations of the Convention must begin to apply concerning that part of the line in question.

This decision of the Commission to take the summit of Losfaki for the summit of Kritiri in the Convention is justified neither by information gained from the inhabitants of the country, nor by the maps, nor even by the position of this peak, and its relative position to Mount Pappalivado. *The Commission chose this secondary peak of the group of mountains in question solely in order not to leave the line of watershed.* But the Convention, as well as the Turkish modification of it, which insisted on this line up to the summit of Mount Kritiri, abandoned it on proceeding from this mountain to the River Xéraghis, by stipulating that from the summit of Mount Kritiri the frontier-line should reach the River Xéraghis by a line perpendicular to the river, and by the shortest distance.

The inhabitants of Turnavo, it was true, were entirely ignorant of Mount Kritiri ; however, two inhabitants of Damassi, on being asked the position of Kritiri before Major Boselli, the Italian Delegate, on the day of our arrival at the village, indicated the summit Pappalivado. Independently of this information, the Commission ought to have done in this case as they had always done in similar ones, namely, sought for the peak which corresponded to that marked Kritiri on the map, without any regard for its local name.

By taking *the line of watershed as a base of delimitation* for this part, the Commission had partly followed a line proposed much later by a declaration, accompanied by a sketch, from the Ottoman Government, which, under the pretext of explaining the modification of the text of the Convention proposed by Turkey, completely changed the stipulated line, and substituted for it an entirely different one, which left to Turkey not

only a considerable part of the mountain group Kritiri, but, also a part of the River Peneus.

Their Excellencies the Representatives of the Mediating Powers at Constantinople recommended the Delegates of the Powers on the Commission of Delimitation to take into consideration this further declaration of the Ottoman Government, only in so far as it did not modify the stipulations of the Convention relative to this point.

The Commission has followed a line from the summit of Pappalivado to the summit of Losfaki, which proceeded in an easterly instead of a southerly direction, as required by the Convention ; from the summit of Losfaki, as if it had been the summit of Kritiri mentioned in the Convention, the line descended as far as the summit of Trypiméni, joined this peak to that of Sidiropalouko by the ridge of Mount Trypiméni, which runs down into the plain of Thessaly, and from thence, taking the line of the watershed, it terminated at the summit of Koutra, forming part of the heights of Zarkos.

According to the opinion of the Undersigned, the Commission of Delimitation, after following the crest of Olympus, which passes by Melonna, ought in conformity with the Convention and the Turkish modification, to have left this line at the summit of Pappalivado, followed the spur Samari from there, which runs south, reached the River Xéraghis, cut it perpendicularly and at the shortest distance, near the village of Damassi, and afterwards, not far from the same village, to have regained the line of the watershed in order to arrive at the summit Koutra of the mountain situated to the north of the village of Zarkos.

Persuaded that this line is the only one prescribed by the Convention of the 12/24th May, as well as by the modified text of the Ottoman Government, and convinced, after a profound study of the locality, that the Commission would inevitably have adopted this view, if they had accepted the identity

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which had been clearly proved of the peak Pappalivado with the summit of the mountains of Kritiri in the Convention, the Undersigned consider it their duty to protest against the decision of the Commission of Delimitation concerning the part of the frontier-line between the summits of Pappalivado and Koutra, and to reserve entirely the right of the Government of His Majesty to decide this question.

Colonel G. C. METAXAS.—Captain N. B. POURNARAS.

CONSTANTINOPLE, September 11/23, 1881.

### *Memorandum by the Delimitation Commissioners.*

(P. 101) The Commissioners of the Great Powers entrusted with the demarcation of the new Turco-Greek frontier have received the despatch which His Excellency the Russian Ambassador addressed on the 29th October last to the President of the Delimitation Commission. They have also received the note which was inclosed in this despatch, which bears the date of the 12th October, 1881, and which the Sublime Porte has addressed to the Ambassadors of the Great Powers with the object of obtaining the introduction of certain modifications in the line of the new Turco-Greek frontier as adopted by the Delimitation Commission.

In conformity with the desire expressed by His Excellency the Russian Ambassador in his above-mentioned despatch of the 29th October last, the Commissioners of the Great Powers have the honour to communicate to him herewith their opinion, with the reasons in favour of it, on the subject of the modifications claimed in the note of the Sublime Porte. The first of these modifications refers to the portion of the frontier comprised between the summit of Sidero-Palouki and the summit of the heights situated to the north of the village of Zarkos, known by the name of Hododa of Zarcos in the note of the Porte and on the Sketch A, annexed to this note.

In the month of July last their Excellencies the Ambassa-

dors addressed to the Commissioners of the Great Powers a copy of a communication they had received from the Porte relative to the frontier-line between Kritiri and Zarcos. In the opinion of the Ambassadors, this communication, although containing names not to be found on any map, had no other object than to define this part of the frontier with greater exactness. Nevertheless, in forwarding this communication to the Commissioners they expressly enjoined them to conform to the indications therein contained, in so far only as the indications were not found on the ground to be in contradiction with the original text of the Turkish proposal of which mention is made in the general Protocol and the Declaration annexed to the Convention of the 24th May, 1881, and which runs as follows :—

“ . . . The line arrives at the summit of Kritiri ; turning thence towards the south it reaches the right bank of the Xéraghis, cutting it perpendicularly at the nearest point ; and *following the line of water-parting towards the south-west,*<sup>1</sup> it gains the summit of the mountain situated to the north of the village Zarcos, etc.”

This text, beginning with the part in italics, which is alone under consideration here, differs in no way from that of the Convention of the 24th May.

The Commission having verified on the spot the line of the Turkish Commission, found that it was in complete contradiction with the text of the Turkish proposal, and of the Convention of the 24th May ; and in conformity with the recommendations of the Ambassadors, they refused to adopt it.

The new line proposed by the Sublime Porte in its note of the 12th October differs, it is true, from the former. *But instead of following the line of water-parting towards the south-west, and the crests of the mountains as required by the Convention of the 24th May,* the original text of the Turkish proposal, and the Declaration of the 24th May annexed to the Convention,

<sup>1</sup> Italicized in the original.

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*it divides the crests and the ravines* and turns towards the south, then towards the west, and lastly towards the north. It is therefore, like the former one, opposed to the Convention and the text of the Turkish proposal.

The case will be the same, moreover, with any line which differs from that of the Commission, *since this latter follows the line of the water-parting which turns towards the south-west, and is the only possible line.*

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### THE WATER-PARTING NOT PRESCRIBED in the Tian-Shan, according to the Russo-Chinese Treaty of Pekin (1860).

[From *British State Papers*, vol. xliii. p. 970.]

(Quoted on page 847 of the Statement.)

*Treaty of Commerce, Navigation and Limits, Signed at Pekin, 2/14 November, 1860; ratified at St. Petersburg, 20th December, 1860.*

ART. I.—Pour corroborer et élucider l'Art. I. du Traité conclu dans la ville d'Aigoun le 16 Mai, 1858, et en exécution de l'Art. IX. du Traité conclu le 1<sup>er</sup> Juin de la même année dans la ville de Tien-tsin, il est établi : Désormais la frontière Orientale entre les deux Empires, à commencer du confluent des rivières Chilka et Argoun, descendra le cours de la rivière Amour jusqu'au confluent de la rivière Ausouri avec cette dernière. Les terres situées sur la rive gauche (au nord) de la rivière Amour appartiennent à l'Empire de Russie, et les terres situées sur la rive droite (au sud), jusqu'au confluent de la rivière Ausouri appartiennent à l'Empire de Chine. Plus loin, depuis le confluent de la rivière Ausouri jusqu'au lac Hinkai, la ligne-frontière suit les rivières Ausouri et Son'gateha. Les terres situées sur la rive Orientale (droite) de ces rivières appartiennent à l'Empire de Russie, et sur la rive occidentale (gauche) à l'Empire de Chine. Plus loin, la ligne-frontière entre les deux Empires, depuis le point de sortie de la rivière Son'gateha,

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coupe le lac Hinkaï, et se dirige sur la rivière Bélen-ho (Tour) ; depuis l'embouchure de cette rivière *elle suit la crête des montagnes* jusqu'à l'embouchure de la rivière Houpiton (Houpton) et de là, les montagnes situées entre la rivière Khoun-tchoun et la mer jusqu'à la rivière Thou-menkiang. Le long de cette ligne, également, les terres situées à l'est appartiennent à l'Empire de Russie et celles à l'ouest à l'Empire de Chine. La ligne-frontière s'appuie à la rivière Thou-men-kiang, à 20 verstes Chinoises (li) au-dessus de son embouchure dans la mer.

De plus, en exécution du même Art. IX. du Traité de Tientsin est confirmée la carte dressée à cet effet, et sur laquelle, pour plus de clarté, la ligne-frontière est tracée par un trait rouge et indiquée par les lettres de l'Alphabet Russe A, Б, В, Г, etc., etc. Cette Carte est signée par les Plenipotentaires des deux Empires et sellée de leurs sceaux, etc., etc.

Art. II.—La ligne-frontière à l'ouest ; indéterminée jusqu'ici doit désormais suivre la direction des montagnes, le cours des grandes rivières et *la ligne actuellement existante des piquets Chinois*. A partir du dernier phare nommé Chabindabaga, établi en 1728, (6<sup>m</sup>e année de Young-Lehing), après la conclusion du Traité de Kiakhta, elle se dirigera, vers le sud-ouest jusqu'au lac Dsai-sang, et de là jusqu'aux montagnes situées au sud du lac Issyk-Koul, et nommées Tengri-chan, ou Alatau des Kirghises, autrement dites encore *Thian-chan-nana-lou (branches méridionales des montagnes Célestes)*, et le long de ces montagnes jusqu'aux possessions du Kokand.

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### CUSTOMARY FORM TO EXPRESS THE WATER- PARTING BOUNDARY, as derived from the Brazil-Venezuelan Treaty of 1859.

[Articles II. and III., translated from "*Relatorio da Reparticao dos Negocios Estrangeiros do Brazil*," Rio Janeiro, 1861, Docs. p. 61.]

(Quoted on page 849 of the Statement.)

ARTICLE 2.—The Venezuelan Republic and H.M. the Emperor of Brazil declare and define the dividing line in the following manner :—

I.—The dividing line shall begin at the headwaters of the River Memachí, and, following *along the highest ground, shall pass by the headwaters* of the Aquio and the Tomo, the Guaicia and the Iquiare or Issana, *in such wise that all the waters flowing* to the Aquio and Tomo remain in the possession of Venezuela and *those flowing* to the Guaicia, Xie or Issana, of Brazil ; and it shall cross the River Negro opposite the Isla de S. José which is near Cucui Rock.

II.—From the Isla de S. José it shall continue in a straight line, cutting the "caño" Maturaca at the middle, or at the point upon which the Boundary Commissioners shall agree, and which may conveniently divide the said "caño" ; from thence, passing by the groups of Cerros Cupi, Imeri, Guay and Urucusiro, it shall cross the road which serves as a communication by land between the Rio Castaño with the River Marari,

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and by the Sierra de Tapirapécó shall gain the crests of the Parima chain, so that the waters flowing to the Padaviri, Marari, and Cababuri, remain in the possession of Brazil, and those running to the Turuaca or Ydapa or Xiaba in Venezuela.

Article 3.—It shall follow *along the summit* of the Parima range as far as the angle formed by the latter with the Pacaraima range, *so that all the waters flowing* to the Rio Branco remain in the possession of Brazil, *and those running* to the Orinoco, of Venezuela, and *the line shall follow by the most elevated points of the said Pacaraima range, so that the waters flowing* into the Rio Branco remain as before in the possession of Brazil, and *those running* into the Essequibo, Cuyuni and Caroni, of Venezuela, as far as the territories of both States extend towards the east.

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### **BRAZILIAN AND VENEZUELAN OFFICIAL DECLARATION AS TO THE PRINCIPLE OF DEMARCATION BY THE WATER-PARTING.**

(Quoted on page 855 of the Statement.)

#### Enclosure A.

[Translated from "*Relatorio da Repartição dos Negocios Estrangeiros do Brazil*," 1893, pp. 27-30.]

THE Boundary Treaty between Brazil and Venezuela was signed in May 1859, and, despite the continuous efforts of the Brazilian Government, it was only in July 1879—that is 20 years later—that the Venezuelan Commission, to join ours in the demarcation agreed upon, was organized.

Once the work was begun, it was carried out in common as far as the Cerro Cupy, at which point it was suspended owing to the near approach of the rainy season.

From the Act then drawn up, it is shown that, accepting the demarcation as far as the aforesaid mountain as final, the joint Commission left to the decision of the Governments the convenience of continuing the demarcation as far as the respective territories extend, for it seems that, as the frontier follows the division of the waters towards the east, no doubt could ever arise as to its direction. Quoted  
p. 854.

The Brazilian Government held that the demarcation should be continued, and hoped that, with this end in view, the Government of Venezuela would nominate a new Commis-

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sion, or would agree to accept the results obtained by the Brazilian Commission, once their accuracy was established.

As Venezuela did not decide to accept either alternative, the Brazilian Government resolved that its Commission should proceed on its own account, without entering the Venezuelan territory.

On September 30, 1884, the Brazilian Legation at Caracas forwarded to the Minister for Foreign Affairs a general map of the frontier and the report of the Commission ; and it was only on January 11, 1890, that the decision of the Venezuelan Government was communicated to it. The note referred to said :—

The map referring to the territorial boundaries of Venezuela and Brazil, forwarded by this Legation to the Minister for Foreign Affairs on September 30, 1885 [this is a mistake—it occurred in 1884], having been submitted to the College of Engineers, and the view of the Expert and that of two advisers of the Ministry having been heard, the conclusion has been arrived at that, in general terms, owing to the existence of the doubts and inaccuracies mentioned in Article 4 of the Treaty of 1860, the Government [Venezuelan] could not consider as definitive the delineation which appears in the map, or lay aside what had been agreed to in the Act of the eighth meeting of *the joint Commission, who established in principle, as frontier line between both Republics, the divortium aquarum, in conformity with the said Treaty* [of 1859].

Quoted  
p. 855.

The agreement come to by the Commissioners at the above mentioned conference was this :—

Señor Araujo (the Brazilian Commissioner) said : “ that  
“ he agreed that the demarcation was concluded from the River  
“ Memachi as far as the Cerro de Cupy, that permanent land-  
“ marks might be substituted for the provisional landmarks  
“ on a suitable occasion, agreeing, as he did, with his learned  
“ colleague in thinking that the boundary line which follows  
“ towards the east along the *divortium aquarum* could never

Quoted  
p. 854.

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“ give rise to any doubts ; and that, as the joint Commission  
“ was compelled to suspend its labour owing to the rainy season,  
“ he accepted the proposal of his distinguished colleague to  
“ leave it to both Governments to decide whether they thought  
“ it indispensable to finish marking out the rest of the frontier,  
“ by placing landmarks wherever they considered it suitable,  
“ this task being executed by the joint Commission or by the  
“ Commission of either country, as the said Governments should  
“ determine.”

The joint Commission, as appears from this part of the Act, thought any demarcation from the Cerro Cuy eastwards to be unnecessary, and submitted this view to the judgment of both Governments.

*The Commission did not themselves establish as a principle that the frontier line should run along the water-parting ; they assumed that this course was previously established.* Quoted  
p. 855.

We are, therefore, unable to grasp the view of the Minister for Foreign Affairs, when H.E. states that his Government could not disregard the resolution arrived at in the aforesaid conference.

The Brazilian Government was entitled to a clear, categorical reply, and the Government of Venezuela returned nothing of the sort.

From an examination which ensued after a delay of over four years, it concluded in general terms that, owing to the existence of doubts and uncertainties foreseen in Article 4 of the Treaty, it was prevented from accepting as definitive the direction given to the frontier in the map.

It seems that the Venezuelan Government referred to two incidents which had taken place in demarcating the boundaries between the Memachi and the Cerro Cuy. It was mistaken, nor is there any need to prove this, since that section of the demarcation is now decided, as will appear from what I am about to record.

The Treaty with Venezuela contains the following declaration :—

Article 6.—H.M. the Emperor of Brazil declares that, in negotiating with the Republic of Venezuela regarding the territory situated west of the Rio Negro and washed by the waters of the Tomo and the Aquio, which the Republic of Venezuela asserts to belong to her, but which has already been reclaimed by New Granada, it is not his intention to prejudge any right which the latter Republic may establish to the said territory.

The question pending between Colombia and Venezuela was submitted to the Arbitration of H.M. the King of Spain and was decided on March 16, 1892.

The award signed by H.M. the Queen Regent in the name of her august son, thus concludes the description of the frontier :—

Part 2. From the rapid of Maipures by the river-bed of the Orinoco as far as its confluence with the Guaviare ; upstream by the Atabapo as far as 36 kilometres north of the village of Yavita, tracing therefrom a straight line ending at the River Guainia, 36 kilometres west of the village of Pimichin, and by the channel of the Guainia, which further on, takes the name of the River Negro, as far as the Piedra del Cucuy.

By this award Venezuela ceases to be conterminous with Brazil from the Memachi to the Piedra del Cucuy. The Venezuelan Government has not sent us the communication due to us on this point. It will probably forward it after coming to an understanding with the Government of Colombia.

As the Brazilian Commission alone carried out the work from the Piedra del Cucuy eastwards, and as the Venezuelan Government declared itself unable to accept as definitive the direction given to the frontier on the general map, it follows that everything remains to be done by this Republic.

In the map, appended to the Report of the Minister for Foreign Affairs of 1884, may be seen the direction of the fron-

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tier, the description of which can be read in the report of the Commission likewise appended.

### Enclosure B.

[From "*Relatorio da Reparticao dos Negocios Estrangeiros do Brazil*," Rio Janeiro, 1896, p. 21.]

(Quoted on page 855 of the Statement:)

It was only in July 1879, that the Brazilian Government secured the organization of the Venezuelan Commission, which, in conjunction with the Brazilian Commission, was to carry out the demarcation arranged in the Treaty of May 1879.

The work was carried out in common from the Memachi to the Cerro Cupy. Thenceforward, in the direction of the east, the demarcation was carried out by the Brazilian Commission alone, in consequence of the following facts :

In the Act that was drawn up, recording the demarcation as far as the Cerro Cupy, the joint Commission left the advisability of continuing it to the decision of both Governments. This seemed unnecessary, as, from that mountain onwards, *the frontier runs by the division of the waters, no doubt as to its direction being consequently possible.*

The Brazilian Government did not accept this view, and as the Venezuelan Government came to no decision, ordered the work to be carried out without the assistance of the latter : this done, it forwarded the general map to the latter in September 1884.

The Venezuelan Government replied in January 1890, stating that it could not regard as definitive the direction given to the frontier.

Subsequent to this, on March 16, 1892, the Queen of Spain delivered judgment on the boundary question between Venezuela and Colombia. The part concerning Brazil was drawn up in these terms :

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[The award referring to the western part is given in Enclosure A.]

In consequence of this award, complied with as it naturally should be, Brazil ceases to be conterminous with Venezuela from the Memachi, whence the demarcation began, to the Picha de Cucuy. Thence onward, that is, from this point to the Cerro Cupy,—where the demarcation was carried out in common, —and from the Cerro Cupy to the termination, there is lacking the definitive approval which the Venezuelan Government has not yet given to the general map.

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### **The Venezuelan Government Official Opinion as to THE PRECISE SIGNIFICATION OF THE TERM "DIVISION OF WATERS" in Boundary Treaties.**

[From "*The Counter-case of the U.S. of Venezuela before the Tribunal of Arbitration to convene at Paris*," etc., vol. 3, Appendix, pp. 304-309.]

(Quoted on pages 856 and 857 of the Statement.)

#### **Enclosure A.**

*The Venezuelan Minister for Foreign Affairs to the Venezuelan  
Minister in Washington.*

CARÁCAS, May 23, 1898.

MR. MINISTER,—

In the Brief recently presented by Venezuela, in the question of her boundaries with British Guiana, this frontier has been claimed: "The boundary line between the United States of Venezuela and the Colony of British Guiana, begins at the mouth of the Essequibo river; thence runs southward along the waterway of said river to its union with the Cuyuni and Mazaruni rivers; thence around the island of Kykoveral, leaving it on the east; thence along the waterway of said Essequibo river to the line separating the territory of the United States of Venezuela from the territory of the United States of Brazil."

The boundary with Brazil, agreed upon in the treaty of May 5, 1859, *should be along the summit of the Parima ridge*

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*of mountains to the angle formed by the latter with the Pacaraima ridge, continuing along its highest points, so that the waters that run into the river Branco belong to Brazil, and to Venezuela those falling into the Essequibo, Cuyuni and Caroni rivers, as far as where the territories of both States extend on their eastern side.*

Up to the present, only the boundary line from the principal head of the Menachi to the Cupi hill has been fixed upon the ground by the Commissioners of both parties who met in 1880. The rest of the line has not been set by mutual agreement, but only by the Brazilian Commissioners. His work having been presented to Venezuela for her acceptance, she has withheld it, because she holds that the concurrence of her representatives is indispensable, natural and rightful.

The question now is to find out how the boundary proposed in the brief of Venezuela can be connected with the frontier of the latter and Brazil. The wording made use of in the Agreement wherein it is fixed, is too vague, namely: "As far as where the territories of both States extend on their eastern side." The Commissioner of Brazil who traced by himself the final portion of the line, carries it up to a point which he calls S. Anai, without naming the Essequibo.

In the map of Brazil of 1880 by C. Brockes and C. Held, the limit with Venezuela is placed at a distance, leaving out part of this, including its sources, in British Guiana.

In the book entitled "*Nociones sobre Corografia del Brasil, for Joaquin Manuel de Madeco*," which is accompanied by said map, we read: "The lines of the frontier of Brazil with British Guiana are two: the first on the north, and the second on the east; in the first, as also in Dutch Guiana, France disputes the right of Brazil; in the first it is England that disputes it, the origin of her unexpected claims and diplomatic controversies being the action of the President of the Province of Para, in compelling an English missionary who was teaching the Indians

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there, to leave the territory that had always been considered and recognized as Brazilian, up to the *Pacaraima mountains, the acknowledged boundary line*. The outcome of the negotiations between the respective governments was the neutralization of the territory situated between the Tacutú and Regumuri rivers, until the necessary explorations should finally determine the true boundaries."

The following maps should be consulted :

1st.—Atlas of Codazzi, whereof in No. 10, a territory is marked on the south, extending to the Acarai Mountains, and embracing the upper part of the Essequibo, from the mouth of the Rupununi, with the note : " Territory considered as usurped by the English."

2nd.—The map attached to the statistical year-books of Venezuela wherein the same extension is given it on the south-east.

3rd.—Schomburgk's map of 1840, which gives the claims of Venezuela as he understood them, of Brazil and of Great Britain.

4th.—The aforesaid map of Brockes and Held.

5th.—The maps of Surville, Cruz Cano y Olmedilla, and Requena which extended the boundaries of Spanish Guiana to the Tumucuraque mountains, making it confine with the present Dutch Guiana and with the French.

Besides the above-mentioned maps, the sketches are forwarded of the Venezuelan-Brazilian frontier, set in 1879-1880 by the joint Commission of both countries, and of the continuation of same to its termination by only one Commissioner of Brazil.

It is desired that from this study should result, not only the connection of the frontier of Venezuela and Brazil with that of Venezuela and British Guiana, but also a standard which may serve to appreciate the merit of the demarcation made unilaterally from the Cupi hill to the S. Anay.

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Although Codazzi in his geography makes the boundaries of Venezuela and Brazil to coincide at the mouth of the Rupununi, this is done without taking into account the usurpation which he himself points out in his map. See Montenegro, *Geography of Venezuela*, and Marmol's pamphlet on the boundaries of Guiana.

The study herein recommended, is very urgent ; it is required for the 27th instant, with the return of the accompanying maps.

I am, etc.

J. CALCAÑO MATHIEU.

## Enclosure B.

*The Venezuelan Minister of Public Works to the Venezuelan Minister for Foreign Affairs.*

CARÁCAS, June 7, 1898.

As the result of the study of the subject which you are pleased to submit to the consideration of this Ministry, in your note of May 23, 1898, No. 761, F.P.L., I have the honour of reporting to you as follows :

The tracing of the boundaries *between Venezuela and Brazil* presents no difficulty from its western extremity to *Monte Anay, a mountain belonging to the Pacaraima range* ; but from this point towards the east the following doubt occurs : Whether the line of demarcation proceeds directly until it cuts the Essequibo river at the mouth of the Rupununi, as set down in Codazzi's Atlas (Map of the Canton of Upata), or turns toward the south in the direction of the headwaters of the Essequibo river, *separating the waters of the latter* from those of the Branco river, as shown on the maps published in the statistical year-books of Venezuela and on Bianconi's Map of 1889.

The question therefore, is reduced to ascertaining whether the headwaters of the Essequibo belong to Venezuela, or not.

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The treaty agreed upon between Brazil and Venezuela, on May 5, 1859, says that the boundary between both nations should follow " along the summit of the Parima range of mountains to the angle formed by the latter with the Pacaraima range, so that all the waters running into the river Branco should belong to Brazil, and those running into the Orinoco, to Venezuela, *the line to continue along the highest peaks of said Pacaraima range, so that the waters running into the river Branco should, as has been said, belong to Brazil, and those running into the Essequibo, Cuyuni and Caroni, to Venezuela, as far as where the territories of both States extend on their eastern side.*"

By virtue of this clause, *it is clear that the boundary line, to the east of Monte Anay, should not deviate from the division of waters mentioned in the Treaty*, but follow them up until the eastern extremity of the Republic is reached, which is, according to the Brief presented by Venezuela, the waterway of the Essequibo. Now, as the above-mentioned *division of waters turns towards the south*, and as it cannot cut the Essequibo, except at its headwaters, it follows that the latter point becomes precisely the conjunction of the southern and eastern frontier of Venezuela. It is so set down in the *explanatory map* (Venez. C. case, vol. iv. atlas, map 1), which I have the honour of subjoining to the present note.

Quoted  
p. 856.

To Venezuela, therefore, belongs the territory comprised within Monte Anay, the mouth of the Rupununi and the headwaters of the Essequibo river; an ownership which is furthermore verified by the following documents:

1st.—In the geographical map of Don Francisco Requena, 1796, which contains the boundary line between the dominions of Spain and Portugal, it is shown that the old Captain Generalship of Carácas extended to the east until it conjoined with French Guiana, comprising in its territory all the headwaters of the Essequibo.

2nd.—In the map of Cruz Cano y Olmedilla, 1775, and in the chorographic map of Nueva Andalucia, made by Surville in 1778, it is seen that all the basin of the Essequibo lying south of the mouth of the Rupununi river, belonged at the time to Spanish Guiana.

3rd.—From the Direction issued February 4, 1779, by the Intendent-General of Venezuela, wherein rules are given for settling the province of Guiana, it is inferred that the lands belonging to Spain extended eastward until they reached the confines of French Guiana, leaving on one side the territories of Dutch Guiana, while those of the Crown of Portugal remained on the south.

4th.—In the map of Mannert, 1803, it also appears that the headwaters of the Essequibo belonged to Nueva Andalucia.

5th.—In the *Geography of Montenegro*, vol. iv. page 3, we read the following: "The easternmost part of Venezuela is the one which touches French Guiana, toward  $2^{\circ} 10'$  latitude north, and  $56^{\circ} 4'$  longitude west" (Greenwich). And further on it adds that the line marking the eastern frontier of the Republic cuts the river Essequibo toward  $4^{\circ} 12'$  north latitude, and continues *along the summits of the Tumucuraque range*, until it confines with French Guiana at the intersection of said range with the Acaray mountains. The boundary line then swerves back along the latter range up to a point where the Acaray mountains meet the Pacaraima range, thus leaving all *the headwaters of the Essequibo in Venezuelan territory*.

6th.—Codazzi's Atlas (Map No. 10) notes that the territory in question was then considered as usurped by the English, which is an indication that it did not belong to them legitimately.

From the foregoing exposition it appears that the Republic *has a right to all the headwaters of the river Essequibo*. But as in the Brief presented by Venezuela, and for reasons that have no doubt been duly considered, only the waterway of

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said river has been claimed as a frontier, it follows in the opinion of the undersigned, that the demarcation that should be maintained is the one traced on the accompanying map, namely, *the waterway of the Essequibo, from the point where it empties into the sea to its headwaters, continuing thence to Monte Anay along the range of mountains which divide the waters of the Essequibo from those which run into river Branco.*

The paragraph transcribed by the Señor Minister of Foreign Relations, from the work of Don Joaquin M. de Macedo, regarding the neutralization agreed upon between England and Brazil of the territory lying between the Tacutú and Regumuri rivers, can be no argument against this conclusion, for it is known that England illegally occupies all the headwaters of the Essequibo, as can be seen in the aforesaid Atlas of Codazzi (Map No. 10).

The Señor Minister also desires that the study recommended by him to this Ministry should result in a standard which may serve to appreciate the merit of the demarcation made unilaterally by the Brazilian Commission, from the Cupi hill to the Anay range.

Upon this point I beg to state, that having compared the geographical co-ordinates of some angles of the line in question, with those corresponding to the same points of the line traced in the map accompanying the statistical year-books of Venezuela, there appear some slight discrepancies as to the latitude ; but, regarding the longitude, the discrepancies amount to 1° 28' against Venezuela. The proper thing to do, in this case, would be to send a Venezuelan Commission who upon the ground would ascertain which of the parties was in fault. If this is not practicable for the present, and if the settlement of the question is urgent, I am of opinion that it would be advisable to accept the frontier traced in the Brazilian map, since it was made by an honourable and competent Commission of that country, but with the following proviso :

“ Inasmuch as there are differences between the line of

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demarcation fixed unilaterally by the Brazilian Commission, and the one set down in the official map of Venezuela, the latter Republic *accepts the former line*, with the condition that should there be any inaccuracy in the geographical co-ordinates of some of its points, these shall be corrected ; *so that in definitive the frontier line should always mark the division of waters mentioned in the Treaty of 1859.*" Quoted  
p. 857.

It should also be borne in mind that the map presented by the Brazilian Commission offers more differences as compared with that of the statistical year-book of Venezuela than is the case with the atlas of Codazzi, the only scientific work we have upon the subject.

The foregoing is in reply to your note of May 23, of the current year.

God and Federation.

A. SMITH.

## No. 106.

### CUSTOMARY USE OF THE TERM "GREAT MOUNTAIN CHAIN" TO DESIGNATE IN TREATIES A MAIN WATER-PARTING WITH NO OROGRAPHIC RIDGE.

[From "*Premier Mémoire du Brésil*," etc., vol. i. p. 239.]

(Quoted on page 863 of the Statement.)

*Traité de Paix entre le Portugal et la France, signé à Madrid  
le 29 September, 1801.*

ART. IV.—Les limites entre les deux Guyanes Portugaise et Française seront déterminées à l'avenir par la Rivière Carapanatuba, qui se jette dans l'Amazone à environ un tiers de degré de l'Equateur, latitude septentrionale, audessus du Fort Macapa. Ces limites suivront le cours de la rivière jusqu'à sa source, d'où elles se porteront vers *la grande chaîne de montagnes qui fait le partage des eaux* : elles suivront les inflexions de cette chaîne jusqu'au point où elle se rapproche le plus du Rio Branco vers le deuxième degré et un tiers Nord de l'Équateur.

Quoted  
p. 863.

Les Indiens des deux Guyanes, qui dans le cours de la guerre auraient été enlevés de leurs habitations, seront respectivement rendus.

Les citoyens ou sujets des deux Puissances, qui se trouveront compris dans la nouvelle détermination de limites, pourront réciproquement se retirer dans les possessions de leurs Etats respectifs; ils auront aussi la faculté de disposer de leurs biens meubles et immeubles, et ce pendant l'espace de deux années à compter de l'échange des ratifications du présent Traité.

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### NO WATER-PARTING PRESCRIBED IN THE ALASKA BOUNDARY.

[Articles III., IV. and V. of the Treaty of 1825, between Great Britain and Russia.]

(Quoted on page 869 of the Statement.)

“ III.—The line of demarcation between the possessions of the high contracting parties upon the coast of the continent and the islands of America to the north-west shall be drawn in the manner following :

“ Commencing from the southernmost point of the island called Prince of Wales Island, which point lies in the parallel of 54 degrees 40 minutes north latitude, and between the 131st and 133rd degree of west longitude (meridian of Greenwich), the said line shall ascend to the north along the channel called Portland Channel, as far as the point of the continent where it strikes the 56th degree of north latitude ; from this last mentioned point *the line of demarcation shall follow the summit of the mountains situated parallel to the coast* as far as the point of intersection of the 41st degree of west longitude (of the same meridian) ; and finally from the said point of intersection the said meridian line of the 41st degree, in its prolongation as far as the frozen ocean, shall form the limit between the Russian and British possessions on the continent of America to the north-west.”

Quoted  
p. 869.

“ IV.—With reference to the line of demarcation laid down in the preceding article, it is understood :

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“ 1st. That the island called Prince of Wales Island shall belong wholly to Russia.

“ 2nd. That *wherever the summit of the mountains which extend in a direction parallel to the coast, from the 56th degree of north latitude to the point of intersection of the 41st degree of west longitude, shall prove to be at a distance of more than* <sup>Quoted p. 869.</sup> *ten marine leagues from the ocean, the limit between the British possessions and the line of coast which is to belong to Russia, as above-mentioned, shall be formed by a line parallel to the windings of the coast, and which shall never exceed the distance of ten marine leagues therefrom.*”

“ V.—It is moreover agreed that no establishment shall be formed by either of the two parties within the limits assigned by the two preceding articles to the possessions of the other ; consequently, British subjects shall not form any establishment either upon the coast or upon the border of the continent comprised within the limits of the Russian possessions, as designated in the two preceding articles ; and, in like manner, no establishment shall be formed by Russian subjects beyond the said limits.”

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### THE WATER-PARTING IN THE SIERRA LEONE BOUNDARY.

[From "*Agreement between Great Britain and France, fixing the boundary between the British and French possessions to the north and east of Sierra Leone*," in *Blue Book*, Treaty series (C.-7600) No. 5, 1895.]

(Quoted on pages 872 and 873 of the Statement.)

ARTICLE I.—The boundary starts from a point on the Atlantic coast north-west of the village of Kiragba, where a circle of 500 metres radius, described from the centre of the village, cuts the high-water mark.

From this point it proceeds in a north-easterly direction parallel to the road leading from Kiragba to Robenia (Roubani), which passes by or near the English villages of Fungala, Robant, Mengeti, Mandimo, Momotimonia, and Kōngobutia, at an even distance, of 500 metres from the centre of the track, as far as a point half-way between the village of Kongobutia (English) and the village of Digipali (French). From this point it turns to the south-east, and, cutting the road at right angles, reaches a point 500 metres on the south-eastern side, and proceeds parallel to the road at an even distance of 500 metres, measured as before from the centre of the track, till it reaches a point to the south of the village of Digipali, whence it is drawn directly to the watershed formed by a ridge which, commencing south of the destroyed village of Passinodia, distinctly marks the line of separation between the basin of the Mellakori (Mellacorée) River and that of the Great Skarcies or Kolenté River.

*The frontier follows this watershed line, leaving to Great Britain the villages of Bogolo (N'Bogoli), Musaliya, Lukoiya (Malaguia), Mufuri (Maforé), Tarnenai (Tanéné), Modina (Madina), Oblenia, Oboto, Ballimir, Massini, and Gambiadi, and to France, the villages of Robenia (Roubani), N'Tunga (N'Tugon), Daragli, (Daragoué), Kunia, Tombaiya, Heremakuno (Erimakono), Fransiga (Fonsiga), Talansa, Tanganne (Tagani), and Maodea, as far as the point nearest to the source of the Little Mola River; from this point it follows a straight line to the above-mentioned source, follows the course of the Little Mola to its junction with the Mola, and then the thalweg of the Mola to its junction with the Great Skarcies or Kolenté.*

From this point the frontier follows the right bank of the Great Skarcies (Kolenté) as far as a point situated 500 metres south of the spot where the road leading from Wulia (Ouelia) to Wossu (Ouossou), via Lucenia, touches the right bank. From this point *it crosses the river* and follows a line drawn to the south of the above-mentioned road at an even distance of 500 metres, measured from the centre of the track, until it meets in a straight line connecting the two points mentioned below, namely :

1. A point on the Kora, 500 metres above the bend of the river which is situated about 2500 metres north of the village of Lusenia, or about 5 kilom. up the Kora River measured along the bank, from its point of junction with the Great Skarcies (Kolenté).

2. A gap in the north-western face of the chain of hills lying in the eastern part of Talla, situated about two English miles (3200 metres) south of the village of Duvunia (Donia).

From this point of intersection it follows the above-mentioned line eastwards to the centre of the above-mentioned gap, from whence it is drawn straight to a point on the River Kita, situated above and at a distance of 1500 metres, as the crow flies, from the centre of the village of Lakhata. It then fol-

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lows the thalweg of the Kita River as far as the confluence of that stream with the Lolo.

From this point of junction it coincides with a line drawn straight to a point on the Little Skarcies or Kaba River, four English miles (6400 metres) south of the 10th parallel of north latitude ; and it then follows the thalweg of the Little Skarcies as far as *the said parallel, which then forms the boundary as far as its intersection with the watershed* (“*ligne de partage des eaux*”), *separating the basin of the Niger on the one hand from the basins of the Little Skarcies and other rivers, falling westward to the Atlantic Ocean on the other hand.*

Quoted  
p. 872.

Finally *the frontier follows the aforesaid watershed* south-eastward, leaving Kalieri to Great Britain, and Herimakuna (Erimakono) to France, *until its intersection with the parallel of latitude passing through Tembikunda* (Tembikounda), that is to say, the source of the Tembiko or Niger.

Article II.—The boundary defined in this Agreement is marked on the map which is annexed hereto.

Article III.—This Agreement is regarded by the two Governments as completing and interpreting Article II. of the Agreement of 10th August, 1889, Annex 1 of the said Agreement, Annex 2 of the said Agreement (heading Sierra Leone), and the Agreement of the 26th June, 1891.

Done at Paris, the 21st January, 1895.

Signed.—E. C. H. PHIPPS.—J. A. CROWE, GEORGES BENOIT.—J. HAUSSMANN.

### ANNEX.

*Although the delineation of the line of demarcation on the map annexed to the present Agreement is believed to be generally accurate, it shall not be considered as an absolutely correct representation of that line until it has been confirmed by future surveys.*

Quoted  
p. 873.

It is therefore agreed that, in the event of Commissioners

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or local Delegates of the two countries being hereafter appointed to delimit the whole or any portion of the frontier on the ground, *they shall be guided by the description of the frontier as set forth in the Agreement.* They shall at the same time be permitted to modify the said line of demarcation for the purpose of delineating its direction with greater accuracy, and also to *rectify the position of the watersheds*, roads, or rivers, as well as that of any of the towns or villages indicated on the map above referred to.

It is, however, understood that any alterations or corrections proposed by common consent of the aforesaid Commissioners or Delegates shall be submitted for the approval of their respective Governments.

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### POWERS AND ATTRIBUTIONS OF THE DELEGATES in the Puna Arbitration.

[Translated from "*Documentos relativos a la Conferencia de Buenos Aires*,"  
Santiago, 1899, pp. 4-7.]

(Quoted on page 894 of the Statement.)

#### *First Record.*

IN the city of Santiago de Chile on November 2, 1898, there being present in the bureau of the Minister for Foreign Affairs the Minister of the Department, D. Juan José Latorre and Señor Don Alberto Blancas, Chargé d'Affaires and Plenipotentiary *ad hoc* of the Argentine Republic, according to telegraphic credentials to be confirmed later in due form, they declared that, it being the desire of the Governments of the Chilean Republic and of the Argentine Republic to come to an agreement on all matters which affect, or might affect, the two countries directly or indirectly, thus establishing in a complete, frank and friendly manner the relations involved by glories common to both from the very outset of their political emancipation, it was agreed:

*First.* To hold a conference in the City of Buenos Aires with the following objects.

A. To trace the dividing line between parallels  $23^{\circ}$  and  $26^{\circ} 52' 45''$  S. lat., in fulfilment of what was laid down in the first basis of the Agreement of April 17, 1896, *regard being had to all the documents and antecedents of the question.*

Quoted  
p. 894.

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B. To study and draw up the solutions relating to matters which may, directly or indirectly, interest the two countries and which may be directly submitted to their consideration.

*Second.* The Conference shall consist of ten delegates, five being nominated by the Chilean Republic and five by the Argentine Republic. The nomination of its delegates by each Government and the settling of the initial date of the Conference will be the subject of a subsequent Act.

*Third.* The Conference will begin by considering the first point to which the first basis refers. If the delegates come to an agreement on the said point, either unanimously or by a majority, the dividing line thus accepted shall be definitively traced and communicated at once to both Governments so that, the matter being laid before the Government of Bolivia, to the effect of placing landmarks at such points of this line as may be thought necessary. If the delegates should not come to an agreement, they shall inform their respective Governments so that the procedure established in another Act of the same date be carried into effect.

*Fourth.* After executing the provisions of the previous basis, the Conference shall proceed to consider the remaining points to which the first basis refers. The resolutions adopted by the delegates shall have no binding force on their respective Governments; but, once communicated to them, the said Governments shall make a decision concerning them in a definitive manner.

*Fifth.* The Commission shall accomplish its mission within ten days of its first sitting, unless the Governments shall, by common accord, agree to prolong the said term.

*Sixth.* If after three sittings the Conference should not have effected the tracing of the line between parallels  $23^{\circ}$  and  $26^{\circ} 52' 45''$  S. latitude, the Demarcating Commission referred to in the Act of this same date shall begin the execution of its mission.

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In record of which the undersigned, in the name of their respective Governments, sign the present agreement in duplicate, one for each party, and attach thereunto their seals.

J. J. LATORRE.

ALBERTO BLANCAS.

### *Second Record.*

In the city of Santiago de Chile on November 2, 1898, there being present in the bureau of the Minister for Foreign Affairs, the Minister of the Department, D. Juan José Latorre and Señor D. Alberto Blancas, Chargé d'Affaires and Plenipotentiary *ad hoc* of the Argentine Republic, according to telegraphic credentials to be confirmed later in due form, with a view to continuing the Conference referred to in the Act of September 17 last, after an interchange of views, they agreed :—

*First.* To appoint a Chilean and an Argentine delegate, and the present Minister of the United States of America accredited to the Argentine Republic, in order that they, acting as demarcators, *and in view of the documents and antecedents of the question*, may proceed by a majority, to *trace in a definitive manner the dividing line referred to in the first basis of the Agreement of April 17, 1896.*

*Second.* The dividing line having been traced, the Demarcating Commission shall lay it before the respective Governments so that it may be communicated to the Bolivian Government to the effect of erecting on the ground dividing landmarks at such points of this line as may be considered necessary.

*Third.* The Demarcating Commission shall meet in the City of Buenos Aires and shall begin the task entrusted to it within 48 hours after the respective Governments have informed its members of the occurrence of the case foreseen in the Agreement of this same date. Within three days of the first sitting, the demarcation of the dividing line should be concluded.

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*Fourth.* Should there be any difference as to the solution adopted, the dissenting member may place this on record by signing as such, but he shall not state the grounds of his view.

To record which, the undersigned, in the name of their respective Governments, sign the present Act in duplicate, one for each party, and thereunto attach their seals.

J. J. LATORRE.

ALBERTO BLANCAS.

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### ANTECEDENTS OF THE ARGENTINE-BOLIVIAN TREATY OF 1893.

[Translated from an extract of Señor Bertrand's Report as to the Puna Boundary in 1893, printed in "*Documentos oficiales relativos a los Límites entre Chile, Bolivia y la República Argentina en la región de Atacama*," Santiago, 1898, pp. 109-113.]

(Quoted on page 897 of the Statement.)

WHEN the numerous maps of the Argentine Republic, from those of Moussy, Seelstrang, etc., to the new map by Brackebusch (1891), are examined, it is seen that the Bolivian frontier in the provinces of Salta and Jujui, though not determined by treaties, is nevertheless drawn with small differences by the geographers; these boundaries *de facto* are shown with perfect precision in the excellent map of Señor San Roman, in view of the traditions personally collected in the entire extent of the said frontier.

As it would be tedious to quote all the maps on which this demarcation appears, I will confine myself to pointing out the small differences between such authors as deserve credit on account of the thoroughness of their work.

Dalence (1851) in his "*Statistical Sketch of Bolivia*," describes thus the divisional line from the Portezuelo (San Francisco) which serves as boundary to the Province of Catamarca and the canton of Antofagasta.

"From here it turns to the N.W. by the deserts of Chaco Alto, skirting the opening of Carachapampa, Cerro Galan and

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Puerta de Burras, the Argentine parishes of Belen, Santa Maria, Cachi, Rinconada and Santa Catalina, dividing those from the Bolivian cantons of Antofagasta, San Antonio de Lipes, Esmoraca and Talina as far as la Quiaca."

Moussy (1866) in Plate XVI. of his atlas begins the Bolivian frontier from parallel  $26^{\circ} 20'$ , to the north, by the summit of the mountains which divide the central plateau from the eastern plateau, and makes it pass to the east of Antofagasta, Antofallita, Cauchari and Sierra de Sapateji and Rosario, by Chorrillo, Tolar, Toconar and Esmoraca as far as Quebrada Quiaca.

Brackebusch (1882) in his paper on the petroleum formation of Jujui says, referring to this province :

" Its boundaries with Bolivia, still unsettled, are according to the actual conditions of possession and jurisdiction the following : to the N.E. the mountain of Intacancha ( $65^{\circ} 18'$  W. long. and  $22^{\circ} 10'$  in S. lat.). The boundary line issuing from here passes by Yavi Chico, La Quiaca, Penas Blancas, Piscuno as far as Rochaguasi on the River San Juan, the most advanced point to the N.W. On the west the Cerro de Granadas, and following to the north the river which rises in the said hill, called further down the Rio de Gaciayo, which joins in Chusmimayo with the River San Pedro; all these rivers join to form the River San Juan, along which the boundary runs as far as Rochaguasi. To the south of Cerro Granadas the boundary is an ideal straight line drawn from Cerro Galan to Cerro Incahuasi, and from here as far as the Rio Susques which further down is called the Rio de las Burras, and forms as far as its mouth near the Cerro Negre the divisional line with Salta. . . ."

The same author in his map of the interior of the Argentine Republic which was published in 1885 prolongs the boundary line southwards by the gaps of Chorrillo, Cortaderas, Pasto de Ventura and Cerro de Peinado, leaving within the

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Argentine territory San Antonio de los Cobres, and without it Rosario de Susques, Pastos Grandes, and Antofagasta.

Finally, in his new map (1891) Dr. Brackebusch has marked with more precision the boundary line in view of his new topographical operations and of those of the undersigned, fixing it by numerous summits and gaps allowing its easy identification.

Señor Manual Solá, in a report to the Government of Salta (1884) on the western boundaries of the province, says :

“ On the west the province of Salta is divided from Bolivia by the prolongation of the boundary line which, passing by La Quiaca, crosses the road from Tarija to Lipes as far as the Rio Grande or San Juan, and its headwaters, the River Granadas and Coyaguaima : it passes by Rosario de Susques, Toconao, Pastos Grandes, to the east of the Bolivian village of Antofagasta at 50 kilometres from Laguna Blanca, which remains in the territory of Salta, and, deviating to the west, runs along the summits of the Cordillera de los Andes and the frontier of Tucuman and Catamarca.”

The Argentine Geographical Institute, in the map of the Provinces Salta and Jujui (1886) marks the boundary with Chile to the north of parallel 26, by the beginning of the Quebrada de Tacuil, Cerro Luracatao, Cerro Tobar, whence, instead of passing by the opening of Tolar and the snowy mountains of Cachi, it turns to the snowy ranges of Pastos Grandes, leaving the swamp and village of that name in Argentine territory, but it recedes afterwards as far as the opening of Chorrillo, passing to the east of Rosario de Susques, skirting the headwaters of the Rio Coyaguayma, Cerro Granadas and the Rio Estarca.

Señor Latzina in his “*Geography of the Argentine Republic*” indicates the same limits as follows :

“ Province of Catamarca with Chile and the desert of Atacama and Antofagasta (formerly belonging to Bolivia),

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bounds the Province by *the line dividing the waters* which descend to the Pacific Ocean, and to the great central plateau. This line passes by the mountains of San Buenaventura, the summits of la Hoyada, Mount Azul, the gap of Pasto de Ventura, the summit of Sierra de la Laguna Blanca, the lagoons of Durazno and Diamante as far as the sources of the Rio de los Patos.

“Province of Salta. This province is separated from the desert of Atacama by the division of the waters which descend to the Calchaqui Valley, from the sources of the Rio de los Patos to the Cerro Gordo, Tagarumi and the gaps of Tolar and las Pizcas ; the line continues along San Jerónimo (to the west of los Chorrillos), the gap of Pasto Chico and the summit to the west of Salinas Grandes, until it meets the Rio de las Burras to the east of Susques.”

Señor Justo Leigue Moreno in his “ *Map of Bolivia, compiled from the documents existing in the Foreign Office,*” shows the department called Littoral from the 24th parallel to the mouth of the River Loa, as Bolivian territory occupied by Chile, giving to it on the west the same boundaries as Dr. Brackebusch and the undersigned.

Señor San Roman in his Report from 1889 and 1890, referring to his geographical work in the Cordillera de Atacama, says :

“ The international boundaries have been left defined with such a degree of precision and minuteness that it is quite unnecessary to make new surveys in the extent of more than a hundred geographical leagues of the bordering Cordillera between Cerro del Potro, where the single-ridged chain of our southern Andes ends, and the peak of Granadas, in the midst of the Bolivian plateau, being the meeting point where the boundary lines of the three Republics intersect, and the eastern termination of our territory and of the sea-coast, between the extremities of Huasco and those of the total area covered by

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the surveys and the network of more than 500 principal triangles, which represent an extent equivalent to one-third of the area of the rest of Chile as far as the canal of Chacao."

In fact, from the San Francisco Gap to the 23rd parallel, the map of San Roman contains not less than eighteen trigonometrical points. This boundary is almost coincident with Brackebusch's, save as to a detail in the Valley de los Patos [25° 30' S.] which the latter leaves entirely in Chilean territory, while San Roman leaves the upper part of the said valley in Argentine territory.

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### REASONS ALLEGED BY THE CHILEAN DELEGATES, IN THE PUNA ARBITRATION, IN SUPPORT OF THE CHILEAN EXPERT'S LINE.

[Translated from "*Documentos relativos a la Conferencia de Buenos Aires*,"  
Santiago, 1899, pp. 23-26.]

(Quoted on page 898 of the Statement.)

*The Chilean Delegates to the Chilean Minister for Foreign  
Affairs.*

BUENOS AIRES, March 11, 1899.

\* \* \* \* \*

THE Chilean Delegation maintained that the dividing line should be traced in the eastern chain of the Cordillera de los Andes beginning from Incahuasi southwards.

It stated as its reasons:

1st. That the Cordillera de los Andes, *within which the dividing line must necessarily be traced, is not only the western chain of Licancaur, but also the eastern chain which detaches from Incahuasi southwards*, the central chain which starts from the neighbourhood of Zapaleri to the south, and all the mountains and valleys existing between the chains of Incahuasi and of Licancaur; that this aggregate of mountains and chains, which join, bifurcate or separate, forms the great Cordillera that traverses all America from north to south; and that, though it be legitimate and usual to give special names to its different

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sections, it would not be so to separate any part of them, for they are really an aggregate of mountains designated by the name of Cordillera de los Andes by all geographers.

2nd. If it was *only* established in the Records that the line should be traced along the Cordillera de los Andes, the delimitation of the boundary by the eastern Incahuasi Cordon would be correct, this range being part of this Cordillera, and combining the conditions of height, continuity of high summits and division of waters contemplated in the treaties. Quoted  
p. 898.

3rd. That, as the Act of November 2nd establishes both that the line be traced in the Cordillera and that *this tracing be made in view of all the documents and antecedents referring to it*, the tracing must be executed in the Incahuasi chain which would leave the Puna, as at present, in Chile's possession, and that the Licancaur chain, which would yield the reverse result, should be rejected.

4th. That the Puna of Atacama, which the Argentine [Republic] declares to belong to it through cession on the part of Bolivia, ceased to be Bolivian territory from 1879, and consequently Bolivia could not in 1889 and 1893 cede what it had lost and ceased to possess in 1879.

That, apart from ancient rights, the Puna has been Chilean territory since 1879, for Chile, being at war with Bolivia, declared, in February and April of that year that the boundary Treaties violated by Bolivia were annulled, and that she reclaimed, as Chilean territory, all that extending south of parallel 23 wherein is included the Puna.

That this solemn declaration, officially communicated to neutral nations, is decisive since, either as recovered or conquered, it was sanctioned by the triumph of the Chilean arms, and has been upheld by an unbroken series of facts and official declarations and records from 1879 to the present day.

That the Treaty of Truce of 1884 between Chile and Bolivia only considered as Bolivian territory that lying north of parallel

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23, thus placing it beyond discussion that the territory situated south of this parallel was recognized to be Chilean, as had been already declared in 1879. This fact is emphatically stated in a note from the Chilean to the Bolivian Foreign Office dated December 15, 1888. It is stated with equal emphasis in the Treaty of Peace between Chile and Bolivia, signed May 18, 1895, which is absolutely silent regarding the territory situated south of parallel 23, and is affirmative solely with respect to territory situated north of this parallel.

That, moreover, the Chilean nationality of the Puna has been maintained with the assent of Bolivia. This statement is proved by the fact that the villages of the Puna have, from 1879 to the present date, been governed by Chilean authorities without any protest from Bolivia; by the presence of Chilean troops in this territory; by the exercise of jurisdiction there by Chilean tribunals; by Chile's rejection of the Bolivian law of jurisdiction which sought to attach some villages of the Puna to the province of Sud-Lípez; by the express inclusion of the Puna in the province of Antofagasta, created by Chilean law in 1888; and by many other facts and declarations. It is further shown by many English, German, Argentine and Bolivian maps.

5th. That if the declarations, agreements and facts adduced to establish the dominion of Chile over the Puna be insufficient to warrant this dominion being definitively secured, they unquestionably suffice to warrant our affirming in the clearest manner the Chilean possession of this territory: a possession which has existed uninterruptedly since 1879, and which Bolivia has explicitly recognized in the Treaty of Truce of 1884, the effects of which were defined in the Carrillo-Zañartu protocol of August 1887, called forth by the Bolivian law respecting Sud-Lípez, and in the declarations of the Chilean Ministry occasioned in 1888, by the Chilean law which established the province of Antofagasta, declarations which were

not impugned by the representative of Bolivia at Santiago.

We have shown lastly, that this Chilean possession radically vitiated the cession to Argentine by Bolivia of a territory which she did not possess and of which International Law prevented her disposing. . . .

\* \* \* \* \*

On this day [March 4] we summed up the whole debate and, recognizing that, so far as concerned the legal domain, all discussion was at an end, we frankly and openly proposed that we should endeavour to seek a conciliatory and friendly solution in view of the vast political and international interests to which our accord might lead.

Emphasizing our proposal, we declared that we were expressly authorized by the Chilean Government to seek *a settlement outside the province of strict right*, and that personally we strongly desired this result, this being one of the reasons which had led us to accept our commission.

We further stated that the high position and political influence of the Argentine Delegates and the absence of Geographers and Experts from the Delegation, as well as the unusually short delays allowed for discussion, indicated the Government's purpose of leaving technical solutions aside, if necessary, and of favouring a solution by compromise instead. (Quoted  
p. 756.)

In further support of our proposal we drew attention to the fact that, as the Puna was of no extraordinary importance and was, in the greatest part of its extent, unknown, it would be laudable and satisfactory to hit on a solution which, setting aside all idea of antagonism and strife between the two Republics, would afford genuine roots to their friendship and would abundantly stimulate their industrial, commercial and social interests conjoined by nature over a territorial proximity of thousands of kilometres.

EULIOJO ALTAMIRANO.—ENRIQUE MAC-IVER.—EDUARDO  
MATTE.—LUIS PEREIRA.—JULIO ZEGERS.

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### SEÑOR BERTRAND ON THE CORDILLERAS North of the 27th Parallel.

[Translated from an extract of "*Memoria sobre las Cordilleras del Desierto de Atacama*," etc., Santiago, 1885, pp. 195-200.]

(Quoted on pages 909 and 910 of the Statement.)

GENERAL DESCRIPTION OF THE PUNA DE ATACAMA AND  
ADJACENT REGIONS SHOWN IN THE MAP.—*Scope of our description.*

WE propose to collect in this chapter the knowledge we have acquired on the region represented in the map which is annexed to this Report. The information will be mostly of a superficial and practical character, as our object is to supply the traveller and the explorer with the needful data for the formation of an accurate idea of the region he is about to traverse, its resources, its tracks and its paths, warning him at the same time as to the deficiencies and blanks he will find in the same.

Doubtless the original information in geological and mineralogical matters will seem somewhat deficient; this is due to two causes: the first is that, during the journey we have been principally concerned with astronomical and geodetical observations, and consequently it has not been possible to form a collection of specimens which would have required frequent deviations from the route; thus, it has only been possible to acquire a general notion as to the various formations,

judging by the aspect of the rocks; the second reason is our conviction of the danger of generalizing from certain isolated facts; hence the little use of those premature geological or stratigraphical maps, in which hypothesis played the greater part, based on few, and sometimes unconnected, observations. The descriptions contained in the present chapter are based either on our own observations or on trustworthy and original ones in the works which we have just revised.

OROGRAPHY.—*Particular configuration of the Andes according to the latitude.*

M. de Moussy, describing the Cordilleras de los Andes, says:—

“ This gigantic range, which appears awful on account of  
 “ its piled up masses, begins as a single chain of inconsiderable  
 “ breadth in the south, and increases in amplitude as it trends  
 “ northwards. The width of its plateaus, increasing with the  
 “ number of its ranges (*chaînons*), and of its longitudinal  
 “ valleys, forms, under the equinoctial zone, in Bolivia, those  
 “ elevated plains which, at an altitude of 4000 metres, call to  
 “ mind the uniformity of the Pampas. It is from the 30th  
 “ parallel, a little to the north of the village of Jachal, that the  
 “ Cordillera duplicates and then triplicates, quadruplicates and  
 “ even sextuplicates its parallel ranges, so as to form, in the  
 “ first place, the grand Andean massif, and further east, the  
 “ Famatina chain, those of Rioja, Ambato, Aconquija and of  
 “ Alumbre, which is the easternmost spur at whose foot begin  
 “ the horizontal plains of the Chaco. It thus embraces in the  
 “ tropics an extent of seven degrees of longitude.”

Quoted  
p. 906.

This dismemberment of the Andes into parallel cordons is also observed in Chile, but, in general, the latter fall remarkably in height as they are further removed from the anticlinal cordon.

Amongst all these Cordilleran branches, geographers used to

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apply the denomination of Andes to the western range, because it is the one which deviates least from the general direction ; Señor Hugo Reck does so when dealing with the orography of the Bolivian high tableland, and calls the eastern one Cordillera Real ; this last, however, does not join the first, as Señor Reck believes, between  $23^{\circ}$  and  $24^{\circ}$  S., but continues further south without deviating much from its original direction. South of the 23rd parallel, however, the Cordillera Real does not preserve the continuity which it presents north of that parallel, nor is there, between it and the Andean Cordon, any other continuous snowy chain which substitutes it. In general, *it is difficult to consider the orographical features of the region about to be described as similar, either to the marked separation of Andes and Cordillera Real of Señor Reck, or to the parallel ranges of Señor Moussy.*

Quoted  
p. 909.

Quoted  
p. 910.

However, as it is necessary to introduce a certain order in our description, we shall divide into five orographic zones, parallel to the meridian, the portion of the Cordillera comprised between the 21st and 27th parallels. THESE VARIOUS ZONES DO NOT FORM RANGES (*cordones*) PROPERLY SO-CALLED, but rather *groups of summits*, and the following classification is based, not so much on the height of the latter as on the altitude above the sea of the more or less even ground on which they stand.

### OROGRAPHIC ZONES.

We shall not enter here on the consideration of the coast-zone, as it has not been included in our surveys, nor is it drawn in our map.

The *first orographic zone* which leaves to the west what has properly been called the “despoblado,” deviates little from the 69th meridian (west of Greenwich). It starts to the east of this meridian, at the heads of the ravines of Guatacondo near  $21^{\circ}$  S., and includes the group of mountains rich in minerals which surround on three sides the River Loa, the Cerros de

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Limon Verde, those of Caracoles and, further south, the Cordon de Varas, the Sierras of Sandon, Chaco, Bolson, Doña Inés, Cerro Vicuna and Indio Muerto. The western base of this zone has a general altitude of 1500 to 2000 ms. above the sea in its northernmost part, increasing in height towards the south. The passes across these mountains and their summits follow the same law ; thus, while the Cerros de Paqui scarcely rise to 4000 m., those of Caracoles, Las Aguadas and el Quimal attain 3500 to 4000 m., and the Cerros del Juncal and Doña Inés exceed 5000 metres.

The *second orographic zone* comprises the groups of lofty summits which form what more appropriately can be considered as similar, in this region, to the Andean cordon so well characterized in the south of the Republic. Beginning with the Volcan Olca, the Nevados de Aucanquilcha, Palpana, Polapi, San Pedro and San Pablo, Paniri, Puma Urco and Linzor, the mountain groups stretch more directly to the south by the summits of Tatio, Vizcachillas, Jorjéncal, Puripica, Licancaur, Pótor, Hécar, Láscar, Tumisa and Miñiques ; thence the four summits of Miñiques, Pular, Socompa, and Llullaillaco lie in a straight line to the south-west. South of the latter, beyond the Nevado de Azufre, *this zone is lost in a vast unexplored space, and seems to join the first* at the summits of Doña Inés and Cerro Bravo. The western base of this zone is, in its northern part, the upper course of the River Loa, and then, the succession of valleys, tributaries either to the Loa, or to the salt-plains of Atacama and Punta Negra. The northern and southern extremities of this base rise to more than 3000 m. above the sea, while its intermediate portion lies at about 2400 metres. Although this Cordillera cannot be crossed, as some affirm, at any point whatever, it has nevertheless numerous passes, as will be seen from the itineraries which we shall insert further on.

East of the Andean cordon a vast undulating region ex-

tends, the mean altitude of which varies from 3500 to 4000 metres ; this is properly called La Puna, from a Quichua word which means elevated region. Many mountain groups which form our *third orographic zone* lie scattered in this region ; among these are the volcano Oyagua, the Cerros de Tapaquilcha, the Nevados de Laguna Colorada, Torque, Quetena, Zapaleri, Lina, del Rincon, Pocitas, Antofalla, Mojones, and lastly those of Laguna Brava, San Francisco and el Peinado,—summits not inferior to those of the second zone, the difference being that these groups are all isolated, leaving between them passes not exceeding 5000 metres in height.

The *fourth orographic zone* may be considered as a prolongation of the Cordillera Real de Bolivia, on which broad ridge rise the notable Cerros de Chorolque, Santa Isabel and Lipez ; in fact the Cerros de Granadas, Incahuasi, Acay and the range of Cachi, follow from thence the direction of the meridian. The same zone is again met with, further south, in the summits los Quilmes and the Sierra de Gualumpaja. This zone forms, in general, the eastern boundary of the Puna, excepting the Puna de Jujui, which extends still further east. The eastern base of this zone is not lower than 3000 m., and in parts reaches 3500 m.

Our *fifth orographic zone* is formed, in the south, by the Sierra de Aconquija, that of Calchaqui, and, further north, by the Nevados del Castillo ; it forms the eastern boundary of the Puna de Jujui with the Sierras de Chañi and Aguilar, but extends much further east in the Sierra de Zenta, outside our map. The eastern base of this zone is very low, as few points rise above 1000 metres, and it descends to 450 m. in Tucuman.

After this rapid enumeration, it is easy to define the Puna as an expansion of the summit of the Cordillera whose level portions have an altitude of 3500 to 4000 metres, bounded on both sides by successions of mountains which, on the west, form the Andean cordon, and on the east, the fourth and fifth oro-

graphic zone. The proper configuration of the region of the Puna is, besides, accentuated by numerous groups of mountains distributed with the utmost irregularity, though it may be observed, as will be pointed out when dealing with the hydrography, that a general direction from north to south prevails.

Although *these groups do not properly form chains*, the space intervening between one summit and the next lies at a higher level than the lateral bases, thus constituting true openings and gaps, the altitude of which above the sea varies from 4200 to 4900 metres. This is applicable, as well to those which give access to the lower regions extending east and west of the Puna, as to those over which it is necessary to cross in order to pass from one part of the Puna to another.

#### HYDROGRAPHY.--*General idea.*

We already know that the Cordillera de los Andes in its southern portion forms a well-defined cordon, and constitutes the *divortia aquarum* between the waters which fall into the Atlantic and those which flow more rapidly to the Pacific.

*Although this water-parting ridge be not formed by the most elevated summits of the Cordillera, its course is nevertheless clear and undivided*; thus, the imagination could rigorously follow, step by step, the progress of two twin drops formed side by side on the edge of the Araucanian Cordillera, and which might glide down by the opposite slopes, one to the west, and the other to the east, from the ravine to the torrent, from this to the rivulet, to the stream, to the river, until the first should mingle with the waters of the Pacific amidst the sands of the Bio-bio, and the second should reach the Atlantic shores, lost in the waters of the Rio Negro at a distance of 1300 kilometres from the first.

As far north as  $32^{\circ}$ , the separation is always very clear, although the course of the waters is not continuous on the Argen-

tine side, as the Rivers Mendoza and San Juan have no direct or permanent drainage to the ocean. From  $32^{\circ}$  to  $28^{\circ}$  the dismemberment of the Andean summit mentioned by Señor Moussy becomes accentuated, forming great extents of very high ground, although these are not plateaus as some maps seem to depict them, the fact being that they appear blank, because they are unexplored and their mountains are unknown. *Despite the multiplicity of their ridges, the hydrographic system is continuous*, that is to say, the beds of all the ravines, streams and rivers, join successively to form the River Desaguadero.

*To the north of the 28th degree a new hydrographic conformation presents itself, consisting of independent basins, or hollows, whose waters do not visibly feed any river*, being besides separated from the conterminous basins by elevations of the ground. This conformation predominates in the Punas de Atacama, de Salta and Jujui, de Lipez, Chichas, and Oruro; in consequence of which there is a bifurcation of the *divortia aquarum* of the Andes into two branches; the western one corresponding to the boundary of the water-drainage towards the Pacific coast, and the eastern one to that of those which directly or indirectly are tributary to the Atlantic. These two branches of the *divortia aquarum* are very sinuous; they form very acute angles pointing inwards, such as those at the origin of the Rio San Francisco or Fiambalá, and the River de San Juan Mayo, and do not join again until  $14^{\circ} 30' S.$ , where the *divortia aquarum* line begins its unity which it preserves to the northern extremity of the Andes.

Between the two principal branches into which the water-parting line divides, many others exist, forming the separation between the various basins or hollows we have mentioned. Some of these are very extensive, such as those of Lakes Titicaca and Poopó, and others are very small, like the greater part of those forming the southern portion of the Puna, with a description of which we are dealing.

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### DR. L. DARAPSKY ON THE CORDILLERAS OF THE PUNA DE ATACAMA.

[Translated from extracts of an article entitled "On the Geography of the Puna de Atacama," published in "*Zeitschrift der Gesellschaft für Erdkunde*" zu Berlin, Band xxxiv., 1899, No. 4.]

(Quoted on page 915 of the Statement. Darapsky's Map reproduced in Plate XXXIII. facing same.)

(P. 282) BUT, as geology and climate involve numerous exclusive formations on the other side of the River Colorado and the Wahsatch Mountains, as the Rocky Mountains suddenly cease at Santa Fé, and yet similar conditions recur further on in the Llano Estacado as well as in the Bolsón de Mapimi, so also in the south of the continent, the region of the '*salares*', cannot be sharply divided by a sharp line from the basins of the sources of oceanic rivers. Apart from that, many of the latter deserve their name only periodically.

(P. 287) Whereas older descriptions show the high mountains with multitudes of chains, their number and length are generally reduced on closer inspection. Philippi especially sought to do away with them in Atacama by replacing them by plains with individual elevations. These plains then again exhibit inequalities, which unexpectedly seem to increase to ridges in an atmosphere the clearness of which annuls all differences of distance. The configuration of this world of high mountains is therefore just as imperfectly represented by transverse and longitudinal chains (according to Moussy and Pissis)

as by individual mountains scattered over open plains (according to Burmeister and Philippi). The base itself expands until it assumes gigantic proportions, the number of distinguishable summits decreasing with their slope ; from the crest of the pass the eye seeks in vain the ridges and peaks that have been followed for days, and which now turn into shapeless ledges. Steep declivities form the dwindling exception, and belong exclusively to recent lava-cliffs. But these ridges measure 4500–5000 metres, the depressions 3500–4000. Usually water plays the leveller of differences of height ; here its absence has a deceptive effect regarding the real circumstances. But local usage unhesitatingly chooses Cerro and Punta in speaking of one, and Quebrada in speaking of the other of the contrasts familiar to it. It shall have its way. Only a single instance of a real plain is known to me : the Meseta de los Colorados ; and even that is only the broad edge of the depression between Potrero Grande and Tamberia, and distinctly swells to the south and east.

To go at once into details, San Roman's "orographical systems" of the desert may serve as a starting point. The five meridian zones into which Bertrand divides the Puna should only facilitate the grouping. The author expressly protests against F. Moreno understanding by this the same number of chains (*cordones*). The word "Cordillera," which is by no means specially coined for America, but, true to its derivation, means any chain or range of mountains, leads us only too easily to find such everywhere. Coming from the south San Roman now first separates from *the main watershed* in the Cerro del Potro in  $69^{\circ} 40' 40''$  W. Long.,  $28^{\circ} 18' 30''$  S. Lat., a Cordillera Darwin, which is said to observe its course in the meridian more faithfully than the former. Opposite the Cerro Tronquitos, where he makes the Cordillera Darwin end, its place is taken by the Cordillera Domeyko, which stretches from the Volcán Copiapó in  $69^{\circ} 8' 40''$  W. Long.,  $27^{\circ} 19'$

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S. Lat., to the Cerro Quimal in  $68^{\circ} 43' 20''$  W. Long.,  $23^{\circ} 9'$  S. Lat., over the Cerros Maricunga, Codocedo, Bravo, Doña Inés, Bolsón, Chaco, Sapos, Varas and Imilac, a length of 550 km. According to C. M. Sayago the Cordillera Domeyko starts from the Cerro de la Gallina in  $69^{\circ} 3'$  W. Long.,  $27^{\circ} 49'$  S. Lat., in the main water-parting chain, and, passing the Cerro Quimal, rejoins the series of high volcanoes in the Tatio ( $67^{\circ} 58'$  W. Long.,  $22^{\circ} 27'$  S. Lat.). The last part San Roman specially gives as Sierra Barros Arana.

Whatever may be the guiding ideas in establishing these ranges, one thing is certain : that the stately cone of the Doña Inés (5500 m. S. Rom.) has no continuation southward. It ends abruptly, without spurs, and, before it, extends for over 30,000 hectares the Salar de Pedernales (3333 m.) so-called from the wealth of flint stones in a valley entering it in the S.W., but also called La Ola. From its edge, which in the N.W. is scarcely 30 m. above the surface, and overtops a ravine 150 m. deep, flows, a few kilometres southwards from the Agua Helada, at a third of the height, the Rio Salado, *a natural discharge of the great basin*. So low is the embankment, which is a pile of loose heaps of volcanic matter, that one can see from every part of the shore of the Salar the heights beyond the Rio Salado, and even the range of the Doña Inés Chica in the N.N.E. Only in the S.W. corner of the Salar do the mountains close up again nearer and higher.

Towards the north a mountain lies against Doña Inés, stretching uninterruptedly to  $24^{\circ} 49'$  S. Lat. It is true that mountain masses also extend further with a similar trend ; but it remains doubtful how they are connected with one another, the more so as they lose in height what they gain in connection. So far therefore a chain undeniably exists here ; it is usually regarded as the first or west Cordillera, and rises in the Cerro de Sapos to nearly 4800 m. *Here begins the Puna in the physiological sense* : westwards there are only river-valleys, al-

though but little water; *eastwards there are separate basins*. The Laguna Blanca, in  $69^{\circ} 27'$  W. Long.,  $24^{\circ} 35'$  S. Lat., is the first such salt-plain to cross over towards the coast also, where they now rapidly increase. The Salar del Cármen behind Antofagasta approaches the sea within 12 km. We cannot therefore ascribe this phenomenon exclusively to the Puna, as it evidently depends only on the quantity of rainfall. Its absence proves the prevalence of erosion throughout the district on this side of the western Cordillera and south of the 25th degree of latitude.

(P. 290) There can be no cross-ridge, like the Cordillera Claudio Gay as understood by Sayago, coming from the Cerro Tres Cruces, in  $68^{\circ} 43'$  W. Long. and  $27^{\circ} 7'$  S. Lat., over Leoncito, Panteón de Aliste, and Cerro Colorado de Pedernales, and turning to the Bolsón.

(P. 293) We have thus come right into the high Cordillera, Quoted  
p. 915. that of the giant volcanoes, the "main chain," Bertrand's Cordon Andino, or San Roman's Cordillera Real de los Andes, *and yet nowhere are mountain-ranges visible*. Whereas, in the case of the western range, Doña Inés—Alto de Varas, all the highest elevations were without difficulty brought into a line, and a simple ascent and descent over a simple pass sufficed to cross the mountains, *we have here a mass of about 70 km. in length and up to 25 km. in breadth*, between  $24^{\circ} 45'$  and  $25^{\circ} 26'$  S. Lat. Bertrand has rightly referred to the necessity, instead of devising "systems" and tracing "chains" (*encadenamientos*), of first arranging the Andes hypsometrically, and has himself ventured an attempt at such a description, so far as the material at hand allows. The Volcan Lastarria does not even take up the edge of the plateau, which has lakes and depressions up to 4600 m., *besides a confusion of flat or sloping summits which seem to flee from one another*. What seemed from the front to be a peak or ridge, when seen from the side grows into a regular fortress, which a horizontal bed of lava crowns with

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an insurmountable breastwork. Only on the east branches off a solid wall, at least from the pinnacle of the Cerro Cabezon, which becomes visible from the Sandon Pass, by the motley bastion-like sulphur peaks, to the dark brown Cerro de la Estrella. The south-east part is unknown to me.

(P. 294) It was formerly thought that the various Chacos had to be connected with one another and with the Llullaiyaco: the Sierra Gorbea is a relic of such an idea. But even any connection, from Doña Inés over Cerro Pajonales is inadmissible. Not only does a deep pass separate the ridge of Pajonales, which is nearly 5000 m. high, from the south-west; the feathered crest-line that points from this mountain in a convex curve over the Morro de la Desolacion to the Gemelos de Azufre (4680 m.) also terminates again here. This is proved by the Laguna Amarilla (3873 m.) and the furrow that winds by the pool Espejuelo to the north point of the Laguna del Plato.

*The connection of the "Real Cordillera de los Andes," which certainly does not form a chain from Llullaiyaco to 25° 26', causes San Roman some embarrassment in the south. But from Los Morros no other way can be claimed as a summit-line than that which, circling round the Laguna de las Parinas on one of its two sides, and leaving the depression of the Laguna de los Colorados (3950 m.) to the left, runs towards the rugged wall of the Colorados and the two-lipped cone of the same name in 68° 20' W. Long. and 26° 14' S. Lat. It is true that on this trend we find no conspicuous crests, only a few flows of trachyte rolling threateningly like black surf over the crest of Leon Muerto eastwards; but this tract marks "la línea" for the lungs of beasts of burden, known to every driver here on the old trade-route from Copiapó to Salta. This ideal line is also a climatic boundary: in the interior summer rain and storm; towards the coast, principally in the winter, snow, hail and storm with an unclouded sky. The Cerro de la Laguna Brava stands defiantly apart, likewise el Diente and the two peaks of nearly*

Quoted  
p. 915.

Quoted  
p. 915.

the same size north-east of it, whose triple majesty shuts out the panorama from Las Parinas. From the depression of the Laguna Brava (4075 m.), which runs S.W.-N.E. and retains scanty remains of water only at its most southern end, a deep cutting leads to the isolated and towering Diente.

But the Volcan de la Piedra Parada and the nameless one to the south-east of the Laguna de la Piedra Parada (4018 m.) are, as real volcanic mountains, *quite as isolated* as the Volcan del Agua Negra and the Panteon de Aliste. If the latter is connected by a wide open pass with the Sierra del Agua Helada, and in the north likewise with the Cerro Colorado (de Pedernales to distinguish it from innumerable namesakes), this mere juxtaposition does not involve any connection. It must at least strike one, that here, as at the Laguna del Cerro Negro (3950 m.), the loftiest elevations come out of the place assignable to them. As elevation and depression in the descriptive sense only illustrate contrasts, *it must be easy to construct around each basin a ring of mountains which may be connected in many possible ways.*

Quoted  
p. 916.

Accordingly it scarcely needs to be proved that *the Llullaiyaco is neither a central point nor a directing point, but an absolutely independent mountain*, which genetically influences its surroundings far less than it is presumably influenced by them. Even its imposing height leads us to expect this. The Ojo del Llullaiyaco (4074 m. above the sea) approaches within 10 km. of its chief summit, and the Zorritas Pass (4604 m.) within 8 km., and yet, according to Bertrand's trigonometrical measurement, the only one which is available and which is by no means too high, it towers nearly 2600 and 2000 m. above them respectively. It is a single, compact mountain with a chief summit and two minor summits, one S.S.W. of the former and for the most part separated from it by a snow-furrow, and the other and smaller one to the west. Spurs are absent ; only the Sillon de Azufre protrudes northward with three elevations.

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(P. 297) *A special unit is the volcanic massif of Antofalla, which falls little short of the Llullaiyaco in height, and far surpasses it in bulk.* Its broad crest with inward bent jags is oriented in about  $310^{\circ}$ , and has no continuation on the north and south. Only on the north-east does it seem, through various holes, to approach the three-tipped Sierra de Antofallita, from which it is separated by the Quebrada de Antofalla. In front of the Volcán de Antofalla, but independently developed, on the west side, are the Cerros de Chibarca, de los Patos, de Cajeros, and Botijuelas with its two peaks.

Mount Antofalla stands in the angle formed by two large fissures, of which one forms the Salar de Antofalla, also called Rio Salado (3307 m., and over 120 km. long), and the other, stretching over the Lagunas de los Patos (4085 m.), Cajeros (3802 m.), Potrero Grande (3570 m.), and Breas (3519 m.), meets the former in the 68th degree of longitude under  $55^{\circ}$ . Beyond the salares of Antofalla and Arizaro the mountains again arrange themselves with perfect regularity into long ridges running from north to south, with steeply raised strata which also traverse the Salar de Acarzoque (3970 m.) in groups of islands. Isolated among them are eruptive elevations like los Mojones. Easy as it seems to string these ranges into long chains, this task would be difficult in detail unless based on geological study, as Brackebusch very rightly observes.

## No. 114.

### ENGINEER FLINT ON THE CORDILLERA AT SAN FRANCISCO PASS.

[Extracts from "Proposed Railway Route across the Andes, from Caldera in Chile to Rosario on the Paraná, via Cordova, with Report of Mr. E. A. Flint's survey." By W. Wheelwright, in the "*Journal of the Royal Geogr. Soc.*," 1861.]

(Quoted on page 924 of the Statement.)

(P. 156) THE entire distance from the Pacific to the Atlantic by the proposed route is about 1000 miles which may be divided into the following sections:—

	<i>Miles.</i>
1st. Rosario to Cordova .. .. .	250
2nd. Cordova to the eastern base of the Andes or Fiambalá .. .. .	350
3rd. The eastern base of the Andes to the junction with the Tres Puntas Railway .. .. .	320
4th. The junction with the Tres Puntas Railway to Caldera .. .. .	80
* * * * *	

(Pp. 157, 158) According to the tabular section of our survey from Copiapó across the Cordillera . . . it will be seen that the first point at which the gradient begins to assume a serious character is at the junction of the San Andres and Paipote Valleys. . . . Just beyond Maricunga commence the most serious gradients, and a tunnel of more than half a mile in length will be needed to pass from Moreno's valley to the main valley, but the rest of the work to the "Cuesta de los

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Chilenos " will be trifling. To pass the Cuesta another tunnel will be needed on a grade of 100 feet to the mile, and its length, for the purpose of estimating, might be stated at 2 miles. . . . *We are now on the central plateau of the Andes.* From Laguna Salada to the Rio Lama we rise for 18 miles at the rate of 2 feet per mile, and then . . . we have a gradient of 619 feet per mile for 3 miles. . . . This heavy gradient has been necessary to reach the plains of Tres Cruces, about 30 miles long and 10 miles broad. We pass through the centre of them over a greatly rolling surface for 10 miles, when we bear more to the eastward for the "Barrancas de las Llamas." These Barrancas are a spur from the Las Llamas mountains, and extend quite across the plain to the volcanic range on the other side and serve as a barrier between the Tres Cruces and Las Llamas plains. . . . From this point we fall gradually to the Barrancas Blancas and then rise again to Laguna Verde, the level of which I have assumed at 14,921 feet above the sea.

Although the road just described is perfectly practicable, yet a preferable location for gradients, though a more expensive one, could be obtained by keeping more to the north and skirting *the volcanic range* with a gradually ascending gradient and thus overcome part of the rise of the pass of "San Francisco." But, assuming that it is necessary to pass the level of Laguna Verde, we then have an average rise to *the summit of the Pass* of but 66 feet per mile for  $16\frac{1}{2}$  miles. The descending gradient from here to the "Punto del San Francisco" is 180 feet to the mile, but as the location of the railway would be to the north, keeping up along the base of the mountains, an average gradient of 140 feet per mile would be sufficient, while the extreme gradient for overcoming this pass on a straight line, or in other words, the natural rise of the ground, is in no place over 300 feet per mile. From the great width of the pass it is but reasonable to suppose that the gradient could be so much reduced by location.

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From "El Punto de S. Francisco" to Fiambalá we find no impediment, with the exception of the passage of the Angostura of the "Las Losas" river, where the stream descends rather abruptly for 5 miles. . . . *I would call attention to the fact that from the Pass of San Francisco to Copiapó the force of gravity could be used as the motive power, and as the freight would principally be in that direction, the gradients would be less objectionable; cattle, sheep, and metals always passing down, while the lighter goods and passenger traffic would depend upon locomotive power.*

\* \* \* \* \*

(Pp. 160, 161) The Chile Cordilleras are divided into two distinct ranges. In the province of Atacama the first range is distant about 40 miles from the coast, and the second about 140 miles. The intervals between these two ranges are occupied by elevated plains, like that between Chañarcillo and Huasco.

The two ranges of mountains form three distinct geological groups: 1st. Extending from the sea to the eastern base of the coast range is of the same formation as the Upper Cordilleras. 2nd. From 20 to 40 miles in width lies in the basin formed between the coast range and the Upper Cordilleras and overlies the granitic and igneous rocks which probably extend from the coast to the main range. . . . 3rd. Consists of the tertiary and alluvium deposits which were formed subsequently to the upheaval of the mountain ranges. . . . The Middle Cordilleras are of the igneous formation and generally unstratified. Sulphur abounds and is said to be quite pure. . . . Salt with which Copiapó is supplied, is taken from the Laguna Salada on the east side of the "Portezuelo of los Chilenos," and after five days' journey with mules and one day's cartage, is sold in Copiapó at 250 dollars per 100 lbs. . . .

*The Argentine slope of the Cordilleras, as far as our journey extended, was very similar in its frontier to that of Chile—of the same igneous character, and generally granitic. . . . The*

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mountains on this slope have been very imperfectly examined for minerals. I was fortunate enough to meet with a "Cateador" at "Punto de San Francisco," who was in search of a silver "derrotero," notes of which had been left by the same Spaniard who was acquainted with the existence of "Tres Puntas" and the "Ola." . . .

The soil from the Copiapó river to the summit of the Chile Cordilleras is generally sand and gravel, while sufficient earthy matter exists from "La Puerta del Paipote" to "Los Chilenos" to support a scanty vegetation. . . . The plateau of the Middle Cordilleras is covered with sand and gravel, mixed with volcanic stones, more or less silicious. . . . *The soil on the Argentine slope is also sand and gravel*, the former predominating in the valley of the "Fiambalá," and is of whitish-grey colour, similar to the sea-beach sand, which gravel is the characteristic of the Valley of "Las Losas." *Owing to the greater abundance of water on the eastern slope*, vegetation is quite abundant even at the height of 14,000 feet above the sea. At the Punto de San Francisco we found extensive salt-marshes abounding in grass, while even at the summit of the pass the "cuerno de cabra" furnishes an abundance of firewood of the best quality.

## No. 115.

### DR. BRACKEBUSCH'S GENERAL DESCRIPTION OF THE NORTHERN CORDILLERAS.

[Extracts translated from an Article entitled "The Passes of the Cordilleras between the Argentine Republic and Chile, from 22° to 36° S. Lat.," in "*Zeitschrift d. Gesellschaft für Erdkunde*," zu Berlin, Band xxvii., 1892.]

(Quoted on pages 953 and 957 of the Statement.)

#### *Structure of the Cordilleras.*

(P. 259) To decipher the apparently simple, but really somewhat complicated, orographical features of the northern part of the Argentine Republic is only possible by studying them geologically; and, although my previous works in this direction only bear the character of extensive exploring expeditions, they have yet provided me with a picture of the Cordilleras which can lay claim to perfect novelty, and will correspond to reality in its main features. For the better understanding of the following I would refer the reader to my new map of the Argentine Republic, which represents the orographical features as I believe I proved them in the main to be on my travels in the years 1875-1888, when I made numerous journeys in all directions. Moreover, in order that the reader may be able to connect the districts extending beyond my map, north of 21° S. Lat., I would ask him to take either the fine map of South America compiled by Kiepert, or Stieler's excellent latest map; in the latter only the sharp *hachuring* of the mountains east of Cochabamba disturbs me, as, according to my own convic-

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tion, there is here an undulation with its longitudinal axis falling fairly on the meridian-line, so that the whole mountain-system across Suere and Tarija towards Jujuy and Oran (in the Argentine Republic) represents a series of parallel chains pierced in various places by large rivers like the Rio Grande, Pilcomayo, and Rio Pilaya. If we therefore leave out the whole eastern complex of mountains, and imagine, from Oruro, a sharply defined range of heights running along the mountains of Asanaque (5133 m.), Michaga (5300 m.), Chorolque (5624 m.), and C. Granadas (at least 6000 m.) to Nevado Chaco, we have thus the continuation of the *eastern Cordillera*<sup>1</sup> that runs N.W.-S.E., parallel to the Pacific coast, further north. This (see my map) extends along the Nevado de Cachi, the Cordillera de los Patos, the Nevados del Diamante, the Nevados de la Laguna Blanca, and the Sierra del Tolar (Morado, Colomé, Fraile) to Tinogasta, rising again in the south to 4000 m. as the Sierra de Velasco, subsequently, as the Sierra de los Llanos and the Sierra de San Luis, to disappear gradually below the plain.

From Bolivia to the Nevados of the Laguna Blanca this great chain is typically Andean, and I shall therefore call it in future *the eastern main Cordillera of the north*. *The western main Cordillera* is easily recognized on Stieler's map, running along the entire length of the Pacific coast; <sup>2</sup> not until north

<sup>1</sup> In Bolivia these snow-covered mountains are called *Cordillera Real*, i.e. the Cordillera proper. See, inter alia, *Reck in Peterm. Mitt.*, 1865, p. 282. Only Reck makes the mistake of translating Cordillera Real by Königskordillere (King's Cordillera), to which Tschudi (*Reisen durch Südamerika*, v. p. 190) has already called attention. The word *real*, however, has a double meaning in Spanish, it being derived either from *realis* or *res*, when it answers to our word real, or from *regalis* = royal. Only the first meaning has sense here, with the second the expression has nothing to do. Similarly a good, broad, frequented road is also called *camino real*, which expression Güssfeldt (see *Reise in den Andes*, p. 334) also wrongly translates by "royal road" (fig. "great road").

<sup>2</sup> Reck (*Peterm. Mitt.*, 1865, p. 282) calls it Andes-system, and describes its course north of Atacama o Peru, with the passes leading over it. How far the expression *Andes* familiar to us in Germany is really used in South America, I have not yet been able to ascertain; *it is not used in the Argentine Republic*,

of Atacama (at Mt. Miño, 5520 m.) does it recede somewhat further from the coast, and then runs by Licancaur (6000 m.) Miñiques (6000 m.), Llullailaco (6600 m.), Chaco, Bolson, Cerro Bravo, and the Volcan de Copiapó to El Potro ; (the western parallel chain running northward from El Potro to Tronquitos has been recently named by San Roman Cordillera Darwin, and the Cordillera running northward from the Volcan de Copiapó along Maricunga, Codocedo, Cerro Bravo, Doña Inés, Bolson, Chaco, Los Sapos, Varas, and Imilac, the Cordillera de Domeyko ; we regard the section from the Volcan de Copiapó to Mt. Chaco as belonging to the western main Cordillera) ; from El Potro along the Cordillera del Inga, Taguas, Chivato, Bañitos, Deidad, Agua Negra, and Tórtolas to the Cordillera del Agua Negra, then to the Cordillera de Doña Rosa ; from here its height appreciably diminishes, so that in summer it is partially almost free from snow ; only when it enters the more southern latitudes, is it again covered with snow in consequence of the rawer climate. At the same time higher isolated cones also occur in it further southward ; it runs along the Cumbre, Tupungato, and Maipú to the Planchon, and is finally broken up in the islands of the southern part of Chile.<sup>1</sup> Between this western main Cordillera and the eastern main Cordillera of the north, extends to the Nevados de la Laguna Blanca the so-called great *Bolivian Plateau*, of which the part south of 23° is now taken possession of by Chile.

The expression plateau may, however, give rise to error ; it is by no means a high plain extending between the two main Cordilleras, but we have again here a markedly undulating country with its individual folds striking from S. to N. On the 27th degree S. Lat. this plateau suddenly ends, and breaks

*where they speak only of the Cordillera.* Cf. Stelzner, *Beitr. z. Geol. u. Pal. der A. R. I.*, p. 4, note.

<sup>1</sup> From the geological standpoint it is perhaps more correct to take, as the continuation of this Cordillera, the mountain-range running from C. Overo via the Cerros Bayos, Nuco, Chacay, Minas, Vutamallin and Palauco.

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up into distinctive single chains. The first is the Sierra del Tolar (on the maps incorrectly called Galampajá, for only a small district bears this name), which we have already mentioned as the southern continuation of the eastern main Cordillera of the north in its southern course and interruptions; secondly comes a chain, generally free of snow in summer, which is composed of argillaceous schists and, beginning at Diablito, extends along San Buenaventura, Palca and Planchadas to Cerro Negro, reaches a considerable height (6200 m.) in the snow-covered Famatina, but, as quickly, sinks again, and entirely disappears somewhat south of  $30^{\circ}$  at Paganzo (old crystalline schist). By the Argentines the whole chain south of San Buenaventura is not reckoned among the Cordilleras.

The next longitudinal range to the west, which is chiefly composed of crystalline schists, begins in the Nevado de San Francisco, runs by the Sierra de Cazadero and the Potrero Grande (west of the Valle Hermoso de Vinchina) to the Sierra de Umango (Humango), and from there viâ Maz, east of Guadacol, to Cerro Rajado; it then exhibits more recent strata, partly Rhaetian, and assumes more the character of a plateau lying against the Famatina range, and running west of Ischigualasto to the Sierra del Peñon (here again old crystalline schists), Chaves, and de la Huerta. This chain then almost ceases in the plain, but rises again further south in the Sierras de Guayaguas, Cantantal, Quijadas, and Gigante, and comes to an end in the Alto Pencoso in the plains of the province of San Luis. The whole of this range is also not in the least Andean in character.

The next chain to the west begins south-west of the Nevado de San Francisco, runs as a distinctive schist-range through the Nacimientos del Cazadero, Alto Machaco, Cumichango, Leoncito, and Descubrimiento, and breaks up into a whole series of parallel chains, the most eastern of which extends to

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San Juan as the Sierra de Villicum,<sup>1</sup> while the main elevation lies in the Sierra del Tigre (it is not quite clear to me whether the isolated range called the Pié de Palo belongs to it, it being probably only a branch of the Sierra de la Huerta), the Sierra del Tontal, and El Paramillo.

This complex (called " Anticordillera " by Stelzner, " Pro- " and " Contracordillera " by Burmeister, and " Praecordillera " by Strobel, *names which only have a local value*, wherefore dispute as to the preference of one or the other seems to me purposeless), abuts near Cacheuta, south of Mendoza ; probably, however, it has its continuation in the mountains east of San Carlos, and further on, to the south of San Rafael, in the ranges of the Nevado and Chacha-huen, Anca Mahuida, Sierra Valcheta, and Sierra General Roca. The whole of this range is also not yet numbered among the Cordilleras.

Further west of the Nevado de San Francisco a Cordillera comes from the north (called Cordillera Claudio Gay by San Roman), which, exhibiting at first volcanic rocks, runs along Tres Cruces and Patos, Nevado del Bonete, Estanzuelo, Peñon (from here granite with shreds of clay-slate), and Pastos Amarillos to the Alto del Cachipaya. West of this chain lies a plateau, which may be traced from the Laguna Brava (which is already reckoned as a part of the Cordillera) for over 500 kilometres southward. The Llanos of the Lagunita Verde, de Santa Rosa, San Guillermo, Chinguillas, Tudum, Tocota, Calingasta, Yalguaraz, and Uspallata are all only continuations of a large plateau, which is seldom intersected by large rivers—the Rio Blanco, San Guillermo, Palca (lower course of the combined Rios de la Sal and del Valle del Cura), Castaño and Calingasta—which have torn deep beds (canyon) in it. It is covered for great distances with rubble, a few isolated hills rise here and

<sup>1</sup> This is what the range is called in San Juan, and not Villagun (this name is found west of San Juan), as Wappaeus asserts (*Gött. gel. Aug.* 1877, p. 534). Cf. Stelzner, *Beitr. z. Geol. u. Pal. d. Arg. Rep.*, i. p. 5, note.

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there, and, only where the above-mentioned rivers or their tributaries wind through it, in what are generally very narrow gorges, do we perceive also the real underlying rocks (granite, quartz-porphyry, and palaeozoic and mesozoic sediments).

This plateau forms one of the most interesting phenomena of South America, and is also of great archaeological interest, as, over it, still easily recognizable, and in places even paved, runs the famous Inca road which was used by the powerful Peruvian rulers on their journeys to the south. It probably owes its origin to some great tectonic process, the exact explanation of which gives room for further detailed investigations. The studies I have hitherto made in this respect are of course still quite in the early stage, as it had to be my first consideration to determine in its main features the geological character of the mountains lying east and west of it, and to fix also the course of this depression, which I shall hereafter call (on account of the Inca road) *the Inca Plateau*. The northern part corresponds to the course of the Rio Blanco, which, east of Rodeo, flows through a deep transverse valley to Jachal, and the southern part to *the Rio de Calingasta* (or Castaño), *which likewise breaks through the eastern chain in a steep transverse ravine towards San Juan*; between the two river-systems the height of the plateau amounts to about 2500 m. I have been in both valleys, but have not yet arrived at a final solution of their origin. The Quebrada de Jachal is 20 km. long, and, as the river at its entrance (near the Trancas) lies about 1630 m. high, and at its exit (near Pachimoco) about 1380 m., it has a fall of about 250 m. (average therefore 1 : 80), while the height of the crest of the range it pierces rises to approximately 3000 m. The Quebrada de San Juan, on the other hand, is 30 km. long, and lies 1300 m. high where the river enters it (Isla), and 1100 m. high where it really leaves it near Yoca (the river runs about 30 km. further southward before turning eastward a second time to break through a fresh range), and has therefore a fall

of 200 m. or, on an average, 1 in 150; the height of the crest of the chain it pierces (the immediate continuation of the above) amounts here to about 3300 m. In neither valley does any eruptive rock crop out (the mountains consist of palaeozoic clay- and graywacke-slate and lime) that could be explained as the attendant phenomenon of a tectonic breach, as may otherwise occur. But the side-valleys descending north and south in both valleys are presumably filled with the same mesozoic strata as constitute, partly at least, the sub-strata of the Inca Plateau. I consider that the latter was formerly glaciated; the rubble formations still lying upon it are, in that case, remains of former ground moraines, a view which is favoured by the angular form of the single lumps. The immense glacier overhung where the entrances to the two valleys are, and caused their erosion; then, as the glacier gradually retired into the high mountains—we shall see that remains of it still exist—a large part of the moraines was carried away by the flowing water through the ravines, and deposited in the form of the large drift-terraces that lie in front of the whole range north and south of San Juan (similarly near Mendoza and further southward. Cf. Stelzner, *Beitr.* etc. i. p. 285 et seq.).

*West of the Inca Plateau rises the Cordillera proper, which divides again into an eastern and a western Cordillera. From the range of the Tres Cruces (continuation of San Roman's Cordillera Claudio Gay) the eastern Cordillera of this southern part of the South American highlands, composed principally of argillites (partly horn-stone) and granites or porphyries, runs viâ the Nevado del Veladero (called Vidal Gormaz by San Roman), the Cumbre de las Barrancas Blancas, and Fandango, to the heights of the Brea, Carachas, San Guillermito, Fierro, Salado, Colangüil, Conconta, Olivares, Ollita, Mainrique, Totorá, Ansilta, Aldeco, Espinacito, Tigre and Aconcagua, Picheuta, Jaula, Plata, Portillo (East), Cruz de Piedra, and the Iglesia. If we regard the above-mentioned range from Cerro Overo*

Quoted  
p. 953.

*to Cerro Palanco as really the continuation of the western Cordillera, the eastern Cordillera would end at the Rio Atuel.*

THE SUMMIT-LINE OF THE EASTERN CORDILLERA IS PARTIALLY HIGHER THAN THAT OF THE WESTERN OR BOUNDARY CORDILLERA, WHICH FORMS THE WATER-PARTING. (The king of American mountains, Aconcagua (almost 7000 m.), lies on a connecting plateau between the two Cordilleras, and belongs to neither of them.) Quoted  
p. 956.

The *western or boundary Cordillera* we have already discussed; a word more may therefore be allowed regarding the *hydrographical division of the two Cordilleras*.

The *whole region between the two main northern Cordilleras is undrained*; a great desert, with numerous salt-steppes, lagoons, and sandy plains, extending between the two chains.

The character of the depression between the *two main southern Cordilleras*, which are much closer to one another than the northern ones, is quite different. Here there are only more or less *narrow longitudinal valleys separating the two chains, and in these the sources of the larger rivers of the country first unite, to flow either northward or southward, and then in a bend* TO BREAK THROUGH THE GREAT EASTERN CORDILLERA IN WHAT ARE GENERALLY INACCESSIBLE GORGES ABOUNDING WITH CATARACTS.<sup>1</sup> These valleys are then connected again by cross-ridges, which are probably all passable (my investigations in this respect are not yet concluded) and allow an uninterrupted passage, in a longitudinal sense, between the two Cordilleras.

Thus in the north the Rio Blanco flows southward, and unites above Pucha-pucha with the Rio Macho Muerto, which rises at El Potro and, running first southward and then northward again, passes round the Mogotes in a large curve. Skirt-

<sup>1</sup> Unfortunately my way has never taken me through one of these great transverse valleys, *they being inaccessible to mules*, so that I am not able to make an exact statement regarding their origin.

ing the valleys running southward a road leads into the valley of *the Rio de la Sal*, which, running south, receives the Rio de las Taguas from the south at the Bañitos de las Taguas, and *the Rio del Valle del Cura*, likewise from the south, at Mt. Jarillal, and then *breaks through the eastern Cordillera*. By riding to the end of the Valle del Cura one can get, certainly with some difficulty, direct into the basin of the upper Rio Castaño. The most southern of the affluents of this river is *the Rio Atutia*, which at first flows southward, and, after its union with the other headwaters (Rio Blanco, San Lorenzo, San Francisco, and Melchior) *breaks through the Cordillera de la Ollita*. From the Rio Atutia we can pass again into *the large valley of Santa Cruz*, not yet explored by me, *whose river*, flowing south, forms *a chief tributary of the Rio de San Juan*, after having forced its way through between the snow-covered mountains of *Ansilta and Aldeco*, as the Rio Colorado. From a lateral branch of this river coming from the south we get into the upper basin of *the Rio de los Patos*, which again first flows southward, and *winds through between Espinacito and Aconcagua*. From the southern affluents of the Rio de los Patos we can get, viâ the plateau of the Mesa del Volcan (east of the independent Aconcagua) to the Rio de Mendoza; and thence, through the valley of the Tupungato, which comes from the south, into the valley of *the Tunuyan*, which flows to the south and *breaks through the Portillo chain*. From southern affluents of this last, perhaps the Duraznito, we shall be able to get to the Laguna del Diamante, from which the Rio Diamante flows southward. Thus it is possible to travel in almost a straight line between two Cordilleras,<sup>1</sup> mostly snow-crowned, lying close to one another, from 28° to 35° S. Lat., that is 7 degrees or about 800 km. without finding a human dwelling

<sup>1</sup> The peculiar structure of the Cordilleras generally makes it necessary to cross two Cordilleras in order to get from Argentina to Chile, unless it happens, as is the case with the Agua Negra and the Rio Mendoza, that the river-valley through the eastern chain is passable.

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(with the exception of the Punta de Vacas), but always fresh water, wood, and abundant fodder for cattle, and also good shooting (vicuñas and guanacos, duck and wild geese). So that we have here a counterpart of the grand Inca Plateau; both depressions are phenomenal formations of the first rank.

In order to find an explanation for the peculiarity of the last-mentioned valleys, I must add a few geological observations. But, as in the following lines, it is not my intention to write a geology of the Cordilleras (a concise survey of these features will accompany my geological map), I shall have to confine myself merely to very general statements; and, in the same way, I shall also only be able to consider a few geological features here and there in speaking of the passes of the Cordilleras, without entering into any details.

The real *western or boundary Cordillera*<sup>1</sup> is principally composed of Mesozoic rocks (sandstone, limestone, and marl), ranging from Rhaetian up to chalk. These strata, which are partially rich in fossils, are interstratified with numerous seams and masses of eruptive rocks; porphyries, diorites, dioritic porphyries, melaphyres, olivine diabases, and amygdaloids form the older group of them, and these have been followed in later times by augitic and hornblendic andesites, basalts, and in some places also natural glasses (obsidian, pearlite, and pumice). The tufas of these volcanic masses especially form large sections of the western Cordillera. A peculiar place is also occupied among the eruptive rocks by younger granites or diorites, called Andean rocks by Stelzner, who would attribute them to the Tertiary period. But I have come to the opinion that part of

<sup>1</sup> The Chilean coast-range consists of old crystalline schists intermingled with older eruptive rocks, immediately above which (according to Steinmann), that is, without palaeozoic strata forming a connecting link, the mesozoic strata to be mentioned hereafter have been deposited. Within the latter large pieces of granite or diorite occur in many places, which, however, have not yet been much examined; if these do not belong to Stelzner's Andes-rocks, they can scarcely be regarded otherwise than as denuded primitive rocks.

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them still belong to the Mesozoic period ; to go into these matters in the present work would, however, lead me too far.

The Chilean geologists, especially Pissis, have advanced the most incredible theories,—theories that, I regret to have to say, fly in the face of all geological facts, as to the age and origin of the great Mesozoic rock-masses. According to them most of the rocks were originally sediments, and are represented by every geological system from the Cambrian to the Cretaceous. By a great metamorphosis these enormous masses were then converted into new formations. Thus the notorious stratified porphyries have been introduced into literature, and have continued to haunt it. Even older authors, especially A. Philippi, have repeatedly shown how far-fetched and monstrous this theory was, and have sharply criticized the so-called geological map by A. Pissis, who, with a boldness that is quite astounding, draws geological lines between Palaeozoic, Dyassic, Triassic, Jurassic, and Cretaceous strata within sedimentary and eruptive rocks of exactly the same kind and age. But Stelzner was the first to throw the right light on the subject ; unfortunately it was not granted him to continue the investigations he had begun so brilliantly, he accepting a summons to Freiburg to escape difficulties that had arisen in the country. The most important work on these matters we have still to await from Steinmann, who, after taking part in the German Transit of Venus Expedition in South Chile, devoted himself for some time to geological studies in the Cordilleras of Chile and Bolivia.

On the other side (east) of the great longitudinal valleys between *the two Cordilleras of the south*, the place of the Mesozoic series of strata is taken suddenly, and without a trace of them having hitherto been found westward, by Palaeozoic rocks, which, interstratified with granite and quartz-porphyrries, and not infrequently metamorphosed into horn-stone, extend from the Bolivian plateau, and have the principal share in the composition of the *eastern Cordillera of the south*, the

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branch-chain following it eastward, and the sub-stratum of the great plateau between them.

Then follow, lower down, old crystalline rocks (principally gneiss and older granites, but, between them, also isolated Palaeozoic formations), which, likewise extending from Bolivia, form a part of the mountains called by me the *eastern Cordillera of the north* in Argentine territory, and have the chief share in the composition of the lower mountains further south, which rise abruptly from the plains of Central Argentina. In numerous places these old crystalline and Palaeozoic formations are overlaid by Mesozoic strata, whose age has not yet been determined, owing partly to the absence of fossils. East of the Archaic groups of strata there lie, in the northern part of the country, further great Palaeozoic formations, which again give way, in their turn, to later Mesozoic (probably for the most part Cretaceous) deposits.

If we now return once more to the *eastern main Cordillera of the south*, we have first the striking phenomenon that, from the beginning of the great valleys (south of 28° S. Lat.) not a Mesozoic deposit has yet been observed within the region of the Palaeozoic strata with their interstratified granite and quartz-porphyry (the west slope of Espinacito, where Stelzner found Jurassic fossils high up the pass-summit (4400 m.), lies already west of the granite limit); only at the foot of the Cordillera, at the western edge and in the sub-strata of the great Inca Plain, do they appear, and they may then be traced eastward as far as mountains exist. But here a second striking phenomenon comes to light; whereas the Mesozoic formations occurring west of the eastern Cordillera teem with marine conchylia, *in the eastern Mesozoic deposits not a trace of them has yet appeared!* I think that these facts give us the key to the formation of the southern part of the continent. *At the end of the Archaic period, Chile and the western Cordillera formed dry land, while its west coast began to be washed by the Palaeozoic sea. From*

*the end of the Palaeozoic period, the present eastern Cordillera of the south formed the west coast of South America, west of which lay a long chain of islands (similar to the islands of South Chile). The present western or border Cordillera was, in Mesozoic times, submerged under the ocean (a few granite islands may have stood out of it). By some tectonic process the western or border Cordillera gradually rose (to a height of over 5000 m.), but the old coast left its traces behind in the high mountain-valleys above-mentioned. The greater part of the rest of the Argentine Republic remained dry land. In the Tertiary period, part of the land (the southern Paraná basin and East Patagonia) begins to disappear beneath the ocean; this is proved by the occurrence here of marine Tertiary formations, which have only been observed here, and nowhere in the interior as yet. When these districts rose from the ocean again they offered the present features of the coast of the Argentine Republic.*

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### VARIOUS DOCUMENTS RELATING TO THE DOUBTFUL DOMINION OVER THE "VALLE DE LOS PATOS."

[Translated from "*Memoria de Relaciones Exteriores de la República Argentina*," 1875.]

(Quoted on pages 1010-1012 of the Statement.)

#### Enclosure A.

*From Señor Tejedor, the Argentine Minister for Foreign Affairs, to the Governor of the Province of Mendoza.*

BUENOS AIRES, April 13, 1874.

MR. GOVERNOR,—

(P. 193) I have received your communication of the 1st inst., with the documents adjoined.

It appears from them that the toll collector in the Cordilleras, D. Pablo Lopez Montoro, was seized in the valley of los Patos by an order which the Señora Doña Paula Sotomayor, widow of Señor Rosas, gave to her *peones*; and on the following day, after the first stage, he met a body of the police of San Felipe de Aconcagua sent by the Governor of Chile by whose order he and his *peones* were taken to San Felipe jail on Friday, February 27, and placed under the jurisdiction of the judge of the Department.

Montoro himself adds that, on consulting a lawyer, the latter advised him to ask for a copy of the written allotment by auction, "as the title is not sufficient, on account of the 'Valle

de los Patos del Sud ' not being demarcated therein—that being the place where he was apprehended—as it is said to belong to the Republic of Chile, and as *these declivities run (estas caidas corre)* towards San Juan I believed to have the right of situating myself there.”

Quoted  
p. 1011.

It is incomprehensible, Mr. Governor, why the said purchaser, having been imprisoned so long at San Felipe de Aconcagua, and having been advised by counsel, has not during all this time addressed the statement of facts to the Argentine Minister at Santiago nor sought his protection. It is also incomprehensible *why the title should not include the point of the “ Valle de los Patos al Sud ”*—where the purchaser thought it advisable to station himself for the collection of taxes—*if this point was really Argentine territory*. Nor are we informed, lastly, who the Señora Doña Paula Sotomayor, widow of Señor Rosas, may be—whether Argentine or Chilean—nor *whether the settlement, the peones of which were employed for the first attempt, is situated on Argentine or Chilean ground*.

This Office needs all these data to draw up the suitable claim, if there be occasion for such, adopting all means that may be to the point; but I may now beforehand warn you that once the territorial rights of the Republic are unquestionably proved, or the exercise of its jurisdiction, unresisted for some time back, it is its right and duty to respect all such, even though exercised by force, reporting thereon immediately.

(P. 194) I should also say that on this same date a copy of the whole is being sent to the Argentine Minister in Chile in order that he may, on his side, obtain a thorough knowledge of the facts reported, and may act in conformity with what he may discover, in any case protecting the purchaser against any undue abuse or severity.

I have, etc.

C. TEJEDOR.

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### Enclosure B.

*From the Governor of Mendoza to the Argentine Minister for Foreign Affairs.*

(P. 195) MR. MINISTER,—

I have had the honour to receive Your Excellency's note dated the 13th inst., respecting the documents which I thought it my duty to forward to you regarding the imprisonment of Don Pablo Montoro.

At the same time I also received another note on the same matter from the Minister of the Argentine Legation in Chile, asking for the data in my possession which might establish the fact of a violation of our territory.

To the latter I have replied in a note, forwarding a copy of the proceedings on account of the auction of the taxes levied by Montoro, wherein are set forth in detail all the points of the ground included in the purchaser's right ; as to the acts which have taken place, I referred to the documents which I sent on to Your Excellency and which you inform me you have forwarded to the Minister of the Legation.

Montoro had invoked the latter's protection, but this passed unheeded owing to the fact of his being a Chilean citizen, and owing to the Minister's being unaware of the truth as regards the occurrences alleged.

The Señora Sotomayor is a Chilean, but the establishment of her residence (*estancia*) is comprised, in great part, within Argentine jurisdiction, and consequently subject to all charges of a municipal character which are levied on the rest of the Province.

*The boundaries of this Province with the Republic of Chile have always been acknowledged along the line which separates the courses of the waters, the contrary never having been advanced :* indeed the Chilean Tribunals, having cognizance of a sentence pronounced in a case of smuggling, saw reason to lay

Quoted  
p. 1011.

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down that it had not been committed, as the accused had not trodden on Chilean territory, being in the Valley de los Patos, just where Montoro was seized, according to the information of this Government.

With the antecedents now in the possession of the Minister of the Argentine Legation in Chile and the others which he may obtain from our Consul at Los Andes, I believe he will be enabled to draw up a protest in this case.

I have, etc.

MANUEL J. GOMEZ.  
*Faustino Espínola.*

### Enclosure C.

#### *Decision of the Chilean Tribunal.*

(P. 198) *Summary of the inquiry to investigate concerning the trespass of several Argentine subjects at the place called "Los Patos del Sud," in Chilean territory.*

SAN FELIPE, April 16, 1874.

It results from the inquiry that Don Pablo Lopez Montoro and eight other persons were seized at a spot in the Cordillera known by the name of "Los Patos," by several farmers who thought themselves in danger of losing their animals which grazed upon the said ground, on account of their refusal to pay the undue tax which Lopez claimed from them, entitling himself purchaser by auction of a tax authorized in the province of San Juan, threatening them with the transference to Argentine cities or towns of the animals affected by the tax. All these persons were handed over by those who seized them to the Commandant of Police of this department, who by order of his superior came in aid to the Chilean farmers who had their animals in this neighbourhood, the administration referring the case and the prisoned delinquents to the ordinary tribunal.

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(P. 200) Considering that, even if it were certain that this land (*to the west of the Cordon del Espinacito, the most elevated of the Andes* as stated by those who effected the seizure) belongs to Chilean territory, and that Lopez crossed the fixed boundary to recover the toll for which he had authority, his only fault consisted in his having exacted the payment of a tax unauthorized by Chilean law, the single and only one which can warrant it within our territory: a fault which has been alleged as the legal ground for the arrest of the tax-gatherer and his companions on the presumption of fraud therein involved, there is no occasion for the imposition of a punishment, seeing that there is no proof that any of those who were requested to pay actually did so.

### Enclosure D.

*Decision of the Supreme Court of Chile.*

SANTIAGO, March 1, 1874.

(P. 201) From the case it appears that Lopez Montoro purchased by auction in the province of San Juan of the Argentine Republic, a right to collect a tax called "*de piso*," which included the department of Calingasta, in which he contends that the place where the cattle graze is situated. It is further set forth in the same case that *this point is part of the Chilean territory, and belongs as landed estate to Chilean individuals* who have constantly kept their animals there without any tax ever being collected from them.

(P. 201) Considering that the territory where the cattle were grazing was reputed as Argentine by the defendants, and as Chilean by the witnesses who have given evidence in this cause, and that there is no need for the court to pronounce on this matter in view of what is set forth in the foregoing, it is declared that there should be a suspension of proceedings in this case, the accused being set at liberty and the bail offered

Quoted  
p. 1011.

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by them being remitted. Let the Supreme Government be made acquainted with the documents concerned in these antecedents respecting the tax called "*de piso*," and which it was sought to carry into effect on Chilean property. The sentence delivered on April 16th last is confirmed in so far as it conforms to the present.

MONTT.—BARRIGA.—VALENZUELA.—REYES.—PRATS.

## Enclosure E.

*Information of the Provincial authorities of San Juan  
(Argentine Republic).*

(P. 202) YOUR EXCELLENCY,—

It is a fact reported more than once to the Government, and repeated yearly, that there are introduced from the Republic of Chile to the great farms and pasture grounds which this Province owns, *from the very centre of the Andes* as far as its lowest valleys, including Los Patos and others, thousands of animals—cattle, horses and mules—which are wintered there, and they prepare them to pass over for sale at a suitable season in the Chilean markets: though their owners, rich farmers of that Republic, neither contribute nor have ever contributed any of the taxes and dues of a municipal character which, by the existing laws of the State, are demanded from them, and which the rest of the merchants, farmers, and winterers pay. And there is no reason nor ground, Your Excellency, to warrant the abandonment of this portion of tribute of which the State is greatly in need, all the more that this abandonment has injured and is injuring the Argentine winterers and farmers who religiously pay the tax for this same privilege.

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Enclosure F.

*Appointment of a Commission of Inquiry.*  
*" Hacienda and Formento " Department.*

SAN JUAN, October 7, 1873.

. . . Señores Don Fernando Cano and Don Martin R. Sanchez are hereby commissioned, under the presidency of the " Subdelegado " of the Department of Calingasta, for gathering all the necessary information as to the points indicated by the Fiscal Procurator, etc.

GOMEZ.

*Abel Quiroga.*

Enclosure G.

*Report of the Commission.*

SAN JUAN, December 5, 1873.

( P. 204 ) TO THE MINISTER OF THE HOME DEPARTMENT.

The undersigned, in compliance with Your Excellency's note dated October 8 last, and in view of what is set forth by the Procurador Fiscal in his judgment addressed to the Government, proceeded to draw up the statistical report with the gentlemen nominated by the Government, D. Vicente Lima Sambrano and D. Manuel Poblete, as follows :—

By the gap of " *Los Patos del Sud* " and other gaps leading to the same valley, these wintering places being the property of the heirs of D. Juan Rosas, they introduce about four or five hundred head of cattle, as well as horses, mules and oxen. We regard this as a minimum. Further north are the gaps of Iyapel, Cagotí, and other entrances which give access to the streams (*vertientes*) of Santa Cruz and the wintering grounds of Donoso, fields belonging to the Señores Villarruel and Cortés by which gaps these gentlemen introduce their droves which amount, more or less, to the number of 800, including horses, cattle and mules, but more horses than cattle, and the sheep

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may reach a thousand head, including those introduced by the tenants of these same fields. To the north are the gaps of the Rio Grande, Zapallar (otherwise Mostasal), Rapel and Hurtado, and they give access to the Valle Hermoso and Patillos (*otherwise Patos del Norte*) belonging to the Señores Cortes. By these gaps are introduced about a thousand head of cattle, mules and horses: the sheep which likewise pass may amount to a thousand head. The importation annually made by the Chileans to the wintering grounds of this side, the number which is introduced equals that exported. There is not the same amount introduced every year, Your Excellency, for when in Chile there is rain or snow on the Cordilleras, the Chileans do not bring their droves to this Argentine district, because then the fields on the Chilean side are provided with pasture. This is all the information we can give the Minister, believing that we have estimated fairly closely the fixed number of droves that pasture on the fields of the Cordillera in this Argentine zone.

We hope the Minister will kindly bring this before His Excellency the Governor for his information, and with a view to such measures as may be advisable. Meanwhile we have the honour, etc.

J. ABELARDO LOPEZ.—VICENTE LIMA SAMBRANO.—For my father, D. MANUEL POBLETE.

## Enclosure H.

*From the Argentine Plenipotentiary at Santiago to the Chilean Minister for Foreign Affairs.*

SANTIAGO, June 2, 1874.

(P. 207) YOUR EXCELLENCY,—

The Government of the Province of San Juan has lately complained to the National Executive of an act of violence committed by the Chilean authorities on its territory.

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More than once the Government of San Juan had received reports of the fact that year by year there were introduced into the pasture-grounds which the Province possesses in the valleys of the eastern slope (*falda*) of the Andes down to the lowest, including that of Los Patos, thousands of animals—cattle, horses and mules, which winter therein—with the object of bringing them to, and selling them in the markets of this country at a suitable time, without their owners, rich Chilean farmers, having ever paid any of the taxes which are paid there in conformity with the existing laws. As that Government wished to put an end to this abuse, after consulting the Procurador Fiscal, on October 7 of last year it nominated a commission of the inhabitants of the department of Calingasta in order that, under the presidency of the Sub-delegate, it should collect information as to gaps of entrance, and accesses of the farms, the number of persons concerned in the said introductions, the approximate amount of animals, and all the other data necessary as regards the receipt of the tax laid by law on this branch of industry.

In view of the Report presented by this Commission respecting the cattle which are introduced and exported by the gap of Los Patos al Sud, and others situated further north, and after calculating the amount of the tax applied to the farms in question, the Government of San Juan decreed that from January 1st of the present year the tax "*de piso*" should be put in force without any exception, and that the amount to be recovered in the Department of Calingasta should be put up to auction, at which D. Pablo Lopez Montoro was the highest bidder.

When this gentleman, in the exercise of the right which he had acquired, went to collect the said tax in the places mentioned, he was seized by armed bodies coming from Chile, and taken to the jail of San Felipe, where the proceedings took place of which Your Excellency is doubtless aware, and which

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ended in the release of the said Montoro and of the *peones* accompanying him.

On my Government becoming acquainted with these facts, it could not but regard them as a violation of Argentine territory, *inasmuch as the Valley de Los Patos is situated to the east of the water-parting line in the Cordillera de los Andes*, and it has instructed this Legation to address Your Excellency requesting you to be good enough to give instructions which will guard against the repetition of similar abuses in future.

Quoted  
p. 1012.

Being confident that Your Excellency will think fit to accede to this just desire, I avail myself, etc.

FÉLIX FRIAS.

Enclosure J.

*The Argentine Minister in Santiago to the Argentine Minister for Foreign Affairs.*

SANTIAGO, June 15, 1874.

(P. 209) YOUR EXCELLENCY,—

I have the honour to inform Your Excellency that the Chilean Minister for Foreign Affairs under date the 8th inst., has acknowledged the receipt of the note which I addressed to him on the 2nd inst. protesting against the proceedings taken by the Chilean authorities against D. Pablo Lopez Montoro (the highest bidder for the taxes) in the Province of San Juan, and he has replied that, in the absence of complete information as to the previous circumstances necessary for the formation of a sound judgment on the matter, he is unavoidably compelled to delay the reply which he will give to the above-mentioned note.

God protect Your Excellency.

FÉLIX FRIAS.

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### ORIGINAL PROPOSAL OF THE CHILEAN COMMISSIONER FOR THE DELIMITATION BETWEEN 31° 40' AND 32° 32'.

[Extract translated from the Annual Report of the second Chilean Sub-Commission for 1898.]

(Quoted on page 1017 of the Statement.)

#### Enclosure A.

##### *Excerpt from the Report.*

ON May 9 I received from Santiago a communication from the Argentine Assistants in which they accepted the carrying out of the Demarcation in the Passes and Gaps of Colina, Nieves Negras, Piuquenes, Tupungato, Pircas, Navarro, Bermejo, and Iglesia, withholding their reply as to the landmarks of the western Gap of Rio Bayo and the Maipo Pass till they were joined by the Assistant, Señor Martinez, entrusted with the examination of these points.

They further proposed four points as boundaries : the Portezuelo del Morado, that of Potrero Escondido, that of Contrabandistas, and Contrabandistas Pass. According to the data mentioned by them, these points would be found in the line of summits which divide the waters of the Argentine River Mendoza from those of the Chilean rivers, the Maipo and the Aconcagua, and consequently the Sub-Commission under my charge at once accepted this proposal, though probably the four points are not connected by triangulation. In this same note the

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following *twenty-eight new points* were submitted for consideration to the Argentine Commission :

Paso de Leiva.  
Paso del Rubio.  
Portezuelo de la Quebraba Honda.  
Paso de Valle Hermoso.  
Portezuelo de Longomiche.  
Paso de la Honda.  
Paso de Ortiz.  
Paso del Golpe del Agua.  
Paso de las Llaretas.  
Portezuelo de Quebrada Fría.  
Paso de Quebrada Fría.  
Portezuelo de Quebrada Grande.  
Portezuelo de las Lagunas.  
Paso de los Teatinos.  
Paso de la Laguna del Pelado.  
Paso de las Gredas.  
Paso del Mercedario.  
Paso de las Ojotas.  
Portezuelo del Yunque.  
Portezuelo de la Rinconada del Yunque.  
Paso de Alitre.  
Portezuelo de Alitre.  
Paso del Bonito.  
Paso de Mondaquita.  
Paso de Cerro Blanco.  
Portezuelo del Pachon.  
Paso de las Pelambres.  
Paso de las Puentecillas.

On May the 14th, the chief of the Argentine Sub-Commission, Mr. Stegmann, answered, saying that, as Señor Gramondo was at Mendoza, *it was impossible for him to give an official*

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*reply as to the placing of landmarks.* From the data communicated verbally to the undersigned, a few days afterwards, it seems to follow that the Gap of the Potrero Escondido, proposed by them, is no other than that which we have called Gap of the Laguna del Inca, and that the point fixed by our triangulation in the Gap of Lomas Coloradas does not coincide with any of the points proposed by them, and consequently it falls to us to propose it. *In conclusion there are 30 points on which the Argentine Assistants owe us a reply.* The material demarcation of the points accepted will be carried out shortly, after which the respective Acts will be drawn up.

### Enclosure B.

*Communication of the Argentine Commission.*

SANTIAGO, May 14, 1898.

SEÑOR LUIS RISO PATRON.

DEAR SIR,—

I have had the pleasure of receiving your note dated the 12th inst., addressed to me and to the Assistant of this Commission, D. Ernesto Gramondo.

The latter being absent at Mendoza, *I cannot at present give an official reply as to the placing of the landmarks which you propose to us.* Moreover, until the Assistant, Señor Martinez, supplies us with the requisite data concerning the landmark of the western Gap of Rio Bayo and others, which are necessary for the drawing up of the Supplementary Acts referred to by you—and on which this gentleman has been engaged—we are unable to deal with these matters.

I have, etc.

ADOLFO E. STEGMANN.

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### E. A. FITZGERALD ON THE ANDEAN BOUNDARY.

[Reproduced from "*The Highest Andes*," London, 1899, pp. 377-383.]

(Quoted on page 1020 of the Statement.)

WHEN in South America we frequently found, on both sides of the Andes, indications of the dispute that has continued so long between Chile and the Argentine Republic on the boundary question.

The controversy has at length entered on what every one trusts will be its final stage. It has been laid for decision before Her Majesty the Queen as arbitress, and at the moment when I write, commissioners from both Republics are in London, for the purpose of presenting their case.

The dispute has been going on for many years, and has more than once brought the two States to the very brink of war. It depends upon two main issues—the true configuration of the mountainous part of South America between the acknowledged territory of the Republics, much of which has still been most imperfectly explored, and the precise interpretation to be put upon the terms of existing treaties. The difficulty has really been pending ever since the independence of those countries was recognized by Spain. In the old days when both alike were governed from Madrid, it was understood that all territories to the east of the Andes were under the control of the Viceroy of Buenos Aires, all territories to the west under that of the Captain-general of Chile. In the settled parts of the

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country the great mountain chain was supposed to be a sufficient boundary, and as the immense district of Patagonia was still unsettled and even untraversed, the necessity for a strict settlement of limits there was unfelt.

When the southern part of the continent had been divided between two independent powers, rivalry between the authorities of Buenos Aires and Chile naturally became much keener, and the extent of their jurisdiction required to be more definitely fixed. The gradual opening up of Patagonia made the question more acute. Both parties could claim with some plausibility to be the successors of Spain in that region. And as it came to be recognized that Patagonia was by no means an inhospitable waste, but a territory of value and ready for settlement, each country was naturally anxious to secure for itself as large a portion of this debatable land as possible.

For many years the controversy lingered on ; one draft treaty after another being proposed and rejected by either side. A general agreement, however, was worked out, under which the superior claim of the Argentine to much the greater part of Patagonia was recognized ; while, on the other hand, the possession of the Strait of Magellan was secured for Chile. Considering the immense importance of the Strait in the communication between Valparaiso and Europe, this was a claim which the Chileans could hardly have given up without war. In 1881 a treaty between the two Republics was signed at last, after negotiations carried on on their behalf by the American Ministers in Santiago and Buenos Aires respectively.

This Treaty of 1881 is the classical document in the case. Under its provisions the boundary between Chile and the Argentine down to the 52nd parallel—a point a little north of the Strait of Magellan—is stated to be the Cordillera, i.e. the chain of the Andes. On meeting the 52nd parallel, the boundary is to turn almost at right angles and run about due east and west to Point Dungeness, where the Strait enters the Atlantic.

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Tierra del Fuego fell to Chile, except the Atlantic coast of the island, which was reserved, with a small strip of territory behind it, for the Argentine. Chile was not to fortify the Strait, but it was to remain open to the flags of all nations for ever. Finally, it was provided that each country should appoint a commissioner by whom the boundary should be marked out on the spot, all disputed points being referred to the arbitration of a friendly Power.

After the lapse of eighteen years, however, the boundary still remains unmarked. The treaty, which was supposed to have settled everything, became one of the most disputed documents in recent history. So much ingenuity and perverted acuteness have been applied to its interpretation that the problem with which it deals remains as perplexing as ever.

When two countries are *separated by one of the highest mountain* chains in the world, and both have agreed that the mountains shall be their boundary, it would appear at the first glance that no further difficulty could arise. It is accepted on both sides that the dividing line is the Cordillera of the Andes, or rather in the Cordillera of the Andes. But in *fixing a frontier in a range of mountains, two principles can be followed which may give very different results. In the first place the boundary may be fixed at the water-parting, all rivers on one side, with their tributaries, being assigned to one country, all those on the other side to the other. Every stream that rises on the Andes, every drop of water that falls on their slopes, finds its way ultimately to the Atlantic or the Pacific; and even at the highest well-springs there can be no doubt in an explored country as to the direction it takes. On the other hand, the boundary may be fixed by the highest ridge, or, where there is a succession of isolated peaks, by an imaginary line joining their summits. Naturally it may easily happen that in a mountain range these two lines coincide, the ridge where the waters divide and the highest ridge of all being in fact one and*

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the same. In the Andes, however, this is not the case. *The highest summits are not upon the water-parting: the water divides on its way to the Pacific or the Atlantic at a lower range some distance to the west of that which attains to the greatest elevation. Aconcagua is not on the water-parting, but stands wholly and entirely to the east of it.* The streams that are fed from its western side do not continue in that direction to the Pacific, but, curving round the base of the mountain, they fall into the Rio Mendoza or the Rio de los Patos, which both flow downward through the pampas of the Argentine. Thus the melted snows of Aconcagua have their destination in the Atlantic, and not a drop of them ever enters the Pacific. *The watershed is actually at the much lower elevations of the Cumbre and the Boquete del Valle Hermoso,* while the highest peaks stand to the east of the ridge that divides the waters in the district between Santiago and Mendoza. As we go farther south the relationship changes. The highest ridge of the Cordillera trends towards the Pacific, and the water-parting changes to the other side. In the far south the parting of the waters is somewhere in the lower and central lands, as yet imperfectly explored, of Patagonia, whilst the summits that attain the greatest elevation are close to the western shore of the continent, and some are even said to be upon the islands off the coast. According to Señor Moreno, the Argentine Expert, "it is shown in an irrefutable manner that in latitude 52° S. the Cordillera of the Andes sheds all the water from its slopes into the Pacific." It is needless to say that in these regions the Andes have been broken into a number of isolated mountains, sometimes divided by arms of the sea, between which the rivers coming down from the interior have no difficulty in flowing.

The difference of opinion that divides the representatives of the two countries may now be briefly stated. The Chileans stand out for the water-parting, the Argentines for the line of highest summits. The frontier proposed by the former, "leaves

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within the territory of each of the two nations, the peaks, ridges or ranges, however elevated they may be, which do not divide the waters of the river systems belonging to each country." Aconcagua thus belongs entirely to the Argentine, as although it is the highest mountain on the continent, it stands wholly within the Argentine river system ; whilst the lofty mountains on the Pacific coast to the south would fall completely inside the Chilean territory. The boundary claimed by the Chilians "is no other than the natural and effective dividing line of the waters of the South American continent." This principle would give to Chile a very much larger share of Patagonia than a division according to the line of highest summits would do. The latter would leave to Chile little more than the coast-line of the Pacific. But by adopting the water-parting as the frontier, Chile would be entitled to the complete river basin of every stream emptying into the Pacific, right up to the remotest source of its tributaries in the heart of the continent. By adopting the highest mountain line, on the other hand, the Argentine Republic would become possessed of the greater part of these river basins, and in places would push Chile right back to the Pacific itself.

It is stated by the Argentine explorers that in some parts of Patagonia the water-parting is excessively indistinct. Streams change their courses, says Señor Moreno, and flow now to the Atlantic and now to the Pacific. In the flat land in the heart of Patagonia, rivers frequently form new channels. A heavy storm, or a flood which washes away an old gravel bank or piles up a new one, will divert the drainage of many square miles of territory from one ocean to the other. In one instance, Señor Moreno found that a river which formerly flowed eastward, had now taken a westward direction, but by employing the labour of his party for about a week, he diverted it into its old channel, and sent its waters down once more through Argentine territory to the Atlantic.

A boundary fixed by the highest summits would, however, present many difficulties. *It would upset what in the central districts* has long been the acknowledged frontier. The ridge of the Cumbre is accepted as the boundary by every one who crosses the pass; so is the Boquete del Valle Hermoso, farther to the north, where another pass road crosses the mountains. Between the province of Mendoza and Chile the frontier is perfectly well-known and established, and that frontier is the water-parting.

*Accept the principle of highest summits*, and everything is thrown into confusion. The boundary shifts from the Cumbre to the top of Aconcagua. But it is by no means obvious how it is to run from there. Clearly it must also pass over the top of Tupungato. Yet it is less certain how the line shall be drawn. As Aconcagua and Tupungato are the highest points in the neighbourhood, it might be argued that the boundary should be a mathematically straight line drawn between their summits. But then Juncal, though not so high as either, is undoubtedly one of the "highest crests" in the Andes. Should not the line be deflected at an angle, on its way from Aconcagua to Tupungato, so as to touch Juncal as well? And if Juncal, why not also Torlosa? Everything depends upon the definition of highest summits. It seems hardly possible to fix a height in feet or metres above which a summit shall count for the purposes of delimitation, and below which it may safely be ignored. And according to the list of highest crests which any one may choose to draw up, the boundary might be shifted indefinitely, and made to go through a curious variety of bends and loops, zig-zags and tacks.

The highest peaks of the Andes have not been arranged by Nature in a neat line running north and south. They occur irregularly, some on one side of the main ridge, some on the other. Their heights have been determined only in a few

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cases. When two mountains of an approximately equal height stand near together, it is difficult to say which shall be selected for delimiting purposes. A great number of trigonometrical measurements must first be undertaken before such questions can be settled. It may also be remarked that a frontier so arranged would present quite an artificial character when applied in the valleys, where, and not among the mountain-tops, a definite boundary is needed. It is easy for every traveller and arriero to understand that up to the ridge of the Cumbre the Cuevas Valley is Argentine territory, and that the slopes on the farther side of the Cumbre are Chilian; that the Valle Hermoso, through which flows an Argentine river, the Rio de los Patos, is Argentine, and that the crest of the Boquete del Valle Hermoso, where one begins to descend towards the Pacific, is the point beyond which Chilian soil also begins. According to the theory of highest crests, many valleys would be divided between both countries, and in order to determine the point of demarcation, it would be necessary to find the highest mountains on each side and observe where the valley is intersected by an imaginary straight line drawn from one summit to the other.

The natural geographical difficulties presented along the borders of the two Republics are considerable, and demand very discriminating and impartial treatment. They are as nothing, however, when compared with the complications which diplomatic subtlety has contrived to pile up. The Treaty of 1881 is the most authoritative document in the case. When Chile insists on the water-parting as the boundary and the Argentine Republic claims the line of highest crests, each side professes to do no more than interpret the Treaty according to its obvious meaning, and the intention of those by whom it was signed. It might be supposed that an instrument so variously construed was one of some ambiguity. Yet to any one approaching it for the first time without prepossessions, its purport seems unmis-

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takable. The important and vital words of the first clause may therefore be quoted literally from a translation of the document which lies before me.

“ Clause 1.—The boundary between Chile and the Argentine Republic is from north to south, up to the fifty-second parallel of latitude, the Cordillera of the Andes. The boundary line within these limits shall pass *along the highest crests of said Cordillera which divide the waters, and shall pass between the slopes down which the waters flow on the one side and the other.* The difficulties which may arise owing to the existence of certain valleys formed by the bifurcation of the Cordillera, and in which the line dividing the waters may not be clear, shall be amicably settled by two Experts, one to be named by each party.”

It will be observed that the Treaty does not merely speak of the highest crests. The words expressly are—“*the highest crests of said Cordillera which divide the waters.*” *Aconcagua is the highest crest in the Cordillera, but it does not divide the waters.* Therefore it does not come within the class of summits contemplated by the Treaty. As if to make matters absolutely definite and final, the Treaty adds that the frontier “shall pass between the slopes down which the waters flow on the one side and the other.” *This seems quite explicitly to exclude the Argentine interpretation.* In the telegrams exchanged at the time when the Treaty was concluded, by the American Ministers whom both parties had authorized to conduct the negotiations, it was also stated that “the boundary between Chile and the Argentine Republic shall be the *divortia aquarum* of the Cordillera of the Andes up to the fifty-second parallel.”

It should be noticed, however, that in such expression the term *divortia aquarum* does not stand alone. It is always spoken of as the *divortia aquarum* of the Cordillera of the Andes. It would appear that in the extreme south of the

continent, the water-parting and the Cordillera of the Andes are two distinct and separate things. The parting of the waters lies in the lower ground inland, while the Cordillera runs nearer to the western coast, and does not really part the waters at all. The Chileans therefore, abandoning the strict reference to the mountain chain, take their stand upon the water-divide in opposite directions for the Pacific and Atlantic, that was contemplated as the boundary in the Treaty of 1881. They stand upon "the natural and effective dividing-line of the waters of the South American continent." The Argentine incline to ignore the water-parting altogether, and hold fast to "the Cordillera of the Andes." In the discussion between the Experts of both countries which took place at Santiago in September 1898, the Argentine representative laid down these principles :—

- (1) That the general line which he proposes to his colleague is wholly comprised within the Cordillera of the Andes.
- (2) That in its entire extent it passes between the slopes which descend on one side or the other of the main range.
- (3) That he considers the said main range is constituted by the predominating edge of the principal and central chain of the Andes, considered such by the first geographers of the world.
- (4) That the principal chain is the most elevated, the most continual, with most general uniform direction, and its flanks shed the largest volume of water, thus presenting the conditions established, both by the Treaty of 23rd July, 1881, and the Protocol of 1st May, 1893, to constitute, with the crest line of its slope, the general frontier line between the Argentine Republic and the Republic of Chile.

In this declaration it will be observed how carefully the

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question of the water-divide is hidden out of sight behind "the predominating edge of the principal and central chain of the Andes." On the same occasion the Argentine representative used words even less easy to reconcile with the Treaty of 1881. "At that time," he said, "the general watershed of the Cordillera was considered inseparable from the latter's central or prevailing chain; and the crest thereof—that is to say, the snow-capped chain of the historians and geographers of all times—was for the signatories of the Treaty of 1881, and for those who accepted it, the only international boundary; although they knew that the chain was crossed, not only in one but in several cases, by rivers having their sources to the east of the same."

This statement, an ardent Chilian might almost say, is not the interpretation of the Treaty: it is a repudiation of it.

EDW. A. FITZGERALD.

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### COLONEL OLASCOAGA (ARGENTINE) ON THE EASTERN CORDILLERAS.

[Translated from Extracts of "*Memoria del Departamento de Ingenieros Militares*," etc., Buenos Aires, 1883.]

(Quoted on page 1038 of the Statement.)

#### DESCRIPTION OF THE TERRITORY TRAVERSED.

(P. 8) First of all I will give you, according to the route followed, the topographical description of the territory explored by the Commission.

Starting from the town of Mendoza southwards, the general or dominant configuration of the *Andean territory* is soon comprehended.

*A system of mountain chains to the right or west, which are interlaced and prolonged southwards, constantly filling an extent averaging eighty kilometres from its extreme eastern slope as far as the anticlinal line of the great dividing Cordillera with Chile. As far as the said line that large system of mountains or lower Cordilleras which generally run parallel in the direction mentioned, leave between them innumerable valleys, the bottom of which is higher as they approach the central Cordillera, altering their climate likewise, as is but natural, in a gradual manner, from the mildest, in the first, where Mendoza is situated, to the heavy snows of the last ones in which the main Andean ridge is situated; therefore, in that strip of land, formed merely of mountains and valleys alternately—*

measuring from Mendoza to the Straits of Magellan, some 22 degrees which, multiplied by the average width already stated, would give a total of 20 millions hectares,—all the peoples in the world could find their appropriate climate, to say nothing of the territory of the elevated plains which extend to the Atlantic coast.

Independently of this strip of ground, *properly called Andean* by reason of its being connected with the Cordillera, between its ramifications, there is that occupied by the city of Mendoza, just where the ground becomes decidedly level, which happens some eight kilometres east of the last declivities. It is also a valley, or better still, the southern extremity of the great Andean valley which comes from the north, and which includes San Juan. Opposite Mendoza it is interrupted at the Sierra del Gigante which gives to it a width of 200 kilometres.

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(P. 15) The line where the first section of our journey ends is marked by the famous cone of Mount Diamante which rises 2300 metres above the sea on the southern bank of the river which gives it its name.

It rises at  $34^{\circ} 41' 25''$  of latitude and at  $10^{\circ} 38' 10''$  longitude west of Buenos Aires. It is a volcano with an extinct crater, and its base is surrounded by eruptive rock.

I ascended to its summit and from it I took sights with the compass, the bearing of a number of well-known points in the chain of the Andes, as in the rest of the large circumference seen from that great height.

From this southern point there extends a continuous plain, which is only interrupted by some hillocks of little importance and by the wide transverse depressions formed by the basins of the Rivers Atuel and Malalhue, Lake Yancanelo, and the Rivers Colorado and Neuquen. A telegraphic line, for instance, which might run straight from the Diamante southwards, would not require any deviation until reaching the River

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Neuquen, after 380 kilometres, exactly at the point close to the last telegraph station of the line from Patagones.

I will describe this section of the ground. For 47 kilometres the ground is hard, with some vegetation and thick grass. It descends to the basin of the Atuel, going over soft hillocks and becoming stony all along the bed of the river. From this point the ground becomes softer and permeable, and with more abundant and luxuriant vegetation for a distance of 39 kilometres, at which point it becomes arid, saltpetrous and hard, scoriae and cretaceous ground being alternately found, and along the traject of 35 kilometres on the eastern side of Lake Yancanelo there are not any traces of drinking water. The waters of Lake Yancanelo are not drunk even by the most thirsty animals. Beyond the southern shores of the lake rise the first hillocks which are traversed in their prolongation of Mount Nevado. Once these are crossed, the valley again stretches in front and towards the left or east. On the right, the ground rises in gentle slopes, which sometimes become rough when crossing opposite the Cordillera "Barba de Chivato" and the massif of the "Payen." At 130 kilometres from the hillocks of Yancanelo, the mountains rise to the left [east] and form a variety of sharp cones with Gothic towers. It is the "Sierra de Chachahuen," which leaves the road always to the right. Near that point the ground rises and descends again to the basin of the River Colorado, to which there is a distance of 32 kilometres, the road described coinciding precisely with the most practicable and wide passage offered by this river which is divided into six branches. Once the Colorado is crossed, a beautiful plain, until now unknown in the maps, is traversed, which is situated between the river mentioned and the "Sierra de Auca-Mahuida," 47½ kilometres south of the Colorado, and not near its right bank as it has been previously drawn. The Auca-Mahuida, a round and high block of some 14 kilometres in circumference, and not a prolonged ridge as

was believed, sheds its streams (*vertientes*) and the melting of its eternal snows northwards, to which circumstance the fertility of the plain mentioned is due.

From Auca-Mahuida the plain stretches without interruption to the south, for 85 kilometres, *where the River Neuquen crosses it, flowing at the bottom between the two rough and true Cordilleras* which form its banks.

This last stretch, between Auca-Mahuida and the river Neuquen is the most arid and barren land we have come across.

\* \* \* \* \*

(P. 21) With the element of this long base [a computed base-line of 50 odd kilom.] we could add to our previous observations with perfect accuracy the position of many uncertain or omitted points in the previous maps, among which the great lake Yancanelo may be mentioned and *especially* MOUNT NEVADO, *the precise location of which it is of great importance to know in connection with* OTHER POINTS OF THE CORDILLERA DE LOS ANDES determined by respected scientific authorities, because the said mountain rises in the neighbourhood of meridian 10° of Buenos Aires, which divides the National Territories from Mendoza. The said dividing line cuts, longitudinally, a strip of first-class land, which is *that situated on the eastern slope of the Cordillera del Nevado*, which only sheds to this side the waters from its eternal snows, as happens to the north of Auca-Mahuida; and, as the Government of Mendoza are at present selling, conditionally, lands which delimit with this meridian, it is of urgent necessity to determine it with accuracy.

Quoted  
p. 1053.

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The situation of Loncoche,—where I halted with the commission with the object of carrying out several geodetical works indispensable to ensure the accuracy of those to be made further on,—is worthy of notice owing to its topographical situation. To the south and west *there is a system of Cordilleras where*

*the best-defined, rugged and fertile part of the Andes begins, where the River Grande runs almost longitudinally, receiving its innumerable affluents. To the north and east lies the plain connecting Mendoza with the pampa, along the meridian of the Diamante, which has been described before.*

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(P. 23) *Continuing the description of the Andean region to the west of the valley which I have followed from the Rio Diamante, I will commence with the headwaters of the Rio Grande, which rise on the highest Cordillera de los Andes in parallel 35° 45', at a few kilometres from those of the Atuel. From this same latitude begins the Cordillera that stretches at the back of Loncoche.*

As this Cordillera branches off from the central one it takes the name of "La Choyca," and, at some 12 kilometres from the dividing line with Chile, upon one of the porphyric slopes, there is the richest copper mine which I believe exists in the country, and which, up to the present, has been almost unknown. It has been worked for some time without the knowledge of our authorities by a Chilean company of minor importance under the management of a Señor Bovadilla, who transported the ore to Chile on mules. In Chile a tax of two silver dollars per load was exacted from him until five years ago when the Government of Mendoza, being informed of the exploitation and tax, ordered the payment of 12 "reales" of the same money to the province, which undoubtedly had more right to exact such a collection. The manager of the company refused to pay the new tax, suspending the work from the moment that the notification was made.

The mine, the yield of which was uncertain and irregular, presents, on its wall and even on its bottom, almost a solid mass of raw copper capable of being cut with a chisel, and although its exploitation seems to have been stopped from that date, I believe it may be worked clandestinely, as, *on the Argen-*

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*tine side, for a distance of 100 kilometres, there does not exist any authority to inspect it, owing not only to the long distance but also to the roughness and hidden character of the place.*

It is to be regretted that these and other riches of the Andean region should be lost to the country through lack of population and of easy means of communication.

Behind the "Sierra de la Choyca," which further south take the name of "Leñas Amarillas," rises and flows, as I have said, the River Grande, fed by a large number of brooks and rivers which I shall enumerate, because it has not been possible to draw them all on the smaller map annexed herein. They will all be seen with many other details in the map of a larger scale which I am finishing.

The greater part of these affluents form as many more grassy valleys, rich for the raising of cattle and agricultural purposes, with the exception of those very near the Cordillera which are only useful in the summer.

Commencing from the sources of the river, those flowing from the north are : Rio Tordillo, Arroyos Piedra de Hernandez, El Toro, Los Quesos, Cari-Lauquen, Los Yesos, La Totora, el Huenul, Yerba-Buena, Infiernillo, Bella-vista, Chacayco, Chenqueco, Loncoche, Carrizal, Palauco, Ranquilco, and three smaller ones without names which flow in near the junction with the Rio Barrancas.

Those flowing from the south are : del Cobre, Santa Elena, Las Vacas, las Cargas, las Peñas, Valenzuela, Montañez, Montañecito, Arroyos del Seguro, Mallines colgados, Rios del Yeso, los Anjeles, Trolon, Arroyos del Gancho, Rio Chico, Arroyos la Quinta, del Leon, de las Bardas, Rio Poti Malal, Arroyos Hondo, La Guanaca, Ranquilco, Coigue Melehue, Chaçayco, Chollahuen, Manzano, Rio Michenquil, Arroyos Mallines de la Puntilla, Chaquiraco, Calmuco and Rio de Barrancas.

This river which is as large as the Rio Grande (it carries a volume of water no less than 30 cubic metres), *rises from an*

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*elevated lake called "Curi-Lauquen," situated between the first and nearest spurs of the central range of the Andes. From this point its general course is from north-west to south-east, flowing into the River Grande at 33° 51' of latitude and 11° 30' of longitude, both these rivers forming the large River Colorado, the river called upon to irrigate the nine millions of hectares of good land situated between it and the River Negro.*

The Rio Barrancas, before leaving the high region where it is formed, comes across a deep depression which arrests its course for a stretch of 19 kilometres. This is the beautiful lake of Cari-Lauquen (Green Sea), which derives its name from the apparent colour of its water by reason of its depth.

The permanent volume of the two rivers, affluents of the Colorado, will hardly ever diminish, *because their sources are not confined to the central Cordillera where both rise, but are also fed from the high chains of continuous snow which stretch along the whole of their course on both sides.*

As the *Cordillera de la Choyca* continually skirts the northern part of the River Grande, *the Cordillera de Litran, still higher*, protects the southern part and itself contributes nine rivers and brooks which run into the River Barrancas.

*Another Cordillera feeds, on the south, the whole course of the Barrancas: that of Domuyo, which sheds into it twelve brooks and rivers.*

Since I have spoken of the *Cordillera de Litran*, before I leave it, if I am to proceed with this description, I wish to call your attention to the expediency of protecting a settlement *at the point where the said Cordillera terminates* on the right bank of the River Grande.

It is the ground which is divided at its centre, from east to west, by the Cordillera mentioned at the eastern extremity of which, on reaching the river, *there rises a very prominent crest which breaks off abruptly for some 8 metres to allow the said river to pass, its last spur ending on the opposite bank. The*

*river, being compressed into that narrow channel of granite, crosses it in a torrent. The high crest which every traveller sees and recognizes from many leagues in all directions, is what is called Puntilla de Huincan.*

Quoted  
p. 1060.

Two extensive slopes stretch to the north and south of the Cordillera mentioned, both of them being watered by four brooks of abundant and rich waters: the Michenquil to the north, the Mallines de la Puntilla, Chaquiracó and Calmucó to the south.

This land occupies approximately an area of 100,000 *hectares* of soil excellent for all kinds of cultivation. It is grassy, with plenty of timber and rich waters. Permanent irrigation would be ensured with the four brooks mentioned, and it reckons besides with the River Grande and with all the small *streams (vertientes) which flow from both slopes (faldas) of the Litran.*

This point, besides being suitable by reason of its location and the condition of the soil, has a position which it will always be indispensable to maintain settled as long as the vast extent of the pampa, which stretches thence as far as the frontier of Buenos Aires and from San Luis and Cordoba as far as the Rio Colorado, remains deserted. A settlement at the Puntilla de Huincan, although it may be small, would live secure against any advance from the marauders of the desert, and it would be at the same time a guarantee for the whole of the south of Mendoza, the attacks by the "Puerta de Malalhue" becoming difficult in the future. Huincan is a great scouting and starting point by which the Indians have always profited, and they are very much afraid of it when in the hands of the Christians.

\* \* \* \* \*

(P. 32) The River Neuquen must be assigned, in my opinion, the fourth place of those of our country, that is to say, after the Paraná, Negro and Uruguay. It would also figure among

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the notable rivers of the world, because it ranks before the Thames, owing to the length of its course which is 480 kilometres, whilst the latter is only 344. Its waters are relatively smooth in the greater part of its course ; it justifies its Indian name (strong current) only in the portion *where it traverses the Cordilleras* as far as the fort 4th Division. From this point it has made for itself a very deep bed with a bottom of sand or pebbles. No point of the Neuquen is known to be swampy or clayish. Its course in its steeper part, after the junction of the Curi-leuvu, may be calculated as 1000 cubic metres per second, its current being 2 metres in a similar time. In its periodical time of flood, this volume of water is at least twenty times as large.

Quoted  
p. 1058.

\* \* \* \* \*

(P. 34) On November 25, we left the fort 4th Division to penetrate into *the central region of the Cordillera*, making a survey of all *the orographic section between the sources of the River Barrancas and the Cordilleras of Trocoman opposite Antuco.*

I fixed the first central point for the work at "Epulauquen," a splendid valley for summer grazing, situated at an altitude of 1400 metres and 4 kilometres wide at half a day's journey from the Andean anticlinal line, surrounded by Cordilleras completely clothed with forests of pine and oak, and enclosed at both extremities by two lakes, each of an area of some six kilometres, the centre of the valley being thickly covered with grass.

Quoted  
p. 1059.

\* \* \* \* \*

On March 6, 1882, we abandoned the eastern valleys of the Domuyo and sought our way back to Neuquen, penetrating into the narrow gorge where the Rio Curi-leuvu [Coli-leuvu in Chilean map] is found. After 25 kilometres, in which distance the narrows of the gaps make it necessary to cross the river seventeen times, the gorge opens and transforms itself into a beautiful valley. This is *confined on the east and west by the*

Quoted  
p. 1058.

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*Cordilleras of Palau-Mahuida and del Viento*, which descend to the south and south-east, until they approach the Upper Neuquen, near which exists the fort " Cuarta Division " [Chos-Malal], and abut on the northern bank of the same River Neuquen. Along the centre of the valley mentioned flows the River Curi-leuvu, which starts at the Domuyo ; it receives the waters of 17 streams which flow *from both Cordilleras*, and discharges into the Neuquen opposite the fort mentioned.

The area of this plain is some 150,000 *hectares*, two-thirds of which may be considered as *rough Cordillera land*, and the other third as plains and valleys adaptable to all kinds of agricultural purposes, most especially the central valley which is irrigated by the River Curi-leuvu. This valley is some 22 kilometres long by an average of 20 in width. Its bottom is invariably soft and grassy, and not only is it easy of being irrigated in all its parts by the Curi-leuvu, but it also has nine streams irrigating it laterally, which empty into the river on the right, and eight more which flow in like manner from the left. The banks of all these streams are abundant in forests and timber, and all their waters are clear and fit for drinking purposes.

### SOUTH OF NEUQUEN.

(P. 44) The river Neuquen which from its sources has a general course of almost due south as far as the latitude of the fort of the 4th Division, meets at this point the block of the Pinin Mahuida, and deviates to the east, flowing along a not very deep basin enclosed on the north and south by *Cordilleras*.

After passing by the fort 4th Division, where it forms a broad valley, it keeps its southern course, and is *again enclosed between its Cordilleras* as far as the junction of the River Agrio in latitude  $38^{\circ} 30'$ . From this point it again deviates to the east, with a slight inclination to the north, as far as Fort " Tra-

B B

trayen " in lat.  $38^{\circ} 20'$ , and in longitude  $10^{\circ}$  West of Buenos Aires, and reverts to its original course as far as its junction with the Limay.

The lands separated from each other by the River Neuquen are of a different nature below the fort 4th Division. Those on its right or Andes side are of an alluvial and calcareous nature, of hard soil and generally grassy. That to its left or Pampa side is chalky, soft, and in many parts saltpetrous ; it has very little water, and that brackish or putrid. This land improves a great deal as it recedes from the river.

The wide curve formed by the river south of the fort 4th Division, is where the characteristic nature of the ground presents itself, and this, once the Neuquen is passed, improves in every sense and in all directions, the *grassy lands stretching well within the Cordilleras* with the special circumstance that the latter become soft, undulating and low.

The first of these lands, which is skirted on the north and east by the Neuquen, is beautiful. It stretches with a gentle declivity from the S.W. to the N.E., in which direction flow the streams Rahueco, Tihuquico and Tacu Milan, starting from *the Cordillera of Caycayen*.

This latter point, which was the favourite residence of the Cacique Purran, was the place where large plantations were made by this Cacique and by some Chileans.

The name generally given to this place is " Los Manzanos de Tacu Milan." It must have an area of 80,000 hectares.

In the northern boundary on the Neuquen it has the valuable salt-deposit of Lilco ; to the west, the brook Maytencó and *the Cordillera de Caycayen*, where silver mines have been discovered.

To the south there stretch two large " campos de invernadas," which surround the Rivers Neuquen and Pichi-Neuquen and are divided from north to south by the Cordillera del Codio.

This Cordillera, when touching with its southern extremity the bank of the Pichi-Neuquen, shows a wide seam of coal, which I consider of the best quality as yet known in the country, and I have not the slightest doubt that, if exploited, it will furnish still better quality until yielding the best mineral coal which exists. There is such an abundance of coal and so much on the surface, that the Indians know it to be fuel and burn a great deal of it, as may be seen by the traces of cinders and remnants of burnt mineral to be found there.

At several points of this Cordillera the enormous mass of mineral fuel which it contains is apparent. One of these examples which are found in many parts of it, is what has earned for it the name which the Indians give to it: "Codio" is a sort of pitch in which there are very ferrugineous crystallizations of plumbago which the Indians pick up and make a preparation of for dyeing indelible black. With this they also paint around their eyes when crossing snow-fields on days of strong sunlight, and they also use it to dye their hair.

The richness of the Cordillera del Codio, which rises not more than 28 kilometres from the River Neuquen, will easily open its way some day through this river and the River Negro to the Atlantic, and it will give no little increment to the settlement which may be established at the Manzanos de Tacu-Milan.

\* \* \* \* \*

(P. 48) The Agrio is one of the fairly large rivers of the south. *It rises in the central range of the Andes*, almost at the same latitude which it has when passing opposite Ñorquin ( $37^{\circ} 48''$ ). Two notable mountains, the Trapa-trapa and the Copahue supply to it the first two streams, the Trolope and the Agrio. It is the latter, the waters of which are very acid to the taste, which gives the name to the river. They are thermal waters, and very much sought for in the south of Chile for scrofulous diseases. I have seen it sold in bottles in some drug

stores of Chillan. For many years past families have come from that town to bathe in the thermal sources of the Agrio and to take its waters, for which permission was requested from the Cacique Cheuquel.

The River Agrio will offer great facilities for the irrigation of almost all the country it traverses, for, besides commanding all this plain, its waters may be tapped at many points without much labour.

(P. 49) Passing to the east of Ñorquin, it deviates to the south, and receives on its western side the brooks "Nunucö," "Chihuayhue," "Hualcupen," "Pichinco," "Loncopué," "Atreuco," "Yumuyumu," "Ranquileo," "Vurinchenque," "Codoi," "Liu Cuyum," "Malal-leo," and the Rio "Carreri." On the eastern side the brooks "Ranquilon," "Lonco Michi," and "Mulunchenco," five more small brooks which start in the Cordilleras de "Campana Mahuida," and "Vutham Curá," reach the river only in times of flood.

On the right bank of the Agrio, after passing Ñorquin, from the stream Pichinco as far as Vurilchenque, there is a beautiful plain called Loncopué full of resources for a settlement. It must have an area of 40,000 *hectares*. It is an open plain, without stones and, although very near the Cordillera boundary with Chile, has an excellent climate in winter and summer, for the snows of the hardest season do not reach the banks of the Agrio, save in very exceptional winters. There is grass of all kinds: alfalfa, clover, mallin, gramillas, etc.

The road from this point to Chile is one of *two or three days' journey at a mule's pace, through the Gaps Yinquiyinqui, Pucon-Mahuida and Trapa-trapa, the Cordillera de los Andes being so low at these passes, that in many cases the cart-roads may be considered as already laid.*

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### The Museo de la Plata's Assistants on THE CONTINENTAL DIVIDE AT THE VERGARA PASS, and surrounding region.

[From " ANALES DEL MUSEO DE LA PLATA, Sección Geológica y Mineralógica.—  
II., *Profils Géologiques Transversaux de la Cordillère Argentino-Chilienne.*" La  
Plata, 1900, pp. 12-14.]

(Quoted on pages 1038-1043 of the Statement. See also in connection with  
this Plates LXXI., LXXII. and LXXIII., pages 1042, 1043 and 1046 of the  
Statement.)

Le 25 Février, nous franchîmes de nouveau *la ligne inter-océanique du partage des eaux*. Après une descente rapide, nous dressâmes notre campement du côté du Pacifique, à 2095 mètres, au bord de l'Arroyo de las Zorras. Le Col de Santa Elena nous offrit des conditions géologiques si intéressantes que le lendemain nous installâmes un campement partiel dans la partie supérieure du Valle Santa Elena.

Le 26 y le 27 février, nous étudiâmes les environs du col. Nous y trouvâmes des couches fossilifères et au-dessus le conglomérat violet avec diverses roches éruptives en interpositions et un horizon puissant de gypse formant de hautes et curieuses montagnes. Le tout arqué en une voûte magnifique.

Pendant ces études, un courrier officiel nous appela vers le sud au campement de la commission de limites Argentine, éloigné de plus d'une journée de marche. Le 4 mars, nous atteignîmes de nouveau notre campement à l'Arroyo Zorras pour y continuer nos explorations.

Au lieu de lever un profil longitudinal, *exigé dans l'intérêt des différentes questions de limite*, nous proposâmes à M. le Directeur d'étudier un profil transversal de toute la chaîne de montagnes. Les zones centrales pourraient tout de même être visitées en passant. M. le docteur F. P. Moreno, qui était venu nous visiter dans la montagne, approuva de la manière la plus aimable notre procédé.

Peu à peu, nous avançâmes vers le sud et le sud-ouest. Le 5 mars, nous nous trouvâmes au Col de Tiburcio, à 2791 mètres au-dessus de la mer.

Directement au sud du col, s'élève une cime nue, couverte de blocs trachytiques. Nous la gravâmes (3019 mètres) pour avoir un coup d'oeil général. Une vue très uniforme vers le sud récompensa cette ascension.

Notre tente fut envoyée dans la vallée de la Laguna del Fierro, petit lac refoulé par une série de collines d'éboulement.

Le 7 mars, nous franchîmes l'arête entre la vallée de la laguna de Fierro et la vallée supérieure de Santa Elena. C'est ici que nous trouvâmes les conditions tectoniques compliquées qui seront désignées, dans la partie tectonique de notre travail, comme région de la "bouteille renversée."

Le lendemain, le campement fut transféré dans le valle Villagra, à 2150 mètres. C'est une vallée latérale à gauche de la vallée de Las Zorras. Le 9 mars, nous en examinâmes les pentes orientales, formées par une série variée de sédiments jurassiques. Un groupe d'anciens centres volcaniques forme la zone des cimes, qui atteignent 2500 à 2900 mètres de hauteur (voir planche iv. fig. 1 et 2). On y observe de magnifiques phénomènes de refroidissement volcanique. Par une petite vallée à l'est, parallèle au Valle Villagra, nous descendîmes vers l'arroyo Zorras et nous y atteignîmes le campement de Villagra.

Le lendemain, la même excursion fut répétée pour fixer par la photographie ce que nous avions vu. En attendant, la

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troupe avait l'ordre de transférer le campement d'une lieue en amont, à environ 2400 mètres au-dessus de la mer.

Le 11 mars, nous passâmes le point culminant du Col de Villagra (2750 mètres), en jouissant d'une vue splendide sur le groupe du Peteroa-Planchon avec ses glaciers et névés.

Un ruisseau considérable parcourt, en innombrables pentines, le fond large, plat et marécageux du Valle de los Ciegos. Les pentes nues et stériles, sont couvertes de pierre-ponce. Chaque faible coup de vent soulève la poussière volcanique et la souffle dans les yeux du voyageur. Il se pourrait bien que cette vallée ait reçu pour cela le nom de Valle de los Ciegos : "vallée des aveugles."

Pl. LXXII.  
p. 1043 in  
Statement.

A 2285 mètres, nous dressâmes nos tentes sur la pente orientales (gauche) de la vallée, à l'embouchure du Col de Rabones. La place du campement offrait une jolie vue sur le groupe du Peteroa-Planchon et la Vallée del Peñon. Cette petite vallée latérale (droite), qui s'étend en amont du Peteroa, semble être barrée vers la vallée principale par une grande moraine.

Le 12 mars, nous visitâmes le Col de Rabones situé à l'est du campement.

Nous y trouvâmes, non loin du Valle de los Ciegos, un massif remarquable de roches granitiques presées, puis les sédiments reconnus déjà au nord et enfin, au point culminant du Col des Rabones, des roches porphyritiques et des tufs volcaniques d'une dimension imposante.

Le Col de Rabones nous donne aussi des preuves de l'ancienne et plus grande extension du glacier du Peteroa.

Nous passâmes le *Portezuelo Vergara* qui conduit du Valle de los Ciegos au Rio Teno. *C'est un de ces plateaux interocéaniques curieux où le même petit marécage fournit de l'eau aux deux Océans* : vers le sud, au ruisseau de la Vallée de los Ciegos du système du Rio Grande ou de l'Atlantique ; vers le nord-est, au ruisseau de Vergara du système du Rio Teno ou

Quoted  
p. 1043.

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du Pacifique. Le 13 mars 1897, nous dressâmes nos tentes sur le plateau à 2374 mètres au-dessus de la mer. Ce même jour encore, nous fîmes l'ascension du Portezuelo del Planchon, col praticable qui conduit de la vallée de los Ciegos au Chili, longeant le flanc nord-est du Planchon. L'excursion nous donna des renseignements importants sur le rapport génétique supposé entre les anciens conglomérats porphiritiques et les laves basaltiques modernes de la contrée. Du point culminant du col (2588 m.) on a une vue grandiose sur les deux lacs originaux du Rio Teno : lacs de montagne situés dans un encadrement très pittoresque. Des parois escarpées descendent du Planchon, et au-delà, des glaciers imposants s'abaissent jusqu'au niveau du lac. Un fort orage de grêle—le premier depuis notre départ de Mendoza—redoublait cette impression majestueuse.

Le 14 mars fut consacré à la Vallée de Vergara jusqu'à sa bifurcation avec l'Arroyo Zorras. Quant à la géologie, cette vallée correspond en général avec la vallée parallèle de Villagra que nous connaissons déjà.

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### VICUÑA MACKENNA ON THE VERGARA PASS.

[From the work by the aforesaid author entitled "*A Traves de los Andes*," Santiago, 1885, pp. 181-200.]

(Quoted on pages 1038 and 1039 of the Statement.)

#### THE PASS OF TENO OR DEL PLANCHON.

"The great Cordilleras de los Andes, far from being an insurmountable barrier, to keep apart the two nations which inhabit its valleys, are, on the contrary, the means which nature seems to have placed within reach of men to facilitate their union, stimulating their industry in exploiting the mineral wealth which it encloses, and utilizing the torrents of water which flow from their snowy peaks to fertilize their lands."—"Clark's application before the Argentine Congress in 1873."

#### I.

THE Teno Gap, bordering the town of Curicó, but best known by the historical name of El Planchon, offers two rare geological peculiarities, to wit: that its greatest height does not reach 2300 metres (6600 feet), and that, at the foot of the depressed massif, which is visible from the plain by which runs the path and to which it owes its name, *there stretches, skirting it like a wide belt, a swampy valley several leagues in extent, which sheds by its two extremities, its surplus of water towards Chile and the Argentine Republic*, or, more correctly speaking, towards the Teno and towards the Rio Grande, the latter

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being a powerful affluent of the River Negro in its course from Nahuelhuapi to the Ocean.<sup>1</sup>

This almost semi-circular valley, long known as *Valle de los Ciegos*, was famous among travellers even before science directed its attention towards its verdant oasis.

At the beginning of the century, as we shall further on state, a common prospector, a native of Quillota, believed he had found the least rough as well as the shortest road towards the Argentine pampas which, in those days, owing to the fear of English guns at sea, were the almost exclusive route for the commerce of Chile with Europe. This commerce had ceased to be transoceanic and had become transpampean.

The pioneer of the Central Valley was succeeded by scientific men who followed his route in the mountain and confirmed his hopes and ambitions for discovery. These two happy explorers, whose discovery we shall describe further on with greater detail, were called Zamudio and Sourrière de Souillac.

### II.

This took place during the first ten years of the century ; and, as a matter of fact, if the revolution of independence, which gave rise to the long war, had not taken place soon after, it would have been to a great extent possible that the *Gap of Planchon, which gave an easy passage to our arms in 1817*, would have commenced to be the favourite route for colonial commerce, with marked damage and detriment to the very rough and high Uspallata.

### III.

Sixty years passed without any examination of, or definite solution as to, that route since it was traversed by a humble

<sup>1</sup> This is an error of the author ; the Rio Grande is tributary to the Rio Colorado, which discharges into the Atlantic north of Rio Negro.

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miner, until a man of his profession again hungered after the existence of the new route the recollection of which time and disdain had commenced to efface.

One summer's night of 1863-1864, a tall and slender old man with a white beard and sunburnt face called at the house of the writer, requesting to be introduced to the contractor of the Santiago to Valparaiso railway, who had just brought to a successful end his great enterprise of connecting the shores of the Pacific with the outskirts of Santiago. The name of that persevering adventurer was Bartolomé Navarrete, a miner by profession.

The patriotic desire of the explorer, who, like Zamudio in 1803, considered himself the owner of an important geographical secret, was not long unfulfilled, and a few hours afterwards the former held a conference . . . with Don Enrique Meiggs at his residence.

### IV.

Don Enrique Meiggs . . . immediately gave his unknown interviewer some money, his support, and a surveyor to carry out on paper his disconnected but truthful verbal reports. The engineer selected was the clever young American, Don Eujenio Dubois. . . .

### V.

All this happened in the months of January and February 1864, now twenty years ago, and after the gap, or better still the plateau of the Planchon, had been explored by Naverette and Dubois, just as it had been in 1803 by Zamudio and Souillac, science declared solved the question of the Pass of the Andes for the locomotive. . . .

The Press gave a sympathetic echo to the fortunate discoverer, and since then, in view of the scientific report of the surveyor Dubois, which bears the date of March 1864 [see

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Doc. No. 122], the new passage of the Andes has been traced in a manner which we ourselves printed at that epoch, and which reads thus : . . .

### VI.

In the first place we said in those days the railway by the Planchon Pass would extend for 87 miles, that is to say, 4 miles more than from Santiago to San Fernando, and 17 less than to Valparaiso. But that distance should properly be counted only from the point at which, abandoning the central valley of Chile, *the first declivity of the Cordillera commences to be climbed, until one reaches the high tablelands of the Pampas in the opposite extremity.* In other words *the Andean railway* would start at the spot called "Puerta de Teno," where this river discharges into the plains of Chile flowing in a straight line from the Cordilleras, and the bank of the river Grande, one of the chief tributaries of the famous *Rio Negro which divides the Argentine Republic from Patagonia.* . . .

### VII.

The route of the new road, taken in a general sense, runs in the Chilean territory, along the bottom of the ravine which serves as a bed to the River Teno, all along its extent, and, *on the other side of the Cordillera,* along the course of the Rio Grande. *It is well-known that this is the general topography of our Andes. The rivers on either slope rise from the same glaciers, from the same peaks, from the same springs,* opposite each river which flows towards the Pampa, another one runs as towards the Pacific. The latter are, however, larger and more numerous owing to the frequency and abundance of rain. For this reason the paths of Copiapó, Coquimbo, Illapel, los Patos, Uspallata, Maipo, etc., *stretch along the bed of the rivers of Chile, until meeting the summit of the real Cordillera, and*

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*once this is passed, the route runs along the bed of the rivers on the opposite side.*

### VIII.

But the present road ascends to the Cordillera over rough mountains, whilst an extensive valley (the already mentioned *Valle de los Ciegos*, which some people, through error or analogy of the ground, have also called *de las Ciénegas*), which stretches at the foot of the great block of mountains called *El Planchon* (*the great patch*), perhaps owing to its glaciers of perpetual ice, *avoiding that ascent*, gives access to a passage across the Andes at a height of only 6600 feet, that is to say, something like twice the height of the "cuesta de Prado," and nearly one-half that of the passes of *Uspallata* and *El Portillo*.

The total distance from Puerta de Teno to the summit of the Valley de los Ciegos is 57 miles.

### IX.

The first 13 miles, between the Puerta and the junction of a rivulet called Claro in the interior of the Cordilleras, are extremely easy. The road runs along a soft and thickly wooded valley, in the centre of which the River Teno flows enclosed by high cliffs, the gradient of ascent being only 30 feet per mile.

Then there follow six miles of a similar construction. The only difference which it offers with the preceding section is that the gradient increases, with a constant ascent of as much as 50 feet in each mile.

Then come 10 miles of a slightly more difficult character, because the valley narrows as it penetrates into the deep cavities of the Cordillera, but its construction is almost obvious. The curves which it would be necessary to construct would be of a greater radius than those of the Tabon; that is to say

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they would never be less than 1000 feet, and it is known that we have, in the roads already constructed, curves of as little as 600 feet radius.

### X.

We have thus traversed, over this comparatively level road, no less than 29 miles, exactly one-half of the Chilean section of the route, without meeting with a single obstacle. In this traject it would simply be necessary to build three or four bridges of small dimensions across the Teno ; but, after 30 miles of the route, comes the first of the only two difficulties which exist in the whole tracing of the line.

At this point the valley, or better still, *the river-bed of the Teno, narrows so abruptly as not to leave more than 30 feet of space between the two flanks of the mountains, at the bottom of which the river flows with tremendous rapidity.*

This gorge, very appropriately called " los Infiernillos," has an extent of 7 miles. " This line, says the report of Surveyor Dubois, would necessitate a series of deep cuttings and tunnels through sheer rock, crossings of the river by bridges of from 100 to 200 feet span, and massive retaining walls."

### XI.

After passing los Infiernillos there follow 5 miles with an ascent of 116 feet per mile, and then, the road having traversed a distance of 40 miles from " La Puerta " in a straight west to east direction, it sharply turns to the south, penetrating into a ravine 6 miles in length, called De Vergara.

This gorge is the second difficulty and the most arduous one of the railway, the rise amounts to 430 feet per mile, which makes the straight line and even the sharpest curve impossible; but by the zig-zag system, which has been employed in the road of the Semeringue Alps between Trieste and Vienna, at Mount Cenis, at the Righi, and even on Vesuvius, and which has been

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carried out on a smaller scale between Chañarcillo and Pabellon, the work is practicable.

### XII.

Leaving *the Quebrada de Vergara, the Valley de los Ciegos is reached, the culminating point and true key of this gigantic work. On reaching this point the locomotive coming from the Pacific would commence to descend, almost imperceptibly, towards the Atlantic.*

### XIII.

Such is the part of the route which lies through Chile,—in all 57 miles, of which only 13 (the 7 of “los Infernillos” and the 6 of the Quebrada de Vergara) offer a comparative difficulty, which would disappear entirely in the face of the magnitude of the enterprise and of the obstacles themselves of nature.

The part of the road in the Argentine Republic is much shorter and cheaper of construction.

*The valley de los Ciegos descends for 12 miles towards the east, with a gradient of only 30 feet per mile, the same as the valley commencing at Puerta de Teno has on the Chilean side. Then the line enters the valley Del Azufre and, traversing it for a distance of 8 miles, penetrates into the Quebrada de Venezuela, the gradient of which, similar to that of Tabon, would be only 116 feet per mile.*

After running at the bottom of the latter gorge for a stretch of 10 miles, the railway penetrates into the Rio Grande Valley, and there it is already within easy reach of the magnificent prairies of the pampas wherein lies its appropriate end. The whole of the descent of the opposite side of the Andes is, therefore, only 30 miles.

The total length of the route of the line is 87 miles, of which 57 belong to Chile and 30 to Argentina.

## XIV.

We have now, in connection with this pass of the central Chilean Andes,—by far *the lowest of all those which exist and which have been explored to the north of the Antuco volcano*,—we have now, we say, to ascertain the identity of the old surveys of this historical gap, just as they were made 20 years ago in those same localities by the railway prospectors of the great contractor, Don Enrique Meiggs. . . .

## XV.

At the end of the year 1802, there lived in the city of Talca an unknown man, but not so much so as not to obtain the title of Captain of the Militia of Quillota, his native town, or at least his residence, . . . His name was Santiago *Cerro* Zamudio, and his business was to walk about the hills in search of minerals and other things connected with his wandering profession. . . .

Be that as it may, Captain Zamudio was, at the time we are referring to, living in the Province of Maule and, being no doubt drawn by his taste for mines, made a trip to the Cordilleras, penetrating by the valley of Lontué, a few leagues distant from the present pass which we have called the Pass of Teno.

The discoverer started from Talca on the 25th of November, 1802, and, climbing to *the summit of the Cordillera* on the 29th, he says *he passed along a valley called De los Ciegos* which, as he himself says, is of great extent : “ In it I found a large quantity of horses and several stone enclosures.”

Quoted  
p. 1038.

And then he adds : “ Here (in the *Valle de los Ciegos*) I noticed that another road runs to the north, which, I learnt afterwards from the Indians, descends to the town of Curicó.”

“ *Already from this valley, that is to say, towards the pampas, the waters flow to this continent of Planchon.*” Now, the prob-

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lem as to *the discovery of the pass* is completely demonstrated in these three passages.

The extensive *Valle de los Ciegos* is the same one which Dubois found later on, and which he called by its proper name.

The road more to the north, which goes towards Curicó, can it be other than that of Teno traversed by the latter surveyor ?

*Nor can this valley, from which the waters flow down both slopes of the Cordillera, be any other than that in which Navarrete and Dubois saw the sources of the River Teno towards Chile, and of the Rio Grande to the opposite side, that is to say, to the Valle de los Ciegos.*

### XVI.

But, let us continue our research, that the point may be still clearer as we follow the route of the first discoverer.

After passing the *Valle de las Cuevas* (thus called owing to some natural stone caves to be found there, which were also seen by Dubois), Zamudio descended to the Valle Hermoso where the Pehuenche Cacique Antipan had his huts. "There," he says, "I found out from the Indians the existence of another road different from the one I had followed, and, having been assured that it went in a very straight line towards the town of Curicó, I paid two of the Indians to point it out to me."

Consequently, the discoverer again ascended the *Valle de los Ciegos* by the same road he had made use of in his way down, and once having reached that plateau, "he deviated," he says, "towards the north to take the road of the Indians."

### XVII.

Therefore, this straight road to the north is strictly that of the valley of the Teno which the explorers of 1864 followed in their route,—an ancient Indian road, which to-day is still the one used for cattle.

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But here the truth of the whole discovery is contained in one single phrase.

"There rises, says Zamudio, *near this road*, a portion of Cordillera called EL PLANCHON, which I ascended."

Here we have, therefore, the Pass of Planchon discovered and mentioned for the first time in our geography.

Captain Zamudio is consequently the real discoverer of the Pass of Planchon, in the sense of utilizing it as a means of communication on a great scale for the commerce between the two Républiques which were then one single Kingdom.

## XVIII.

Having made this discovery, Zamudio returned to Talca over the same road which, 60 years afterwards, was followed by Dubois and Navarrete, that is to say, over the valley of the Teno, "following dense forests" where the traveller says he found many Indians picking the ripe fruit of the "Maqui," and "parties of Pehuenche Indians who had been to the pampas with loads of wheat and beans from the valleys of Chile."

From that moment it seems that Zamudio decided to go to Buenos Aires to inform the Viceroy Sobremonte of his discovery, because, as he himself narrates, "during the many days he stayed at the huts" (*tolderias*), he asked several questions relative to the road to the capital of Buenos Aires, and they, like other Indians of the neighbourhood, informed me that it could be reached without any trouble going in a straight line."

Consequently he went to Mendoza, which he reached on Feb. 1, 1803, and from there he started for Buenos Aires.

So satisfied was Zamudio with his discovery, and so convinced was he of *the facility of crossing the Andes in that direction by a cart-road*, that he offered himself to Viceroy Sobremonte to go over to Chile "sobre los montes mas altos del

mundo" (over the highest mountains of the world) *in a carriage drawn by two horses.*

## XVIII.

We are not acquainted with Zamudio's efforts and works in order to obtain from the Government of Buenos Aires the verification of his itinerary, because in this he had forcibly to participate of the fortunes of all discoverers. It was only on January 5, 1805, that we find the instructions given by the Viceroy Sobremonte to don José Sourrière de Souillac to verify scientifically Zamudio's explorations. This expert was a Frenchman, an eminent professor of mathematics, who had fled from his country by reason of a duel in which he had killed his adversary.

Souillac, in the company of Zamudio and an escort of cavalry militia (*Blandengues*), started on his march from Fort San Rafael in the eastern Cordillera and almost opposite the Pass of Planchon; and, after having traversed the pampas for a distance of  $337\frac{1}{2}$  leagues, *he reached the Planchon Gap, which he called Sobremonte, on the side of the pampa, and, having ascended those slopes in a cart, arrived without any obstacle near the entrance of the central valley of Chile.* Only one bad passage, called Maturana, detained his advance.

Of the rest of the road, speaking of the eastern declivity, Souillac says that "he only found in it the drawback of a somewhat rough slope, which can be made easy with great facility, for it is composed of soft earth and small stones which can be used to pave the road, because there are no rivers, dangerous descents, precipices, nor ascents to prevent the passage of a carriage."

From this point to the bad Pass of Maturana, the explorer adds that the ascents and descents are free from danger and precipices, because all that distance (from Sobremonte) Gap as

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*far as the Plateau of Planchon is simply an orchard formed by nature.*

### XIX.

But it is at the sight of the plateau of Planchon and of its skirting road, or *Valle de los Ciegos*, that the French traveller allows himself to be carried away by his enthusiasm for discovery, experiencing no doubt the same kind of emotions, which agitated, after 60 years of oblivion, the breast of the young American to whom we owe the latest information as to this route. "The Cordillera mentioned," says Souillac, "was divided by nature in such a manner that, at *the spot called Del Planchon, which should be the most dangerous part, God has placed a plain like the pampas of Buenos Aires, with a beautiful stream of considerable size, and abounding in all kinds of wild game and quadrupeds adapted to the conditions of the ground, as well as luxuriant grass and sufficient wood to provide any troops who may have to cross thereby.*"

Quoted  
p. 1039.

As to the descent towards Chile, Souillac says that "*it is effected with inexplicable gentleness.*"

Quoted  
p. 1039.

Moreover, in both diaries, in Zamudio's as in that of Souillac, frequent mention is made of the names of the Valley de las Cuevas, de Vergara, Rio Colorado and others, which are the same as those mentioned by Dubois with the circumstance that the latter can only be the "Rio Grande" which the young American surveyor says he saw in the "Valle Hermoso,"—the same which, under the name of Colorado de Villarino, Cobuleuvu (Cobu, red, Leuvu, river) of Don Luis de la Cruz and de las Barrancas, of Falkner, empties into the River Negro, the large navigable river of Patagonia.

Zamudio's discovery was, therefore, completely verified by Souillac, just as the subsequent exploration of Navarrete was, exactly 60 years afterwards, by the scientific survey of Dubois.

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It is astonishing therefore, that such an extraordinary fact should have passed unnoticed for over half a century.

The antiquarian, Don Pedro Angelis, states however that, had it not been owing to the disturbances caused by the English in la Plata in 1807, and the subsequent revolution in 1810, the cart-road of Planchon would undoubtedly have been constructed, and he even adds that the Maturana Pass was made good by order of the City Council of Talca at a cost scarcely exceeding 200 odd dollars.

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### ENGINEER E. DUBOIS ON THE VERGARA PASS.

[Translated from Vicuña Mackenna's "*A través de los Andes*," pp. 317-326.]

(Quoted on page 1039 of the Statement.)

*Report of the Engineer, Don E. Dubois, upon the Passes of the Andes by the Planchon, and its adaptability for the construction of an inter-oceanic railway.*

SANTIAGO, March 7, 1864.

SEÑOR DON ENRIQUE MEIGGS.

SIR,—

Having examined the Cordillera to the east of Curicó with the object of finding out if it was possible to cross it by means of a railway, I beg to submit to you the following as a result of the exploration.

In the central Cordillera and in the latitude of Curicó there is a group of high mountains called El Planchon. One of its points is volcanic, and over it there passes a well-known road called "*paso del Planchon*." Much below the summit of this path, on its north-eastern side and at the foot of these hillocks, the "valle cenegoso," swampy valley, or *Valle de las Ciénagas* [*Ciegos*] is situated. This valley stretches around the base of the Planchon in the shape of the arc of a circle. It is 13 miles in length, and one or two in width. All along its extent flows a stream, and there is a wide belt of grassy land. At almost half a league from its northern extremity THERE IS A SWAMP OF SOME "CUADRAS" IN EXTENT, WHENCE THE WATERS FLOW

Quoted  
p. 1039.

ON ONE SIDE TO THE CENTRAL VALLEY OF CHILE, AND ON THE OTHER TO THE PAMPAS OF THE ARGENTINE REPUBLIC. On both sides of the swamp the ground has a declivity of 33 feet per mile. But it extends on the Chilean side, as I have already stated, for only half a league, whilst, towards the Atlantic, it extends some 12 miles. This plain on the summit of the Cordilleras and 6000 feet above the valley of Curicó, is neither a sterile plain nor a rocky slope, but *a beautiful valley with abundant pure water and excellent grass. In no other of the sources of the Teno is there a depression like this to be found.* To the south the perpendicular walls of the Planchon rise. To the north, although less rough, mountain rises above mountain, until they are lost among the peaks of Santa Elena.

After this general description of the position and character of the summit, I am now going *to follow the waters in their course, on one side along the ravine or valley of the Teno, and on the other, along the valley of the River Grande to the plains of the pampas.*

*From the summit of the swampy springs* to the "puerta" of the Teno, where the river flows into the plains of Chile, there are some 57 miles. As the difference of the level is 6000 feet, the ascent could be overcome by means of gradients of 116 feet per mile, or 2.2 per cent., should the nature of the ground permit a uniform gradient. But, as in every mountain declivity, the Quebrada of Teno has, in its lower part, a less incline than in its upper part.

Going up the Teno from the valley of the Curicó, there flows from the south, almost at right angles, the River Claro, in the 13th mile. Here those who travel by this path leave the Teno and, following the Claro to its sources, climb and pass the heights of the Planchon, not knowing perhaps that in a ravine, near by, more difficult to traverse owing to its rough and sharp surface, but at a much lower level, run the waters of the Teno.

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From the "puerta," as far as the junction of the Claro, the bed of the river is some 2000 feet wide and is enclosed by cliffs of from 30 to 60 feet high. The river runs at the foot of the northern cliff and is enclosed—as may be said of the Teno along its course—in a deep and well-defined channel. The gradient is 30 feet per mile, or 0.6 per cent.

Between the foot of the mountain and the cliffs of the river there is a level strip of ground of a width of from two furlongs to a mile, covered with forests of "lingue," "quillai," and "peumo." The hills are low and densely covered with robles and cypress.

From the junction of the Claro for an extent of over 6 miles, there is a constant and regular ascent of 50 feet per mile, or 1 per cent., and in no part has the valley a width of less than a thousand feet. At many points the river, in its period of greatest flood, is only 50 feet in width. The curves like the gradients are gentle. The ground as far as this point is coarse gravel and sometimes compact gravel.

The plains are at this point much lower, and the forests less abundant. For the next 10 miles both these disappear and the ravine, dwindling often as much as 1 cuadra in width, is enclosed by high mountains. The curves would be more frequent and sharper, but never of 1,000 feet in radius.

The cutting and embankments would be lateral, and the material to be used half stone and half compact gravel. In this extent of 10 miles the Teno receives six streams of considerable size, three from each side. In the 29 miles I have traversed, the river would have to be crossed three times.

Along the following 7 miles of the ascent the river crosses an enclosed valley very properly called "los Infernillos." Although it follows the general direction of the valley from west to east, the path is very tortuous, and often it is not more than 100 feet in width.

The mountains rise abruptly from the river-bed, often like

perpendicular walls, to a height of some hundreds of feet. The river is very uneven, sometimes filling the valley with a sheet of smooth water, and sometimes falling over rocks with a tremendous roar. Seldom will there be found, even in the Cordilleras themselves, such a rustic and wild sight as that presented by this valley, and the construction of a railway would be a gigantic enterprise. The average incline of the gorges is 130 feet per mile or 2.5 per cent., and this incline is sufficiently uniform to allow a good location without the introduction of gradients of more than 130 feet, or 3 per cent. Over these as a maximum, and over curves of a radius of 500 feet, a solid and permanent road may be constructed. This line would be a series of deep cuttings and tunnels through sheer rock, bridges of from 100 to 200 feet span across the river, and massive retaining walls.

Leaving "los Infiernillos," the river flows sinuously along an open valley for 14 miles, which is, in all its aspects, but in its ascent,—which is more abrupt and less uniform,—as adaptable for a railway as the first 10 miles beyond the pass. The average of the ascent is 116 feet per mile, or 2.2 per cent., but the gradient is uneven and the maximum is 150 feet or 3 per cent.

Here the mountains have the barren and desolate aspect which characterizes the central chain. There are also evident indications of the existence of silver and copper. Five miles above the valley or gorge of Los Infiernillos, the river for the first time alters its westerly direction and forms an angle of  $55^{\circ}$  to the right. This direction S.  $35^{\circ}$  E. is preserved for the rest of the 14 miles, until it meets the ravine of the stream of the "Valle Cenagoso," known as Quebrada Vergara. Between Los Infiernillos and the Quebrada Vergara, the River Teno, besides some six small streams, receives in its upper course the rivers Pellejo and Malo. These, together with the Claro, are its principal sources (*vertientes*) within the Cordil.

*lera*. From the first two it receives the greater quantity of its waters during the summer. Further down stream the Teno is a river of considerable size, very turbid and of a yellowish colour. Above the junction with these rivers it is a mountain brook, quite clear, and only a few feet wide. Where the River Teno flows into the Quebrada Vergara it again turns to the east and, ceasing to form the principal valley of the mountains, its bed is a mere torrent like the Malo and Pellejo and, like the latter, it soon disappears with its sources among the inexhaustible snows of the Cordillera.

From the foot of the Quebrada Vergara, some 50 miles from the plain of Curicó, to the summit, to the swampy spring, there are 7 miles, to wit, 6 miles along the Quebrada and 1 mile along the valley of the summit. In this Quebrada, 6 miles long, the declivity is 2600 feet, or 430 feet per mile, or 8·2 per cent. This gradient cannot be admitted even if the ground were to allow it, which does not occur, because the lower part of the Quebrada has an incline of 250 feet, almost 5 per cent., whilst the upper part has 800 feet, or 15 per cent.

This is the most difficult part of the road ; however, it is not insuperable. The lower part of the valley is open, and the hills are neither high nor abrupt. By means of a zig-zag a line may be traced along the two sides of the Quebrada, increasing the distance from 6 to 10 miles, and with a uniform gradient of 260 feet per mile, or 5 per cent. with curves of 500 feet radius. The construction of the bed of the road would not be more difficult nor more expensive than the work in general along the Teno. We have an instance in Chile of the gradient and curve proposed here in the road from Pabellon to Chañarcillo, which now is traversed by rail. No gradient exceeding the latter can be successfully negotiated by locomotive engines. In more abrupt gradients stationary engines will have to be used.

The gradients and curves from La Puerta to the summit may be grouped in the following manner : the gradient in

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feet per mile and also in the percentage ; also the minimum radius of the curves.

Section.	Length.	Gradient.	Curve.
1a.	13 miles	30 feet or 6 per cent	2000 feet.
2a.	6 „	50 „ 1'0 „	2000 „
3a.	10 „	75 „ 5'5 „	1000 „
4a.	7 „	130 „ 2'5 „	500 „
5a.	14 „	116 „ 2'2 „	1000 „
6a.	10 „	260 „ 5'0 „	500 „
7a.	1 „	30 „ 0'6 „	2000 „

In sections 4 and 5 there would be gradients of 150 feet, or 3 per cent.

In a period of four years, and for a sum not exceeding eight million pesos, a railway may be built as described, from Curicó to the summit of the Cordilleras, and, as to its safety and durability, it will not be exceeded by any other mountain railway. I believe, too, that the snows in winter will not obstruct it, just as they are not obstacles to the railways north of New York and those of Lower Canada.

*To the east of the summit there are no serious difficulties. The Valle Cenagoso with a declivity of 30 feet per mile, or 0'6 per cent., skirts for 12 miles the base of the Planchon in a direction S. 60° E. on its right. There it is intersected at right angles by the valley Del Azufre, and continues under this name for 8 miles more. This valley, lower than, but in every other respect perfectly similar to, the Valle Cenagoso, has a declivity of 50 feet per mile, or 1 per cent. It ends at the Quebrada de Valenzuela, an enclosed valley (cajon) of 10 miles long, through which the waters of the summit find an outlet to the valley of the Rio Grande. The Quebrada has an average declivity of 116 feet, or 2'2 per cent. The cost per mile, the gradient and*

laying out of these 10 miles are very similar to the Tabon line [between Santiago and Valparaiso].

At the foot of the Quebrada de Valenzuela, 30 miles from the summit, the rivulet of the Cenagoso valley has developed into a river. Then it is joined by two other brooks of almost the same size, one of them coming from the Valle de las Cuevas and the other from the Valle Hermoso. *The Rio Grande* that here becomes a formidable river, wider than the Maipó or the Cachapoal, *flows diagonally across the mountains of the eastern side for 50 miles*, and, entering the pampa a little to the north of the latitude of Chillan, washes the foot of the famous Mount Payen, discharging into the Atlantic (with the name of Rio Negro [Colorado]) 130 leagues to the south of the city of Buenos Aires.

The valley of the Rio Grande has an average declivity of 25 feet or 0.5 per cent., and never more than 50 feet or 1 per cent. It has a width of from half a league to a league, and the gentle slopes of the numerous ramifications of its ravines watered by springs and brooks of the purest water double its breadth. The construction of a railway along it would not be more difficult than that of a line in the south [of Chile] and its beauty and fertility is not exceeded by any of the most lovely plains of Chile. Everywhere it is covered by a great abundance of wild grass, supplying forage to millions of Guanaces, and it has, besides, numerous quarries of building stone, limestone, and other materials.

Such is, Sir, the general aspect of the railway line which I have traced across the Andes at your request, and I am pleased to say that the results of this first scientific investigation clearly prove that science can remove the immense barriers which nature has placed between two sister countries. Once this grand work is accomplished, the magnificent and vast Argentine Republic would meet Chile with her civilization and confraternity on the very summits which had been the obstacle

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to a more intimate relation, and the whole world will be benefited by the opening of a railway between the Atlantic and the Pacific which will considerably shorten the distance between the Old and the New World.

I am, etc.

E. DUBOIS.

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### THE ARGENTINE ENGINEER, AVÉ LALLEMANT, ON THE EASTERN CORDILLERAS.

[Translated from "*Itinerario de la Expedicion Minera a la Cordillera de los Andes, bajo la direccion del jefe, Ingeniero don J. J. de Elia*," Buenos Aires, 1885.]

(Quoted on pages 1053, 1059 and 1060 of the Statement.)

(P. 5) THIS group of the Sierra Velluda is situated between the Rivers Laja, Bio-Bio, Trapa-Trapa, Pinos and the great Lake Laja.

The highest summit is that of Sierra Velluda (lat.  $37^{\circ} 26' 19''$ , long.  $71^{\circ} 29' 45''$ , altitude 3492 m.), a peaked mountain rising like a bold belfry above the other summits and the great glacier at its base, and which has served as my principal landmark for taking bearings during my survey of the territory of the Neuquen and Agrio Rivers as far as Cerros Salina and Carrere in the south.

Near this mountain and in the same group rises the volcano Antuco (latitude  $37^{\circ} 23' 30''$ , longitude  $71^{\circ} 27' 10''$ , altitude 2762 m.) which, with the first-named, forms the great block of this group, from which branch off the ranges of Pitronquines, Duquenco, of Trapa, of San Lorenzo and of Pilque. We passed at the base of the last-mentioned, at its western extremity, to enter the valley of the River Laja.

In the map that I have just drawn, wherein I have endeavoured to make clear the orography and hydrography of

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the Cordillera between  $34^{\circ} 40'$  and  $38^{\circ} 50'$  S. lat. (from the River Diamante to the River Lonquimai) the reader will find further details. All that part of the Cordillera which lies in Chilean territory, that is to say the western slope (*falda*) of the watershed (*vertientes*) line, I have taken from Pissis' Map of Chile, and the whole portion to the east of the same line in Argentine territory, I have drawn according to the results of my own triangulations which are calculated on three measured bases, astronomical azimuths observed by the altitude of fixed stars near the prime vertical, and measured angles, availing myself, as connecting points with the surveys of Pissis, of the summits of Velluda, Callaqui, Lonquimai, Polcura and Campanario.

(P. 10) Having crossed the stream Malalcura and ascended to the ridge of a spur of the mountain, the traveller is surprised by the splendid view over the upper part of the River Laja valley, and of the Volcano Antuco and la Velluda. On examining the Sierra de Trupan to the north of the River Laja, attention is called to the fact that, in the midst of the dark red trachytic rocks, there are seen layers and veins of a very light coloured rock, which is assuredly no other than the same andesitic rock that extends northwards. Just as in Punta de Quillay on the River Aconcagua the andesitic forms horizontal layers between tofus sandstones, throwing out large apophyses irregularly towards both sides, thus showing its eruptive nature . . . of a more recent formation than the trachytic rocks which form the group of the Sierra, and in a great extent from north to south with very little breadth from east to west. Here on the River Malalcura this rock is found near *the highest summits of the Cordillera* just as on the River Aconcagua, a fact which is not without interest and deserves the more attention as it is known that the same rock forms *the highest summits* of the great mountains of the Plateau of Quito and Titicaca.

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(P. 11) The Cohihue stream rises in el Hoyo, a depression of the ground to the east of Sierra Velluda, further down than Laguna Verde, separated from the latter by the great lava bed which extends from the Antuco to the S.W., deviating against the high precipices of the Velluda towards the north, and descending by the slopes (*faldeo*) of the Laja Valley downwards ; it is evidently the drainage channel of Laguna Verde, whose waters percolate through the scories forming a subterranean source which discharges in the depression and forms the Cohihues Stream.

After crossing the stream and at the commencement of the ascent the volcanic formation of Antuco is reached.

The altitude of the foot of this slope is 992 m., of el Hoyo 1366 m., of the Escorial 1448 m. ; the road ascends to Cuesta Colorada at 2216 m., and thence descends again to Lake Laja (1343 m.).

(P. 15) Arriving at the gap formed by the Antuco on the east, and the " cordon de Tobas " on the west, we are surprised by the grand view which we have before us. At the foot of the steep slope of the Antuco and at some 900 metres beneath us, lie the blue-green waters of the great Lake of Laja ; further east *the great Cordillera of Pichachen, Copulue and Pilunchai where the waters are divided*. On the south we have the mountains of Pitronquines, and the great glacier of Sierra Velluda, the Escorial, the Cordillera de Chillan, the mountains Calabozo, Negro and Trupan, and immediately to the left there rises the dark cone of the Antuco. A grand view of the Cordillera indeed !

(P. 16) Passing through a small gap, we descend to the valley of the Pinos stream following this up to the Copulue gap.

From the glacier of Velluda there descends another stream called Pitronquines, full of trachytic pebbles.

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(P. 17) The valley broadens here and forms the Pinos stream; from the north comes the Collagüe stream, by the side of which runs *the road to the Boquete de Pichachen, by which carts loaded with timber have been easily drawn from Angeles to Ñorquin, and which with little labour could be transformed into a very good highway, though with some zig-zags of course, descending to the east by Moncol, Rengui-Leuvu, ascending to Vutamallin, old Ñorquin, Culul-Malal and Ñorquin.* It is the main road by which the Indians have driven thousands and thousands of farm cattle to Chile.

By the Collagüe Valley it is also possible to pass over by the Picunleo Gap, though it is not a good path. From the south the Pinos stream receives the tributary streams of the Campamento and of the Cajon de Trapa-trapa, by which runs a track sloping up the volcano of Trolope by the Trapa-trapa Gap which leads to the River Copahues, by the Lagoon of Capijahue to the valley of the River Agrio and the deep *cajon* of Trolope and Ñorquin, but it is a little-used track; we followed the Pino brook up-stream in order to cross the same day by the Copulue Gap; but a violent wind arose, stirring up enormous dust clouds which did not allow us to see ten yards ahead.

(P. 18) On the southern slope of the Sierra de Copulue the road ascended in zig-zag to the Gap ( $37^{\circ} 32' 58''$  lat., and  $71^{\circ} 13' 14''$  long., 2233 m. altitude), which lies between Cerro del Corralito to the south and Mount del Copulue on the north.

(P. 19) The view over the Chilean Cordillera, almost entirely covered with snow, is splendid, but on the Argentine side very little is to be seen; only towards the valleys of Copulue and las Damas down to the great Maloñegüe mountain, which blocks the view further on. What surprised me most was the very little snow to be seen on the Argentine side, the Maloñegüe alone showing a considerable quantity.

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*The division of the headstreams (vertientes) lies here 25 kilometres to the east of the highest Cordillera.* Quoted  
p. 379.

The descent on the eastern side of the Gap is very steep, and the road follows down stream the Copulue brook. At the foot of the slope, where the Padilla brook joins the Copulue, the altitude is 1560 metres.

(P. 20) The height of the junction here is 1164 m., and the traveller follows the broad and picturesque valley of Las Damas down stream. From the south comes the brook Atravezado and thence the path lies at the foot of an interesting plateau mountain, formed by the same conglomerate which has been observed from the western slope of the Copulue Road, in the midst of which, and forming the so-called plateau of the summit, three dykes of trachyte, already mentioned, are distinguishable. The valley narrows at the northern foot of the great Maloñegüe mountains and forms a deep gorge eroded by the waters in the hard conglomerates which, owing to their numerous grottoes and dark colour, are a favourite place for the eagles and condors to nest in, and lend a mournful aspect to the landscape.

The way now ascends to Mount Maloñegüe, formed here of conglomerate and a somewhat schistous trachyte found on the summit, descends to the Chigüereco stream—which rises on the eastern slope of Maloñegüe, and, dividing the latter from Mount Rucanahue, falls into the River Trocoman,—and continues by the deep and broad valley between both mountains, turning to the east at the foot of Mount Rucanahue and descending to the great valley of Uñorquin or Ñorquin as it is now called in official publications.

When crossing the Chinguereco stream I lost my way ; the “ tropa ” had gone forward, while I, following an old Indian path, turned the northern point of Rucanahue and lost myself among the mountains of Pichimaitenco on the Trocoman.

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where my mule became tired, as the slopes of all these mountains are but a conglomeration of loose volcanic matter, in which the beast sinks knee-deep and sometimes up to its belly, so that I passed a night in the fine rain suffering from cold and hunger, with little comfort in the high Cordillera ; I got out next day after noon and arrived at Ñorquin, the head-quarters and in fact the capital of the Gobernacion del Neuquen.

(P. 21) The following day I ascended Mount Maloñegüe, carrying with me the necessary instruments in order to make astronomical and geographical observations from which I obtained the following result : the highest summit of Maloñegüe Volcano  $37^{\circ} 42' 34''$  S. Lat.,  $70^{\circ} 46' 11''$  W. Long., 2533 m. altitude.

The situation of Ñorquin :  $37^{\circ} 41' 54''$  S. Lat.,  $70^{\circ} 46' 31''$  W. Long., 1217 m. altitude.

(P. 28) After receiving the Arroyo del Cholar, the Butanel-Vun forms a deep and rugged gorge and soon falls into the Neuquen. The track follows the heights passing to the west of Peñon Mahuida and descends to the River Trocoman a little below the very deep cajon de Butalechicura and a little above the point of Trocoman, Rengui-Leuvu and Neuquen. Peñon Mahuida is a conical peak, perpendicular, without vegetation worth mentioning, and stands near the very junction of the rivers.

(P. 29) This plateau stretches from Rio Trocoman on the south, northwards to Rio Dahuehue (Nahueve on the Chilean map), another chief tributary of the Neuquen, and between this river on the east and the high Cordillera on the west. The height of the plateau is 1400 metres on the north and 1200 on the south, and it presents an undulating surface, a barren desert impossible of cultivation, with but a few tufts of Coiron

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p. 1059.

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grass here and there among the stones. To the west rises the high snowy Cordillera of Pillain-Mahuida with the groups of massifs of Coyahué, Moncol, the headwaters of Arin-Leuvú, the block of Palau-Mahuida and the high Dahuehue; far to the north the peaks of the Cordillera de Barbarco [2800 m.], and to the east there stretches from north to south the great Cordillera de Choloï-Mahuida [whose northern part is the Cordillera de los Nevados or "del Viento"], and whose highest central mass is formed by one of the highest Nevados of the Cordillera, the Lumullo [Domuyo] of 4257 m., an immense white mass.

The waters which, from the high Cordillera, have opened their thalwegs [*sic*] towards Rio Neuquen have formed narrow and very deep canyons in their détour, the gorges being 300 m. large as a maximum, and having almost perpendicular cliffs of 200 m. Such canyons are Reñileufu (Reñileo), Ñereco and Arin-Leufu (Guañacos?). It is at the bottom of these gorges where Chilean immigrants, poor people of untiring energy and constancy, with a minimum of material demands, and with whom the poorest Indian cannot compete, much less the European settler, have cultivated some fields which they have cleared of stones, irrigating them with the waters of the abundant streams arising between the horizontal strata of the bottom and the walls of the canyon.

(P. 30) The walls of these canyons are extremely interesting as a geological study, for they present a section of the superposed layers which constitute the formation. We crossed by the canyon de Ñereco, the Rengui-Leuvu, the Arin-Leuvu, the • Ling-Leuvu, and ascended by the latter to the summit of Palau-Mahuida. . . .

(P. 36) I made a very interesting expedition to the northern summit of Palau-Mahuida, 2536 m. high (the highest point in

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the group of mountains forming the massive is the great Mount Dahuehue, 2916 m. high); this point was difficult to ascend on account of the ruggedness of the ground and of the snow lying on the slope. It was necessary to climb the last stretch on one's hands and feet, encumbered by the instruments, over huge loose boulders which form this peak; its situation is  $37^{\circ} 4' 36''$  S. lat. and  $71^{\circ} 3' 13''$  W. long. The peak is formed of a porous sanidinic trachyte similar to that of Mounts Maloñegüe, Rucanahue, etc., having all the aspect of a volcanic formation. A large agglomeration of sand, Lapilli, etc., is found on the slopes and crests of the mountains, especially on Mount Palau-Mahuida.

(P. 37) *From the heights of Palau-Mahuida* I have been able to fix many important bearings for geodetical work. From this summit *an admirable view is obtained of a large portion of the Cordillera*: la Velluda, Polcura, the Cordillera de los Nevados, the Lumullu and the Cordillera de Choloï-Mahuida, the Huaili, Tromen, Llencura, Maloñegüe, etc., *the whole Cordillera de Moncol and Pillain Mahuida, and, in the pure and clear atmosphere of the high Cordillera, it is well worth ascending to these heights.*

(P. 38) We crossed the River Trocoman at a place called Villa-Mallin or Milla-Mallin, where the valley broadens on both sides and forms a pretty landscape. Some Chilean settlers had here sown wheat and beans; the hunting of the guanaco, which is abundant in summer time, provides them with meat.

(P. 39) Continuing our journey southward we crossed the Hualcupen stream, a little above the blockhouse at 983 m. altitude. *This stream, like the others further south, comes from the Cordillera which divides the waters, over which the volcanoes of Callaqui and Lonquimay rise, and breaks by deep and long*

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p. 379.

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*canyons through the Cordillera de Butauhau*, which extends from the Agrio plateau or the Pampa del Culuno on the west, forming an extensive cordon stretching from N. to S.

(P. 44) The cost of extraction (of minerals) is very moderate taking into account *a good road to Lonquimay in Chile, which with very little work could be much improved*, etc. . . .

(P. 46) The geographical situation from the point of view of transport is also very favourable. At this place the canyon de Llumum-llumu abuts on the Agrio. Along this canyon lies the road to Chile by the Lonquimay Gap, to the Province of Angol, covered with immense forests and with all desirable resources. The cost of transport by mules to the village of Lonquimay is at present 48 pesos (Chilean paper currency) a ton.

(P. 66) Following the bank of the Neuquen up-stream, there is found sandstone alternating with clay schists and slate clays interrupted by dykes, and notably a huge vein of andesitic rock whose course is S. 45° east, and forms colossal ridges. There is much limestone in the valley between the eruptive rock. This valley, on account of the pronounced curves formed by the river between the Caycayen and Mayan-Mahuida, is truly splendid.

Mayan-Mahuida is completely separated from the northern group of mountains, the Cerro de Butalong, by a depression of the ground; *the latter is the last extremity of the great Cordillera de Choloi-Mahuida which proceeds from Lumullo and Cordillera del Viento and de los Nevados, which are an extension of the lofty Cordillera that surrounds the high plateau of the Laguna de Maule on the eastern side.* The Cerro de Butalong is geologically identical with the Mayan-Mahuida, etc. . . .

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p. 1054.

The whole great Cordillera de Choloi-Mahuida and its depen-

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dencies would require a detailed study ; however, for many reasons I had to desist from penetrating into it.

(P. 72) From Lake Tromen northwards the road still ascends for a time, but we soon reach *the summit of the great Gap (Portezuelo) between Tromen and Huaili*, situated in  $37^{\circ} 1' 27''$  S. Lat.,  $70^{\circ} 9' 12''$  W. Long., at 2240 m. altitude. From this point the view towards the east is splendid ; from the Sierra de los Volcanes to the Payen, the Sierra Pelada to the east and north of the Rio Grande, etc. . . .

The cajon of the Butaco stream is a narrow ravine of some 30 m. depth in the plain which inclines here towards the Rio Grande, that from the crossing point of the Butaco lies some 8 kilometres to the east where it forms a great curve changing its course from N.S. to W.E., skirting on the west and south the foot of *the barren Cordillera or Sierra Pelada*, which *forms a kind of Pre-Cordillera together with the mountains Coihueco, Payen, Payen Matro, los Volcanes and Palauco*. The Butaco stream descends from the Vuta-Mallin mountains which has two peaks of 2989 m. high, and forms at the base the largest and best known swamp (*Mallin*) of these parts called Vuta Mallin ; but a snowstorm and the poor condition of our horses prevented us from making an excursion to that point. The altitude of the passage of Butaco is 1725 m., and the Mallin lies 2 or 3 kilometres upstream. . . .

The ground becomes more and more rugged as we get nearer to the River Barranca. I ascended to the Cerro Ranquil Sud whose height is only 1812 m., but as a geodetical station it is interesting, since it offers a splendid view.

(P. 77) I made an expedition by the southern border of the cajon to Cerro Bayo, from the summit of which a beautiful view is obtained on the cajon of the upper River Barranca to the Cordillera of the plateau of Lake Maule, to the Payen and

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the curious Sierra Pelada to the other side of the Rio Grande, its summit being 1560 m. in altitude. From this station and by the aid of bearings taken from Portezuelo del Tromen, Mount Ranquil Sud and Puntilla Huincanes, *I have been able to determine a large number of important points for the orography of the Cordillera from the Campanario to the Lumullo, Coyoicho, Palan, Mahuida, Huaili, Tromen as far as the great mountains to the north of the river*, whose details are all marked out in my map of the Cordillera and in the record of the geographical positions that have been determined.

(P. 80) After crossing the small range by the Portezuelo Colorado, and the long and beautiful Cañada de Ranquilco Norte which descends at the northern foot of Cerro Colorado to *the Rio Grande, which breaks between Cerro Colorado and Sierra Pelada by a deep and narrow cajon*, we encamped on the Mallin at 1382 m. altitude, from which camp I made an ascent of the mountain of Agua Mayorga, whose highest point is 2584 m. forming three peaks which are evidently the remains of an extinct volcano crater. . . .

(P. 81) The ascent of the mountain is tiresome on account of the immense accumulation of broken boulders of the rugged rock which entirely covers the slopes, and the last piece that we had to climb on hands and feet laden with the instruments gave us much trouble. However, *the view from the top is grand, as it can only be obtained in the Cordillera, extending as far as the snowy mountains of the Maule, Guillamalal, Campanario, etc.* . . .

The two following days it was necessary to give rest to the mules in good pasturage, and also to one of the men who was seriously ill. There was a heavy snowfall and the following night arose *one of those storms peculiar to the high Cordillera*, whose fury is terrible, accompanied by cold which pierces to

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the marrow. Fortunately the camp was at the bottom of a depression, and there were many Cortadera plants between which we could find shelter against the raging, bewildering fury of the storm.

After coming out of Ranquil Norte, the road ascends to the greatest altitude (1861 m.) that it reaches in *this part of the Cordillera*. The ground is all sandstone, with some little loose matter on the surface, until one reaches the ridge of the mountain formed by the black porous sanidinic trachyte.

(P. 82) Issuing from the valley of the los Calmucos which flows near by the Rio Grande, we crossed another stream, the Chiquiracol, which proceeds from a small lagoon of the vicinity called Vacalauquen and flows into the Rio Grande. This river flows by a deep cajon at the eastern foot of la Sierra, the declivity of which towards the river is very steep and difficult. After passing the Huincanes stream I ascended to the summit of the Puntilla de los Huincanes, a huge trachytic block of 2472 m. high, which on its eastern side falls almost vertically for 1074 m., to a ledge between the mountain and the Rio Grande which flows 283 m. lower down. . . .

The view from this summit over the Payen mountain in its vicinity is very interesting. The ground that rises gradually towards Payen and Payen-Matro from the River Grande is an enormous deposit of three lava-beds one upon the other. It will be seen further on that a little lower down than the Puntilla de los Huincanes this lava has even extended to the western shore of the river, though only at two points of small importance; *thus one clearly sees how the waters of the river have opened their way over the lavas, between the same and the trachytic mountains of the Great Cordillera.*

It does not appear that any lava-flow has come down from Mount Payen itself, but, from the Sierra de los Volcanes further west and north, three protuberances of stratum are clearly

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seen whence the black layers of lava proceed. These three craters, the middle one of which is 2228 m. high, are situated thus: the southern one is 11907 m. to the north and 15506 m. west of the highest peak of the Payen; the middle one is 4162 m. north and 1912 m. west of the first; and the last is 4722 m. north and 3016 m. east. Thus the whole mountain group, where these volcanoes together with the Payen and Payen-Matro and their intermediary ranges, seem to be walls of an ancient and enormous crater, on whose western border the three more recent volcanoes have been opened afterwards, and then the thirteen low stratum-volcanoes which surround the semi-circle formed by the three large volcanoes with their intermediary ranges on the scoria ground. *The whole ground from the river to the foot of the Sierra de Palauco towards the north and the Payen-Matro, Payen and Coihueco towards the south, forms a coria deposit, the largest surface of lava that we have seen in the whole Cordillera. . . .*

(P. 83) From the summit of the Puntilla de los Huincanes there are to be seen in the distance towards the east the Aucamahuida mountains, the peaked crests of Chachahuen and the whole Rio Grande valley further up than Palamahuida, a grand view of an immense stony desert, as the scoria deposits are even more barren than the Sierra Pelada, some few—*Coyeron* (*Stipa*) tufts having taken root here and there.

(P. 89) Continuing the ascent of the slope of the Lucuyun stream towards the summit of Choi-Mahuida, we find a dyke of injection of the same light-coloured andesite which forms the enormous mass of the top of Choi-Mahuida; this dyke forming ridges protruding like a huge wall, and from which have fallen the huge fragments and rocks that are found in the slope. However, further up we find once more the limestone slate until we reach the great mass of bare rock which

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forms the top of Choi-Mahuida, whose altitude is 2437 m. and whence is obtained a grand view over the blue Cordillera, that is, the Cordillera de Maule, with the Campanario (3996 m. after Pissis), and its surroundings. This immense block of rock of Choi-Mahuida is an andesite, very light-coloured and very similar to that of the valley of Aconcagua in Guardia Nueva.

(P. 92) . . . The great Mount Nevado, a majestic mass, evidently an extinct volcano and whose situation I determined in  $35^{\circ} 32' 31''$  S. lat., and  $68^{\circ} 33' 50''$  W. long., with a height of 4775 m., the altitude of the Cerro de Chacaico higher up the Agua Plateada being 2263 m. The greatest altitude of the Sierra Polanco, a sharp peaked snow-covered hill in latitude  $36^{\circ} 6' 57''$  and longitude  $60^{\circ} 39' 23''$  is 3204 m. *It is thus very interesting to have shown that to the east of the high Cordillera of the divortium aquarum there exists another enormous Cordillera, which in the Nevado, Palauco, Payen-Matro and Coihuecco rises as high as the other, and which finds itself intimately connected with recent basaltic eruptions of great extent from north to south.*

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pp. 380  
and 1053.

Descending from the Portezuelo de Loncoche *a splendid panorama presents itself of the great snowy Cordillera on the west with the gigantic mountains of Piedra Esnandez (3408 m.), Torrecillas, 3405, Minas 3817, el Chacal 3628, los Banos 4210, and the bold peak of Cerro Diamante, and on the east the enormous Nevado with its dependencies, a great number of peaked mountains which communicate by a series of summits with the Payen-Matro, etc.* This is a truly sublime panorama, and amazing to the traveller who arrives from the south side of the Portezuelo de Loncoche.

(P. 97) Our encampment near *the puesto del Tigre, the last in the Cordillera*, was beautifully situated, a most poetical *farewell to the Cordillera* and to the mountains ; from here the

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valleys broaden and the mountains become gentle hillocks, even smaller at the north of the Rio Diamante ; then, further north, all is a plain, but with *a splendid view of the great and majestic snow Cordillera towards the west.*

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### VARIOUS ANTECEDENTS

of the Chilean Government Decree dated October 8, 1888, whereby the Department of "La Laja" is divided into 25 "Subdelegaciones."

[The extracts of Decrees are translated from Echeverría i Reyes' "*Jeografía Política de Chile*."]

(Quoted on page 1082 of the Statement.)

1.—BY a law enacted August 30th, 1826, the territory of the Republic was divided into eight provinces.

The 6th Province, *Concepcion*, extended from the "River Ñuble at its source in the Cordillera" as far as the boundaries "which are recognized at the present date with the Government of *Valdivia*." <sup>1</sup> It was composed, according to the Election Rules of December 16th, 1818, of several "partidos," which were called "Departments" in the Election Law of December 2nd, 1833; one of the latter being the department of "*Los Angeles*," afterwards called "La Laja," <sup>2</sup> whose eastern boundary was not stated therein.

2.—A law enacted on July 2nd, 1852, created the "*Province of Arauco*," which shall comprise the territories occupied by natives south of the Bio-Bio and north of the Province of Valdivia, as well as the Departments or subdelegaciones of the bordering provinces which, in the opinion of the President of the Republic, it may be convenient to include at present." <sup>3</sup>

<sup>1</sup> Echeverría i Reyes, "*Jeografía Política de Chile*," vol. ii. p. 255.

<sup>2</sup> *Loc. cit.* vol. i. p. 185.

<sup>3</sup> *Loc. cit.* vol. i. pp. 3, 4.

In fulfilment of this it was decreed on December 7th of the same year (1852), that: " Art. 1.—The Province of Arauco shall include henceforward, the Department of *La Laja* and the whole territory situated north of Tolten, and *east* and south of a line which, beginning at the junction of the River Taboleo with the Bio-Bio, follows the course of the former as far as the Cordillera de Nahuelhuapi, and, from this Cordillera, follows the course of the River Carampangue as far as its mouth on the sea. Art. 3.—The territory lying between the Bio-Bio and Tolten, and between *the Andes* and the Cordillera de la Costa, will be administrated as a border territory." <sup>1</sup>

3.—A decree issued September 30th, 1869, divided the Department of *La Laja* into 22 subdelegaciones, the demarcation of which was established in terms identical with those used afterwards in 1888. Thus it is said:

" The 19th subdelegacion shall be called *Antuco*, and its boundaries shall be . . . in the south, *the River Rucué in its entire extent*; *to the east, the cordon* of Cordillera which serves as boundary with the Argentine Republic. . . ." <sup>2</sup>

" District 8th, *Campamento* (in the same subdelegacion), shall be bounded, on the north and south, by two straight parallel lines drawn from west to east, from the points where the rivers Laja and Rucué rise, as far as the summit of the Cordillera de Pichachen o de los Andes; *to the east, by the upper edge of the said Cordillera.*" <sup>3</sup>

" The 20th subdelegacion shall be called *Quilleco*, its boundaries being . . . to the south, *the River Duqueco, from its source to the western corner formed on this side by the Curichu estate*; *and on the east, the Cordillera de los Andes, which is also the boundary with the Argentine Republic.*" <sup>4</sup>

" District No. 3, *Tinajon* (in the same subdelegacion 20),

<sup>1</sup> *Loc. cit.* vol. i. p. 105.

<sup>2</sup> *Loc. cit.* vol. i. p. 155.

<sup>3</sup> *Loc. cit.* vol. i. p. 156.

<sup>4</sup> *Loc. cit.* vol. i. p. 156.

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shall be bounded . . . *on the east, by the upper edge of the Cordillera de los Andes, etc.* . . .

“District No. 4, *Cañicura*, shall be bounded . . . on the south and west, *by the River Duqueco from its source as far as its junction with the River Cañicura.* . . .”<sup>1</sup>

“The 21st subdelegacion shall be called *Vilucura* and its boundaries shall be: on the north, *the River Duqueco, from its source as far as its junction with the River Arilahuen* . . . and *to the east, the Cordillera de los Andes.*”<sup>2</sup>

“The 22nd subdelegacion shall be called *Santa Bárbara*, and its boundaries shall be . . . on the south, *the Bio-Bio from los Boldos ford as far as its source*; to the east, the cordon of the Cordillera de los Andes which serves as boundary with the Argentine Republic,” etc. . . .<sup>2</sup>

“District No. 7, *Botallano* (in the subdelegacion 22) shall be bounded to the south by the River Mininco; to the east, by the Cordillera de los Andes, etc. . . .

“District No. 9, *Cullinco* (in the same) shall be bounded . . . to the south, by the River Bio-Bio; to the east, by the Cordillera de los Andes.”<sup>3</sup>

4.—A decree issued on September 29th, 1874, created the subdelegacion of *los Natros*, bounded . . . “on the north, by the brooks Maitenes and Mininco; *on the south, by the Bio-Bio*, and on the east, *by the Cordillera de los Andes* . . .”<sup>4</sup> The new subdelegacion was divided, by the same decree, into three districts, to be called: “No. 1, *los Natros*, its boundaries being: on the north, the Huequecura; on the west, the Huequecura and the Bio-Bio; on the south, the Bio-Bio; and *on the east, the Cordillera de los Andes.* No. 2, *Mininco*, its boundaries being: on the north, the Mininco; on the west, the Mininco and the Bio-Bio; on the south, the Bio-Bio; *and on the east, the Hueque-*

<sup>1</sup> *Loc. cit.* vol. i. p. 157.

<sup>2</sup> *Loc. cit.* vol. i. p. 159.

<sup>3</sup> *Loc. cit.* vol. i. p. 160.

<sup>4</sup> *Loc. cit.* vol. i. p. 162.

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*cura and the Cordillera de los Andes.* No. 3, *Maitenes*, its boundaries being : on the north, the Maitenes ; on the west, the Mininco ; on the south, the same river ; and on the east, *the River Huequecura and the Cordillera de los Andes.*"

5.—A decree issued October 26th, 1876, divided into two the subdelegacion of *Villucura*, as follows :

" The 22nd subdelegacion *Villucura* shall preserve the same boundaries as at present, save the eastern boundary, which *instead of being the Cordillera de los Andes*, shall be the *cuesta de Alul . . .*"<sup>1</sup>

" The subdelegacion *Queuco*, which shall bear No. 23, shall be bounded on the north, by the River Duqueco ; on the south, by the River Callaqui (or Queuco) as far as its junction with the Bio-Bio, following from this point the road to the volcano Callaqui ; *on the east, by the Cordillera de los Andes.*"

" District No. 2, *Trapa-trapa* (of the new subdelegacion) shall be bounded . . . to the south, by the Cordillera de Trolope ; *to the east, by the Cordillera de los Andes. . . .*"

" District No. 3, *Alul*, shall be bounded . . . on the east, by the Cordillera de los Andes." <sup>2</sup>

Besides these decrees concerning the Laja Department, there were issued two others, the first dated December 23rd, 1873, increasing the original number of 22 subdelegaciones to 23, the new one being situated near the city of *Los Angeles* ; the second dated October 18th, 1875, merely altering the order of the numbers assigned to the various subdelegaciones, which then numbered 24, since the decree of September 29th, 1874. As has been seen, these were further increased to 25 by the decree of October 26, 1876, and they underwent no alteration after the Treaty, so that the boundaries established for the subdelegaciones bordering on the Argentine Republic remained

<sup>1</sup> *Loc. cit.* vol. i. p. 163.

<sup>2</sup> *Loc. cit.* vol. i. p. 163.

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defined in the same terms as before, as is proved by the final document.

6.—Decree issued on October 8th, 1888. (Extracts):—

“ Subdelegacion 20th, *Antuco*.<sup>1</sup>—Its boundaries shall be, on the north, the River Laja, from its source to its junction with the River Rucué; on the south, the latter river; *on the east, the Cordillera de los Andes.*”<sup>2</sup>

“ District No. 8, *Campamento*.—Its boundaries shall be: on the north, two straight parallel lines from west to east, starting from the points where the Rivers Laja and Rucué rise, and extending as far as the summit of the Cordillera de Pichachén; *to the east, the upper edge of this Cordillera,*” etc. . . .

“ Subdelegacion 21, *Quilleco*.<sup>3</sup> Its boundaries shall be . . . on the south, the River Duqueco, from its source to the western corner formed on this side by the Curiche estate; *and to the east, the Cordillera de los Andes which separates it from the Argentine Republic.*”

“ District No. 3, *Tinajon*, shall be bounded . . . *on the east, by the upper edge of the Cordillera de los Andes.*”

“ District No. 4, *Cañicura*, shall be bounded . . . on the south and west, by the *River Duqueco from its source as far as its junction with the River Cañicura . . .*”

“ Subdelegacion 22, *Villucura*.<sup>4</sup> Its boundaries shall be, on the north, the *River Duqueco*, from its source as far as its junction with the River Arilahuén; . . . *on the east, the cuesta (road) Alul*, following the straight line to Cerro de Queuco as far as the River Callaqui or Queuco.”

“ Subdelegacion 23, *Queuco*.<sup>5</sup> Its boundaries shall be, on the north, the River Duqueco; on the south, the River Callaqui

<sup>1</sup> It bore No. 19 in the original subdivision, and No. 20 by the decree of October 18th, 1875.

<sup>2</sup> *Loc. cit.* Appendix, p. xxiii.

<sup>3</sup> Originally numbered 20, and 21 since 1875.

<sup>4</sup> Originally numbered 21, 22 since 1875, divided into two, 22 and 23, in 1876.

<sup>5</sup> Bears this number since its creation in 1876.

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(or Queuco) as far as its junction with the Bio-Bio, following from this point the road to Volcan Callaqui; *on the east, the Cordillera de los Andes.*"<sup>1</sup> (Districts 2 and 3 of this subdelegacion, literally as by the decree of October 26th, 1876.)

"Subdelegacion 24, *Santa Barbara*.<sup>2</sup> Its boundaries are . . . on the south, the River Bio-Bio; on the east, the Mininco and Bio-Bio . . ." etc.

"Subdelegacion 25, *Los Notros*.<sup>3</sup> Its boundaries, on the north, the brooks Maitenes and Pichu-Mininco; on the south, the River Bio-Bio; on the east, the Cordillera de los Andes; on the west, the rivers Pichu-Mininco and Bio-Bio.

"It shall be divided into three districts: No. 1, *Notros*. Boundaries: on the north, the Rivers Cañicura and Huequecura; on the south, the Bio-Bio; *on the east, the Cordillera de los Andes*; and on the west, the junction of the Huequecura and Bio-Bio."

"No. 2, *Mininco*. Boundaries: on the north, the stream Mininco and a straight line which, starting from Cerro de la Mina, touches this stream and the stream Huequecura; *on the east, the Cordillera de los Andes*; and on the west, the boundary of the Subdelegacion No. 3, *Maitenes*. Boundaries: on the north, the Pichu-Mininco; on the south, the Mininco stream; *on the east, the Cordillera de los Andes*; and on the west, the boundary of the subdelegacion."

Comparison of the texts of the different decrees from 1869, in the parts referring to the eastern boundaries of the actual "subdelegaciones" Nos. 21, 23 and 25, proves that they are defined in the very same words as were employed to define the eastern boundary of the original "subdelegaciones" 20, 21 and 22 (whereof the actual subdelegaciones were only a part), in 1869, when no Chilean authority exercised jurisdiction in the Bio-Bio valley further up than Callaqui.

<sup>1</sup> *Loc. cit.* Ap. p. xxvii.

<sup>2</sup> *Loc. cit.* Ap. p. xxvii.

<sup>3</sup> Numbered 22 in 1869, 23 in 1875, and 24 since 1876.

## No. 125.

### ARGENTINE FORCES TRESPASSING INTO THE BIO-BIO VALLEY IN 1883. Customary use of the 'term "the Cordillera" for "the *divortium aquarum* line."

[Translation of the Report of Commandant Drouilly to the War Secretary,  
printed in Serrano Montaner's "*El Litigio sobre Límites*," etc., pp. 106-113.]

(Quoted on page 1087 of the Statement.)

#### HEADQUARTERS OF THE EXPEDITION TO THE CORDILLERAS OF ARAUCANIA.

LONQUIMAY, March 6, 1883.

THE occupation of the Cordillera having been terminated, I was going to report to you on the operations which have been entrusted to us when, having met you, on my journey to the south, we were surprised by the news of a skirmish between the Argentine troops and a detachment of the company of militia at Santa Bárbara.

On receiving this unexpected and unwelcome news you decided that I should return immediately to the Cordillera to make a complete investigation and inform you at the earliest date as to the occurrence.

The long distance and the difficulty in collecting all the data for an enquiry in those regions has been the cause of the delay in presenting the report I have now the honour to lay before you.

For the better understanding of the present report as well as of the sketch map I enclose, I deem it advisable to give a

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general idea of the topography of the valley of the Upper Bio-Bio where the occurrences narrated took place.

*The central Andean chain which separates Chile from the Argentine Republic, that is to say, the DIVORTIA AQUARUM, which runs approximately from north to south with an average height of 2000 metres above the sea, has several gaps which I measured to be from 1600 to 1800 metres high.* Quoted  
p. 1087.

On the western or Chilean side, and almost parallel to the Cordillera, runs the Bio-Bio, which starts from Lake Guayaltué, which has an area of 8 kilometres in length by 3 in width. To the east of the Bio-Bio, and at the foot of the central cordon, flows its first affluent, the Rucanuco, which starts from the lake of the same name situated east of the Guayaltué.

The Bio-Bio receives the Rucanuco at some 15 kilometres from the lake, and continues running in a N.N.W. direction until it receives another affluent from the east called Liucura, where the river turns to the W.N.W., keeping this direction down stream.

The lakes of Guayaltué and Rucanuco lie 1200 metres above the sea, the altitude lowering to 1050 metres at Liucura.

*On the eastern side of the Cordillera, or in other words, in Argentine territory, the River Aluminé is formed at that latitude, starting from the lake of the same name situated at the foot of the Cordillera opposite to that of Rucanuco, and more or less at the same height.*

*The general direction of the valley of the River Aluminé is S.S.E., that is to say, diametrically opposite to that of the River Bio-Bio.*

Therefore, *in order to pass from Lake Aluminé to that of Rucanuco or to its emissary, it is necessary to climb the central Cordillera de los Andes, the passes of which are not less than 500 metres above the level of the valleys to both sides,*<sup>1</sup> and from Quoted  
p. 1087.

<sup>1</sup> Señor Drouilly obviously refers to the *lower valleys*, since Lakes Rucanuco [Icalma] and Aluminé are hardly 150 m. below the Icalma Pass.

many of those gaps the other ranges, Argentine as well as Chilean, are so completely dominated that *it is materially impossible, even if one should not be familiar with the places, to avoid knowing the precise point of the boundary line between both countries.*

I particularly insist upon this circumstance, because, as it is the one which will serve to establish the responsibility for what has occurred, I feel sure that the impossibility of any mistakes occurring on this score,—a circumstance which might be alleged in order to avoid responsibilities,—will be amply acknowledged.

To the topographical data which will help to explain better what follows, must be added the condition in which this part of the frontier had remained after the occupation.

At some 12 kilometres from the junction of the River Rucanuco with the Bio-Bio, and at the point where this latter river is joined by the River Liucura, a fort called Liucura was established, in order to safeguard the passes and gaps and maintain peace among the Indians.

On the 26th of January I informed the Argentine headquarters of the construction of this fort and of the others, as well as of their location. General Villegas replied as follows under date of March 3 :—

“ Duly thanking you for the news you give me as to the  
 “ stationing of detachments of troops from the army of this  
 “ Republic at the gaps to the west of the Cordillera, I shall  
 “ consider it my duty to communicate to you the positions of  
 “ detachments from the division under my orders, as soon as  
 “ they may be placed, in which operation I am now engaged.”

The construction and garrisoning of the fort of Liucura was entrusted to Lieutenant Rodriguez with his company of militia from Santa Bárbara, a company which was improvised at the beginning of last December. As the squadron at that point only existed in name, when the order for mobilization

arrived, I absolutely lacked officers, armament, and even men inscribed on the rolls. In a period of ten days I had to get my men ready, dress them, arm them, and appoint officers, inconveniences which I considered unimportant, for I only needed to have the *adequate elements* to subdue the Indians and to construct the forts and roads to the interior. The labourers thus transformed into soldiers, were, in my opinion, preferable for that purpose to troops of the line or regular militia. The shortness of time did not permit us to instruct them, which, however, would have been of no use as they had to be relieved at the end of February in order that they might have time to reap their harvests.

The fort was being constructed, and the relations with the nearest Argentine forts were cordial.

*Detachments from that nation had reached Liucura and Lonquimay*, friendly communications being kept up by the worthy commandants Belisle and Ruibal.

The Indians on their part had come and tendered their submission, and everything promised a prompt and definite settlement of the frontier question when we were surprised by the news of an encounter between the troops of the Argentine Army and the militia of Liucura.

The following is what has occurred according to data obtained at the place of the occurrence and antecedents enclosed :—

On February 16th a patrol of ten Argentine soldiers who *descended the Cordillera on the Chilean side to Rucanuco* [Icalma Pass], *following the course of the river of the same name as far as Ricalma*, situated between Rucanuco and Bio-Bio, met an Indian boy who was pasturing nine sheep, which the Argentine soldiers seized, the boy fleeing to the mountains.

The patrol continued to the west, reaching Lake Guayaltué, of which they made an inspection all round, crossing on their return the River Bio-Bio, where they met two young Indian girls and three boys engaged in picking “*piñones*”; these

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they made prisoners, *retiring by the gap situated opposite the junction of the Rucanuco and the Bio-Bio* [Batemahuida Pass?]. During the same afternoon a detachment of about thirty men followed the tracks of the first patrol, and, not having been able to overtake them, camped near Guayaltué.

In the meantime the Indians being alarmed, had sent a messenger to Liucura announcing the advance of the Argentines, and early on the following day, the 17th, they sent another messenger complaining that the Argentines were carrying their people away, and stating that if the Lieutenant did not request the return of those people, they were going to start a formal attack on the Argentines whom, up to that time, they were simply surrounding.

Lieutenant Rodriguez had strict written instructions by which he was forbidden to act independently, and which limited his actions to informing Commandant Cid at Fort Lonquimay, some 30 kilometres from Liucura ; but the former officer decided to start in the direction of the Argentines, in order to prevent a conflict between them and the Indians.

With that object he took 32 mounted men with him out of the 67 he had, and, *going up the River Bio-Bio along the plain interposed between the latter and the Cordillera*, reached the road over which the first Argentine detachment, followed by the second one, had retired, so that Lieutenant Rodriguez, when he caught sight of the Argentines, found himself *between those detachments and the Cordillera*.

The Argentines, with the Indians who followed them at some distance, were to be found in an extensive sandy plain in the triangle formed by the Rucanuco with the Bio-Bio, in the centre of which is the bed of a dry brook, with a bank of a metre and a half on its eastern side, on which Lieutenant Rodriguez was marching with his men. The Argentines, when perceiving the latter at some distance, dismounted and entrenched themselves in the bed or ditch mentioned. In the

Quoted  
p. 1088.

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meantime Rodriguez crossed the River Rucanuco to meet the Argentines, when Cacique Quepo presented himself, assuring him that up to that time he had not attacked the Argentines. The Lieutenant repeated to him the order to keep himself at some distance and maintain peace, which he did, moving northwards with the men that accompanied him.

This conference took place at the ford of the river, the bed of which is 20 metres below the level of the plain which separates it from the Bio-Bio where the Argentines were. Therefore, they were out of sight of the latter.

(Here follows the description of the engagement.)

\* \* \* \* \*

I have, etc.

MARTIN DROUILLY.

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### THE ARGENTINE REPORTS ON THE RAID OF 1883.

[Translated from the official Reports printed in Serrano Montaner's "*El Litijio sobre los Límites*," etc., pp. 100, 101 and 46.]

(Quoted on page 1089 of the Statement.)

#### Enclosure A.

*Report of Lieut.-Col. Diaz to the Commandant of the Second  
(Argentine) Brigade, Colonel Enrique Godoi.*

PULMARY, February 20, 1883.

I HAVE the honour to inform you that on the 16th inst., at the same time that I sent a messenger announcing the result of the Commission up to that day, I started on the march against the Indians *in the neighbourhood of Lake Aluminé*, with three officers and thirty-three men. At some three leagues from this point I came across the tracks of horses and sheep in the direction of the said lake, and, as the opinion of the majority was that the tracks had been made that day, I started at quick march with the object of coming up with them. On sighting the lake I sent Lieutenant Canaveri with seven soldiers and an expert to make a reconnaissance, because it was very likely that the Indians would be there; but, as the said tracks continued, the Lieutenant also advanced. A short time afterwards we perceived a quantity of smoke issuing from a forest of *piñons* [*araucaria imbricata*], for which reason I started at a canter with the rest of the troop and reached that place, but the Lieu-

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tenant continued the pursuit, for, as we advanced, the traces were seen to be fresher.

From this place I sent Lieutenant Sontaj with ten men to support Lieutenant Canaveri, because I supposed that Navuel would be there.

I advanced with Sub-Lieutenant Wappers and the rest of the forces to support these officers. As we proceeded we observed that the Indians attempted to disperse, with the object of making us lose the tracks, which led me to presume that they were near. At dusk I lost the tracks, and as I heard two shots in an opposite direction to that we were taking, from the officers, I believed that the latter had come upon the Indians and that they were following them; but the shots had been fired by the Indians to attract my attention and cause me to deviate from the course I was taking.

Since it was impossible to look for the tracks, as it was night, I returned and camped, hoping the officers would see the fires, but this did not happen. Early on the 17th I started on the search for the tracks, which I found at 7 a.m., observing at the same time two Indian scouts. During the previous afternoon I had come across many burnt patches, and as the officers did not return, I was very anxious.

As I was observing that we were again following the tracks, I was surrounded by 100 to 150 Indians who, in bodies of from 20 to 30, sprang out from behind *the hillocks (lomas)*. Having tied the mules together, I took possession of a dune because I was afraid I should be attacked by the Indians, but they simply limited themselves to firing a few shots.

As I was not attacked I returned in search of strategic points for my defence, until they succeeded in attracting me to a valley; then we saw a large cloud of dust which left no doubt that it was a body of people who prevented us from reaching the ford of a stream that we had to cross.

In the belief that I should find too many men there, I

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deviated to the right, and, as I observed that the Indians threatened an attack on my rear, I took possession of the bed of a small dry stream I found on my way.

(Here follows the description of the engagement.)

\* \* \* \* \*

The Lieutenants captured on that same day ten sheep and took from the Indians two young girls and a boy of from 10 to 12 years of age who were gathering "*piñones*." From these they learned that the Chilean forces and a number of Indians were near by, for which reason they retired with the object of joining forces with me. It may thus be seen that the Chileans protected the Indians.

The action took place approximately 12 leagues from this point.

From the Indian prisoners we have learnt that the Chileans are building a fort at Zamicul on the banks of the stream Lihuecura [*Liucura*], and that it is garrisoned by 40 or 50 infantrymen under the command of Lieutenant Martin. *According to information received, this fort is situated within our territory because it is very near Lake Alumine.*

Quoted  
p. 1088.

\* \* \* \* \*

I am, etc.

JUAN G. DIAZ.

## Enclosure B.

*Extract from General Villegas' Journal.*

The regrettable encounter has taken place on the Argentine-Chilean boundary ; our forces have not advanced nor can they advance beyond the international line, and, returning to what has been so much discussed, if our quick scouts had trespassed over that line, what would be the result therefrom ? Evidently nothing. *The anticlinal line is not defined ; nobody knows it*

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*in practice, or in the topographical variety of the territory (la variedad topografica del territorio); it is therefore liable to be violated unconsciously. So much so, that it would be necessary to traverse those innumerable ravines, aided by science and technical instruments, in order to engrave on granite or on the rocks that imaginary straight line, which is until now the separation of the possessions of the River Plate and of the Pacific.*

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### THE ARGENTINE EXPERT'S REPORT (IN 1896) ON THE ARCO PASS AND SURROUNDINGS.

[Translated from Dr. Moreno's "*Apuntes Preliminares sobre una Excursion a los territorios del Neuquen, Rio Negro, Chubut y Santa Cruz*," La Plata, 1897, pp. 33-36.]

(Quoted on pages 1093 and 1094 of the Statement.)

WE followed the *cajon* of the River Aichol until reaching *the summit of the cordon which separates the waters which flow to the east from those which flow to the south and south-east* to feed the Aluminé. On this ridge we did not see any trees or shrubs, but we did see beautiful grass. Its height is comparatively great (1670 m.). The ravine we descended serves as the bed of the Arroyo Litran; it is more open, but as beautiful and fertile as the preceding one, and debouches into the open longitudinal valley of the Rio Arco, the first northern tributary of the Aluminé. In the neighbourhood of its sources, at the foot of Mount Batea, the *Comisaria del Arco* is situated, a point which I had designated to Señores Wolff and Hauthal for our meeting. As I did not find my companions there, I decided to wait for them and, profiting by the delay, to reconnoitre the neighbourhood. At a kilometre's distance to the north of this point, *I found, in a very beautiful and natural park, formed by clusters of araucanias and "robles," bound on the east by a picturesque woody cliff carpeted with ferns, the eastern and southernmost sources of the Bio-Bio and the northernmost ones of the Aluminé.* The drops of water which filter from the rock among the roots of the ferns glide down to the golden meadow, *some of them running to the Pacific Ocean and others to the*

(Quoted  
p. 1093.)

*Atlantic* (Plates IV. and V.). *Any one who was accustomed to regard the dividing line of the continental waters as a colossal and abrupt barrier, would experience a profound deception on contemplation of this.* Climbing a few metres until commanding a view of the horizon over the top of the *piñons* which give shade to those sources, one would see, *far off on the west, the Andean snow-capped mountains stretching from the Isthmus of Panama, and which cheap text-books of geography teach are at the same time the distributing line of the waters of the continent.*

Plates  
LXXXVII.  
and  
LXXXVIII.  
p. 1095 in  
Statement.

Quoted  
p. 1094.

The Arroyo del Arco attains at its sources a height of 1200 metres above the sea, and flows quietly to the south along the valley formed by volcanic ashes; the streamlet tributary to the Bio-Bio flows more rapidly, leaps over the rocks of the ancient frontal moraine of the great lost glacier, and descends to *the beautiful river the principal course of which proceeds from the west.* Tempted by the beauty of the landscape, *we descended to the neighbouring valley at full gallop, so gentle is the declivity,* and, crossing the river, we continued along moraines and beautiful meadows as far as the shores of Lake Guayetue. The quiet waters of this lake extended for a long distance, but the setting sun did not allow us to see or guess the situation of their western extremity. I could, however, count from the mouth of the river, five undulations or *apparent cordons*, these being overtopped by the Volcano Yaimas on the west-south-west. The Bio-Bio, shortly after issuing from the lake and before taking a northern course, receives the Rucanuco stream which conveys to it the waters of Lake Icalma, situated between Lake Guayetue and Lake Aluminé. *The Batea hillock [Cerrito] rises isolated to the east of the brook. Thus the waters of the Bio-Bio rise to the east of those Andean cordons, and cross them afterwards to empty themselves into the Pacific. This basin gives the impression of being the remnants of a large lake of which the three mentioned—Aluminé, Icalma and Guayetue—are the remains,* modern eruptions having formed the Batea hillock with their

Quoted  
p. 1094.

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lava ; eruptions which have filled the primeval lake with their tophus, which in its turn was destroyed partly by the erosion of the glacial epoch, the traces of which are *the moraines of the high plateau* [the actual boundary on the continental divide]. This plateau is the largest trace of the bed of the great lake in the second epoch of the development of the glaciers which formed moraines and whose remains still exist in the neighbouring mountain ranges. *The present lower valley measures more than 20 kilometres from east to west, and the population begins to settle there, formed by the Chilean emigrants, who abandon the territory, being alarmed by rumours of war spread by other people of the same nationality, who thus acquire at a low price the cornfields abandoned by the credulous who believe in a war as impossible as frequently rumoured.*

That afternoon Señores Wolff and Hauthal arrived at the Comisaria. Having made an interesting expedition, they gave me the general information I required. From the estancia "La Argentina" they had penetrated by the quebrada of the Arroyo Pailahue, or along the plateau and its scoria fields they had marched west, crossing the Arroyo Manzano, and, skirting the hillocks near the Arroyo Butahuao, reached the summit of the range by the beautiful and fertile valley Yumuyumu. *This mountainous zone demands a careful study of its orography and geology, which I intend to make later on. There is here a larger development of the Andes in its transverse sense, a group of volcanic massifs, as may be seen at other points of the Cordillera.*

The rocks show a change in the general geological formation of the chains further north : gneiss, granite and porphyry appear under the neo-volcanic rocks, and no sedimentary layers are to be seen.

Besides, those ridges, which, as I have said, diminish in height towards the south, deviate to the south-east, and *I am already in a position to say that they do not correspond, in their*

*apparent prolongation, to the Cordillera de los Andes ; but, in order to decide, with a complete knowledge, if the mountains crossed by my companions ought to be considered as an integral part of the Andes or not, a minute survey is necessary.* From the summit of the range mentioned which separates the waters which flow to the Rio Agrio from those which descend to the River Bio-Bio, a series of mountains may be seen to the west which stretch southwards and then south-south-west, higher than those of Yumuyumu, as they are seen from the Cajon de los Barros, an affluent of the Rio Butahuao. The waters descending to the west feed the Arroyo Rahue, which is considered as a river once it receives the waters of the Arroyo Pulul, which rises from the glaciers of the picturesque hollow on the north among the mountains which apparently form there a great geographical knot. The River Rahue empties itself into the Bio-Bio at the northern extremity of the beautiful Valle de Lonquimai,—the jewel of Andean valleys, at the bottom of which the Bio-Bio meanders, sometimes peacefully, and sometimes forming a sparkling scale-like covering to the polished and rounded stones as its depth diminishes. I saw it thus from the heights of the cart-road of Arco : a colossal snake writhing in shiny coils among the meadows where the cattle of the Chilean exodus recuperate their exhausted strength after their rapid flight before the phantasm of Argentine spoliation.

Quoted  
p. 1094.

In this valley are the ruins of the Chilean forts, Lonquimay and Liucura, and the inhabitants relate, with more or less accuracy, the bloody encounters between Argentine and Chilean soldiers during our campaign against the Indians, *each vanguard considering that the ground on which they stood belonged, the one to Chile, the other to Argentina. This uncertainty has not disappeared yet, and can only disappear when the work of delimitation reaches here.* It is not sufficient that both of us should say that this is ours because it is so. These are not reasons, because they are not well founded.

Quoted  
p. 1094

## No. 128.

### DR. CARL BURCKHARDT ON THE ANDEAN TECTONICS IN 39° S.

[From " Rapport préliminaire sur une expédition géologique dans la Région Andine située entre Las Lajas (Argentine) et Curacaulin (Chili) (38-39° lat. S.) " in " *Revista del Museo de la Plata*," vol. ix. pp. 202-219.]

(Quoted on page 1094 et seq. of the Statement.)

#### 2. *Le plateau de Las Lajas.*

(P. 202) QUICONQUE descend de la chaîne de Pino Hachado vers Las Lajas est frappé d'entrer près de Haichol dans une vaste plaine. Un grand plateau, à ce qu'il paraît, horizontal, s'étend devant ses yeux ; il a au moins quarante kilomètres de largeur. *C'est un véritable fragment de la pampa entre les chaînes andines.* A l'ouest, il est limité par les cimes escarpées de la chaîne de Pino Hachado, tandis qu'à l'est se voit le cordon bas des chaînes orientales.

J'ignore l'extension de ce plateau vers le sud et vers le nord, je peux seulement mentionner qu'il s'amincit notablement et d'une manière brusque au nord de l'Agrio et de Las Lajas. *Là surgit tout-à-coup la chaîne orientale sans qu'on puisse voir à la rive droite de l'Agrio, aucune trace qui pourrait être regardée comme continuation australe des plis mésozoïques du nord de l'Agrio.* Il y a là une faille qui forme la limite entre les chaînes au nord de Las Lajas et l'Agrio, et qui est sans doute en relation avec l'inflexion brusque de ce fleuve et avec sa direction de l'ouest à l'est au nord de Las Lajas.

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La constitution géologique du plateau de Las Lajas est bien simple. Les barrancas des fleuves montrent des éboulis stratifiés modernes, probablement des dépôts d'un grand lac qui couvrirait jadis la plaine.

En d'autres endroits existent des nappes néovolcaniques formant quelquefois de petites collines surgissant çà et là de la plaine. La roche principale est un basalte feldspathique gris foncé, qui possède, comme nous le verrons, une extension extraordinaire dans notre profil.

Une localité très intéressante se trouve dans un affluent droit de l'arroyo Lencullin. Là une roche, probablement phonolitique, montrant des colonnes superbes, repose sur les alluvions modernes citées. Les éruptions ont donc continué jusqu'à des époques peu reculées.

### 3. *La chaîne de Pino Hachado.*

La chaîne de Pino Hachado, qui s'élève entre les plateaux de Las Lajas et de l'Aluminé, se compose de sédiments mésozoïques plissés et de roches paléovolcaniques, au-dessus desquelles s'étend une vaste nappe de basaltes. Les laves néovolcaniques se sont écoulées sur la montagne déjà formée, en couvrant les sédiments plissés en discordance apparente.

Commençons par un coup d'oeil sur les éléments primaires, fondamentaux de la chaîne, soit les sédiments plissés et les roches paléovolcaniques. Les premiers affleurent à trois endroits distincts : près de Haichol, à Pino Hachado et aux pentes occidentales de la chaîne entre le col de Pino Hachado et Liucura.

Dans les environs de l'estancia de Haichol, et de là vers l'est, se trouve une zone sédimentaire composée principalement de grès et de marnes noires schisteuses. Malheureusement, ces sédiments n'ont fourni aucun fossile, de sorte que je ne peux pas émettre ici une opinion fondée sur leur âge. Cependant le voisinage de terrains jurassico-crétaciques me fait croire que

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les grès de Haichol appartiennent probablement aussi aux formations mésozoïques citées.

(P. 204) Ces sédiments forment des plis très visibles, surtout à l'est de Haichol. Là s'élève une cime assez isolée (1469 m.), qui montre dans sa pente presque dépourvue de végétation, des bancs sédimentaires formant une belle voûte, compliquée par une faille très apparente (voir le profil C, D).

Cette voûte excite notre plus vif étonnement, car elle se dirige, perpendiculairement aux chaînes andines, de l'est à l'ouest ! Au-dessus de cette voûte se montre la nappe horizontale de basaltes en discordance frappante avec les couches sédimentaires plissés sousjacentes (voir profil C, D). . . .

(P. 205) La chaîne de Pino Hachado présente beaucoup de phénomènes d'un intérêt plutôt général.

Une belle moraine terminale à l'est du Paso Pino Hachado—dans une région aujourd'hui complètement dépourvue de glaciers—démontre l'existence d'une période glaciaire. Sur cette moraine se trouve un grand bloc du même basalte qui couvre la chaîne, pourvu d'une surface polie et de stries typiques provenant de l'action des glaciers. Ce bloc a un intérêt tout spécial pour le géologue ; il nous enseigne que l'éruption basaltique a commencé avant la fin de l'époque glaciaire et ensuite—comme le même basalte, strié ici par les glaciers, repose ailleurs partout en discordance sur les sédiments plissés—que le plissement principal de notre cordillère s'est terminé avant la retraite définitive des glaciers.

De grands éboulements ont eu lieu à Pino Hachado et dans la vallée du Tehuel-Nigliu. Dans les deux endroits, une partie de la nappe volcanique s'est détachée et ses débris ont formé une multitude de petites collines dans les vallées, en barrant derrière elles les rivières et en causant ainsi la formation de petits lacs, dont les traces se voient encore aujourd'hui sous forme de surfaces planes à peu près horizontales.

4. *Le plateau de l'Aluminé.*

(P. 206) Descendons la chaîne de Pino Hachado et montons le cerro Patea-Mahuida à l'ouest du Paso del Arco. *Nous nous trouvons là au milieu de la Cordillère : à l'est s'élève la chaîne de Pino Hachado, vers l'ouest s'étend la chaîne de Lonquimay avec les volcans isolés Tolhuaca, Lonquimay, Llaimas et Lanin.* Mais notre surprise est grande en regardant vers le sud : là on ne voit ni chaînes ni montagnes isolées ; au contraire, il s'étend là une grande plaine à peu près horizontale ; c'est le plateau de l'Aluminé. Ce plateau s'étend de la Laguna Aluminé vers l'est jusqu'au pied de la chaîne de *Pino Hachado*, mesurant une largeur d'au moins vingt kilomètres. La pierre-ponce, qui le couvre, prête au paysage, presque entièrement dépourvu de végétation, un caractère bien monotone.

L'érosion a morcelé le plateau en créant de *véritables montagnes* tabulaires à surfaces totalement planes et à flancs abrupts. Le Bateau-Mahuida même, sur lequel nous nous trouvons, est une de ces montagnes tabulaires qui donnent au paysage un aspect particulier, en nous faisant oublier que nous nous trouvons au milieu d'une grande chaîne de montagnes.

Ce plateau singulier est constitué dans ses parties supérieures par une nappe néovolcanique, dont la roche principale est le même basalte que nous connaissons déjà de la chaîne de Pino Hachado. Au-dessous, on observe du granit ; à l'extrémité orientale du lac Aluminé, il contient de la hornblende, deux sortes d'orthoklase, beaucoup de quartz et des grenats ; plus à l'ouest, près de l'embouchure de l'arroyo Arco, il ressemble à certains granits des Alpes (granit de Canaria) et est accompagné de diorite.

Vers le sud, on peut suivre le plateau de l'Aluminé, par Pulmari et Quillen jusqu'à Junin de los Andes. J'ignore s'il continue au nord de Liucura ou s'il se termine dans cette région. En tout cas, il est aminci de beaucoup vers le nord, car, près

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de Liucura déjà, se rapprochent sensiblement les derniers plissements de la chaîne de Pino Hachado et les plis de la rive gauche du Biobio, qui appartiennent à la chaîne de Lonquimay.

### 5. *La chaîne de Lonquimay.*

*Je comprends sous le nom de chaîne de Lonquimay toute la région andine à l'ouest du Biobio.* Elle se divise facilement en deux parties assez distinctes par leur constitution géologique. La première concerne la région entre les rios Biobio et Lonquimay ; là s'observent des granits en contact avec des sédiments jurassiques plissés. Les roches néovolcaniques, qui y font complètement défaut, réapparaissent au contraire dans la partie occidentale de la chaîne, entre le rio Lonquimay et Curacautin. . . .

### 6. *Résumé des observations géologiques.*

(P. 210) Le trait principal de la tectonique de notre profil est sans doute la ramification de la Cordillère en trois chaînes et l'existence de deux plateaux interandins entre ces chaînes.

Les plis, qui forment les trois chaînes et qui sont visibles là où une interruption de la nappe néovolcanique nous permet d'observer les sédiments sous-jacents, sont, en général, des anticlinaux assez faibles et simples avec peu de complications par des failles. Une particularité de ces plis est à remarquer avant tout : leur direction très souvent transversale, allant de l'est à l'ouest, et par suite perpendiculaire aux axes des chaînes andines.

Pour aborder la question d'origine des plateaux interandins qui sont certainement à regarder comme des zones sans plissement, il faut, selon ma conviction, tenir compte d'abord de la direction anormale des plis dans leur voisinage et ensuite de la présence d'un massif granitique considérable au-dessous du plateau de l'Aluminé. La meilleure explication de l'origine des plateaux me paraît alors celle qui admet que des massifs

considérables de granit, existant là où nous trouvons aujourd'hui les plateaux, ont opposé tant de résistance aux forces orogéniques, qu'ils ont empêché le plissement dans leur domaine et forcé les plis du voisinage de s'adapter à leurs contours irréguliers, ce qui a eu lieu quelque fois par des fractures et très souvent par des courbures et inflexions des axes des plis.

En considérant *la Cordillère entière* de notre région, nous voyons qu'elle possède une structure zonaire et asymétrique très prononcée. Cela ressort clairement de notre profil, qui montre de l'est à l'ouest les zones suivantes :—

1. Une zone sédimentaire jurassico-crétacique à plissements simples (les chaînes orientales) ;
2. Une zone sans plissement, couverte de roches néovolcaniques (plateau de Las Lajas) ;
3. Une zone de plis mésozoïques et de roches paléovolcaniques, surmontées par une nappe basaltique (chaîne de Pino Hachado) ;
4. Une seconde zone sans plissement formée par du granit et couverte de laves néovolcaniques (plateau de l'Aluminé) ;
5. Une zone de plissements jurassiques avec un massif granitique considérable (partie orientale de la chaîne de Lonquimay) ; et enfin
6. Une zone de basaltes avec des centres éruptifs reposant sur des plis jurassiques et des roches paléovolcaniques (partie occidentale de la chaîne de Lonquimay. . . .

## II.

### A. LA GÉOLOGIE DES ENVIRONS DE L'ARCO.

#### 1. *La prétendue union des chaînes au Paso del Arco.*

(P. 212) *Jusqu'à nos jours on a prétendu maintes fois que les chaînes de Pino Hachado et de Lonquimay s'unissent à l'Arco. La première des chaînes citées devrait, selon cette opinion, trouver sa continuation australe dans un cordon trans-*

versal, qui—dirigé de l'est à l'ouest—passerait par le Paso del Arco en se reliant à l'ouest avec la chaîne de Lonquimay.

Pour juger cette question, montons d'abord la cime orientale du Batea-Mahuida (1745 m.).

A nos pieds s'étend le grand plateau de l'Aluminé. Nous le voyons comme une immense plaine horizontale entre l'extrémité orientale du lac Aluminé et la chaîne de Pino Hachado. Vers le nord, il se laisse facilement poursuivre jusqu'aux environs de Liucura, et nous reposons sur une de ses parties typiques. Le Batea-Mahuida—si caractéristique par sa forme tabulaire à surface entièrement plane—se trouve au milieu même du grand plateau, qui acquiert ici des hauteurs considérables.

Nous pouvons donc suivre le plateau de l'Aluminé du lac Aluminé par le Batea-Mahuida et les environs du Paso de l'Arco jusqu'à Liucura.

La chaîne de Pino Hachado aussi se dirige, *en cordon élevé, du sud au nord et on la voit passer dans les environs de l'Arco sans qu'il ne s'en détache aucun rameau transversal.*

Dans les grands traits orographiques, il ne se montre donc aucun fait qui pourrait démontrer la continuation de la chaîne de Pino Hachado par un cordon transversal et son union avec la chaîne occidentale.

Au contraire, à première vue, s'imposent des impressions opposées à cette théorie.

Il en est de même si nous étudions en détail la constitution géologique des environs de l'Arco. Là existent des nappes néovolcaniques du même basalte, qui couvre partout le plateau de l'Aluminé, et dans aucun point nous pouvons rencontrer ni des traces de plis mésozoïques, ni des affleurements paléovolcaniques : éléments constitutifs des chaînes de Pino Hachado et de Lonquimay. Il est évident que ces éléments ne manqueraient pas en cas de l'existence d'un cordon transversal.

La théorie de l'union des chaînes à l'Arco par un cordon

transversal se trouve donc en opposition apparente avec tous les faits orographiques et géologiques.

2. *Le divortium aquarum et l'ancien cours d'eau du Paso de l'Arco* (pl. ii. fig. 2, et pl. iii.).

Plates  
LXXXVII  
and  
LXXXVIII.,  
p. 1095 in  
Statement.

(P. 213) A la hauteur du col de l'Arco et à l'endroit même du *divortium aquarum* actuel, s'élèvent quelques petites collines de forme oblongue, mesurant une hauteur d'environ trente à quarante mètres (voir pl. iii. fig. 1, les collines désignées avec un "m."). Elles sont couvertes de grands blocs angulaires, formés en partie par un basalte feldspathique, qui se trouve aux environs même du col. En outre, on voit des blocs granitiques et dioritiques qui n'affleurent pas dans les alentours.

La constitution de ces collines prouve donc leur origine due aux glaciers : ce sont des moraines superficielles typiques.

Ces collines morainiques, qui forment un petit cordon transversal, marquent actuellement l'endroit du *divortium aquarum*. Les eaux de leurs flancs nord se jettent dans le Biobio ; celles du sud forment au contraire l'arroyo de l'Arco.

Il y a donc une relation apparente entre les moraines et le *divortium aquarum* actuel ; les premières étant évidemment la cause primaire du second.

Là où les collines sont en discontinuité s'est établi un *divortium aquarum* très intéressant. On observe alors (phot. 3, pl. iii.) une surface tout-à-fait plane, couverte d'un marécage, qui forme la ligne de séparation inter-océanique ; insensiblement on peut passer du domaine de l'Atlantique à celui du Pacifique. Les eaux y travaillent encore maintenant ; elles luttent ensemble pour obtenir un plus grand domaine et chaque petit changement météorologique peut amener ici une dislocation de la ligne divisoire des eaux. Aussi j'ai observé plusieurs ravins en voie de formation.

Nous avons vu que le *divortium aquarum* actuel, coïncidant

avec les moraines, se trouve aujourd'hui au haut de l'Arco. Des anciens dépôts d'un grand fleuve, qui se trouvent dans la vallée de l'Arco, démontrent que cet état actuel des choses ne date que d'une époque peu reculée.

Ces dépôts, répartis irrégulièrement dans la vallée supérieure de l'Arco (voir carte, fig. 2 de la pl. ii.), consistent en un amas de blocs, bien arrondis et de toute grandeur (voir phot. 1, pl. iii.). On y trouve principalement des granits, des diorites, des conglomérats et des calcaires noirs jurassiques.

Toutes les roches citées n'affleurent pas dans le voisinage de l'Arco actuel ; on les retrouve, au contraire, assez loin surtout dans les chaînes occidentales. Ainsi nous avons pu constater à Lonquimay le conglomérat et à l'arroyo Pancunto le calcaire noir jurassique.

Outre ces roches, il y en a quelques unes qui sont identiques avec celles du voisinage immédiat de l'Arco (roches néovolcaniques) et d'autres dont nous ne connaissons pas le lieu d'origine par manque d'observations relatives.

Ces dépôts, composés de pierres roulées en partie inconnues dans le voisinage immédiat, ne peuvent pas avoir été formés par l'Arco actuel ; ils démontrent, au contraire, qu'un grand fleuve venant de l'ouest a jadis passé par la région de l'Arco.

L'aspect général de la vallée large et étendue de l'Arco actuel confirme cette conclusion (voir phot. 2, pl. iii.).

Ici se pose la question, si nous ne pouvons pas fixer d'une manière plus précise le lieu d'origine de ce grand fleuve.

En descendant de l'Arco dans la vallée supérieure du rio Biobio, nous sommes frappés par les grands systèmes de terrasses d'alluvion qui s'étendent dans cette vallée (voir phot. 4, pl. iii.).

On peut facilement discerner une terrasse basse, dans laquelle le rio a creusé son lit actuel (t. i. phot. 4, pl. iii.), et une terrasse haute occupant un niveau d'environ deux cents mètres au-dessus du fleuve. Cette dernière possède une extension très grande, et la ligne droite de sa superficie s'aperçoit déjà

de loin (t. iii. phot. 4, pl. iii.). Entre ces deux systèmes de terrasses, il en existe encore d'autres dans différents niveaux (p. ex. t. ii. phot. 4, pl. iii.), et à la rive droite—justement dans la région de l'Arco—se montre une terrasse qui s'élève à des hauteurs encore plus considérables que la haute terrasse déjà citée (t. ix. phot. 4, pl. iii.).

Ces terrasses accompagnent le Biobio vers le nord, et j'ai rencontré encore au nord de l'arroyo Liucura des éboulis fluviaux sur une hauteur d'au moins deux cents mètres au-dessus du niveau actuel du fleuve.

Toutes les terrasses sont constituées par des matériaux analogues à ceux que nous avons signalés des anciens dépôts de l'Arco ; nous y retrouvons le granit, la diorite et d'autres roches.

On sait que les terrasses fluviales représentent des restes d'anciens fonds de vallées, que le fleuve a entamés de nouveau en détruisant et charriant ainsi ses propres dépôts des temps antérieurs.

Les terrasses du Biobio, en partie très élevées, nous prouvent donc d'une manière irréfutable que ce fleuve occupait jadis un niveau bien plus haut qu'aujourd'hui et coulait alors de 200 à 300 mètres au-dessus de son niveau actuel.

En vue de ce fait, *on n'éprouve aucune difficulté à s'imaginer que le Biobio ait pu passer dans les temps reculés par la vallée de l'Arco et se déverser par suite dans l'Atlantique.*

Si nous réunissons tous les faits acquis, nous pouvons nous faire l'idée suivante des phénomènes qui se sont probablement passés dans les environs de l'Arco :—

Le rio Biobio supérieur,<sup>1</sup> occupant des niveaux beaucoup plus hauts que son lit actuel (comme le démontre la haute ter-

<sup>1</sup> Pour prouver d'une manière définitive que c'est le Biobio qui a passé par l'Arco, il faudrait faire des études détaillées des terrasses du Biobio actuel et de leurs niveaux respectifs, ce qui m'était impossible par le manque de temps. Les travaux de la Commission argentine de limites pourront probablement combler cette lacune.

rasse) a passé jadis par le col et la vallée de l'Arco actuel. Là il a laissé ses traces sous forme d'anciens dépôts fluviatiles. Ensuite sont venus les glaciers, qui ont apporté les moraines du col de l'Arco. Celles-ci ont barré l'ancien cours du Biobio, ne laissant plus passer ce fleuve par l'Arco. Alors le Biobio, abandonnant son ancien lit, s'est versé vers le nord formant l'inflexion si apparente et si brusque de son cours. A la hauteur actuelle du col de l'Arco s'est formé le *divortium aquarum* actuel. Fixé en général par les moraines, il est aujourd'hui en partie sujet à des changements multiples, grâce à la grande variabilité des phénomènes d'érosion.

#### B. LA DÉFINITION DE LA CORDILLÈRE DANS NOTRE CHAMP DE TRAVAIL.

(P. 215) Un des résultats principaux de la première partie de ce rapport a été la constatation de trois chaînes et entre elles l'existence de deux plateaux dans notre champ d'étude. *De là ressort la nécessité d'analyser chacune de ces chaînes et de les comparer mutuellement, si l'on veut obtenir une définition fondée de la Cordillère.*

Les deux chaînes de Pino Hachado et de Lonquimay montrent beaucoup d'analogie entre elles ; il y a des traits géologiques importants qui les posent en opposition apparente à la chaîne orientale (chaîne à l'est de Las Lajas ou de la Vaca Muerta).

Nous pouvons résumer les traits fondamentaux de la structure géologique, qui sont communs à la chaîne de Pino Hachado et à celle de Lonquimay, comme suit : Des plis surtout jurassiques relativement simples et des roches paléovolcaniques sont couverts par une immense nappe d'un basalte feldspathique gris foncé. Les deux chaînes atteignent des hauteurs considérables et on y rencontre plusieurs cimes qui s'élèvent au-dessus de 2000 mètres.

Ces traits communs opposent les deux chaînes citées à celle

qui s'élève au nord et à l'est de Las Lajas et que nous avons nommée chaîne orientale. Cette dernière se distingue de celles-là par ses anticlinaux simples de terrains jurassico-crétaciques, par sa constitution entièrement sédimentaire, par l'absence totale de roches néovolcaniques et par les hauteurs peu considérables de ses cimes. Elle est, en outre, séparée des autres par le plateau large et étendu de Las Lajas.

Nous voyons donc la chaîne orientale en opposition apparente avec les deux autres chaînes ; elle s'en distingue par la simplicité de sa structure géologique et par son élévation peu considérable.

Les rapports entre la chaîne orientale et les deux autres sont analogues à ceux qui existent entre le Jura suisse et les Alpes.

On sait que le Jura se distingue aussi des Alpes par sa structure simple et par ses cimes relativement basses. Cependant, il y a une différence beaucoup plus grande entre les deux chaînes européennes qu'entre les nôtres ; ce qui tient principalement à la structure des Alpes, qui est beaucoup plus compliquée que celle de la haute cordillère étudiée.

*On ne pourra donc pas, comme en Suisse, désigner la chaîne orientale avec un autre nom que les autres et la considérer comme chaîne de montagne propre. Selon ma conviction, elle aussi doit faire partie de la " Cordillère dans le sens le plus étendu."*

Cependant les différences indiquées justifient sa séparation des deux autres chaînes. Nous proposons donc de la désigner comme la basse chaîne, tandis que les deux chaînes de Pino Hachado et de Lonquimay formeront ensemble la *haute cordillère*.

Analysons maintenant les deux chaînes que nous venons de désigner comme haute cordillère pour déduire de cette étude la définition précise de la " Cordillère proprement dite."

En premier lieu, se pose ici la question si la structure géologique nous permet d'envisager comme Cordillère proprement

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dite et principale l'une seulement des chaînes citées ou, en d'autres termes, si les différences entre les deux chaînes suffisent pour justifier leur séparation.

Tandis que nous avons rencontré beaucoup de traits communs relatifs à la structure générale des deux chaînes, nous pouvons, dans les détails, énumérer assez de différences qui seront exposées dans les lignes suivantes.

Entre les terrains sédimentaires de la chaîne de Pino Hachado, nous rencontrons les grès de Haichol qui manquent dans la chaîne de Lonquimay ; en revanche, les couches à Litorinelles sont propres à la dernière.

Le porphyre paléovolcanique est caractéristique pour la première chaîne, tandis que le granit ne se trouve que dans la seconde.

Les roches néovolcaniques forment dans la chaîne de Lonquimay des volcans imposants qui s'élèvent à des hauteurs beaucoup plus considérables que les plus hautes cimes de la chaîne de Pino Hachado.

On voit qu'une étude détaillée géologique peut montrer assez de différences entre les deux chaînes ; mais il ne faut pas oublier que toutes les différences énumérées sont des caractères de second ordre, qui ne troublent en rien la grande analogie générale des chaînes.

Il est vrai que certaines couches sédimentaires sont propres à l'une des chaînes ; mais, en général, ce sont des sédiments mésozoïques plissés qui forment, pour ainsi dire, le squelette des deux.

Certaines roches volcaniques des deux chaînes sont distinctes ; mais, d'autre part, la grande nappe néovolcanique consiste dans les deux chaînes en un basalte feldspathique. C'est donc la même roche qui couvre, soit la chaîne de Pico Hachado, soit celle de Lonquimay.

Il est vrai encore que les centres volcaniques s'élèvent à Lonquimay à de grandes hauteurs ; mais une étude appro-

fondie de la chaîne de Pino Hachado, nous montre que là aussi existe un ancien centre volcanique (profil L, M, pl. i., arroyo Tehuel-Nigliu), qui se distingue des volcans occidentaux seulement par sa forme orographique ; étant plus ancien que les volcans Lonquimay, Llaimas, etc., il est déjà entamé et détruit notablement par l'érosion, tandis que les agents extérieurs ont laissé subsister à peu près intacts les cones majestueux des volcans de l'ouest. En outre, il ne faut jamais oublier que les volcans de la chaîne de Lonquimay ne forment pas une chaîne continue, mais seulement des cimes isolées surgissant çà et là. D'autre part, le phénomène néovolcanique date des temps relativement modernes ; il a commencé après le plissement andin et ses produits (les volcans et les nappes néovolcaniques) ne forment donc pas partie de la structure primaire géologique de la Cordillère.

Par la discussion de ces faits, nous venons à la conclusion que la géologie et l'orographie des chaînes de Pino Hachado et de Lonquimay montrent bien des différences de détail, mais que ces différences ne peuvent pas troubler le fait bien fondé de leur analogie et équivalence complète dans les traits fondamentaux de la structure géologique.

De là nous arrivons au résultat que les deux chaînes de Pino Hachado et de Lonquimay, *équivalentes dans le sens orographique et surtout géologique, doivent être considérées comme parties de la Cordillère proprement dite de notre région.* Ensuite, si l'on cherche une ligne géologique centrale de la région, celle-ci doit passer par la ligne médiane du plateau interandin de l'Aluminé que sépare les deux chaînes (voir fig. 1 pl. ii.).

Cette conclusion est confirmée par un autre fait que me paraît posséder une importance particulière.

*Le poudingue jurassique, en relation intime avec les roches porphyritiques,* joue dans beaucoup de régions centrales de la Cordillère un grand rôle. Il compose presque entièrement les plus hautes parties de la Cumbre de Uspallata, de Tinguiririca,

de la région du Planchon, etc., et peut être considéré comme roche caractéristique des sommets andines de ces régions. Donc les parties andines citées où affleure ce sédiment appartiennent sans doute à la Cordillère proprement dite, et forment en outre leurs cimes les plus élevées.

Si nous retrouvons maintenant le même conglomérat avec tous les caractères identiques non seulement dans la chaîne de Lonquimay (entre les rios Biobio et Lonquimay), mais aussi près de Pino Hachado (entre le commissariat et le col), nous pouvons regarder ce fait comme affirmation précise de notre conclusion, disant que non seulement la chaîne de Lonquimay, mais aussi celle de Pino Hachado, *forment partie de la Cordillère proprement dite*. (La figure 1, planche ii., cherche à fixer les conclusions auxquelles nous sommes arrivés ci-dessus.)

Tout ce qui a été exposé dans les lignes qui précèdent se rapporte à notre champ d'études ; de même les conclusions, auxquelles nous sommes arrivés, sont applicables seulement à cette région. Des études suivies dans des contrées voisines pourront seules démontrer jusqu'à quel point on pourra appliquer nos résultats ailleurs.

Le fait que la structure andine change au sud de notre région peut être constaté par les travaux de M. Wehrli, dans les environs de Junin et du lac Lacar. Là, la Cordillère se trouve réduite à un cordon occidental qui est situé au sud de notre chaîne de Lonquimay et qui, certainement, est à regarder comme leur prolongation australe. Vers l'est, s'étend une grande plaine sans aucune trace de chaîne andine orientale. Le Cerro del Perro est un accident spécial et ne peut pas être comparé avec notre chaîne de Pino Hachado.

Il paraît donc que non seulement les chaînes à l'est de Las Lajas, mais aussi *la chaîne de Pino Hachado ont disparu complètement dans la latitude de Junin* et que nos deux plateaux interandins réunis forment là la grande plaine orientale déjà citée.

Malheureusement presque toutes les données géologiques du nord de notre région manquent. J'ai seulement pu constater :—

1. Que les plis des chaînes de Pino Hachado et de Lonquimay se rapprochent sensiblement déjà près de Liucura ;
2. Que le plateau de l'Aluminé atteint des hauteurs considérables vers le nord ; et
3. Que dans la région située au nord de la confluence des rios Lonquimay et Biobio, il ne se montre orographiquement plus rien du plateau, mais au contraire des crêtes continues semblent relier la chaîne de Pino Hachado à celle de Lonquimay.

De ces observations paraît résulter le fait que le plateau de l'Aluminé disparaît vers le nord et que, par conséquent, les deux chaînes de Pino Hachado et de Lonquimay s'unissent là.

La chaîne de Pino Hachado (et aussi les chaînes orientales) est donc probablement à considérer comme un rameau de la Cordillère, *qui s'élève de la plaine à une certaine distance au nord de Junin de los Andes*, qui atteint ensuite rapidement vers le nord des hauteurs considérables et qui s'unit avec les chaînes occidentales au nord de Liucura.

Comme ce rameau montre dans notre champ d'étude la même structure géologique et orographique que la chaîne de Lonquimay, nous devons conclure qu'il y fait partie de la Cordillère, proprement dite.

*La définition de la Cordillère de notre région sera donc différente de celle qui s'applique aux contrées du sud, étudiées par M. Wehrli.*

De là il faut conclure qu'on ne pourra rien généraliser sans des études préalables, et que seulement en allant étudier soigneusement région par région, on pourra obtenir une idée juste sur l'extension de la Cordillère dans les latitudes différentes.

LA PLATA, juillet, 1898.

DR. CARL BURCKHARDT.

## No. 129.

### ERRONEOUS SITUATION ON THE SANTA MARIA PASS ON THE ARGENTINE MAP V., as inferred from the communications between the Commissions in 1896.

[Translation from copies at the Chilean Legation.]

(Quoted on page 1100 of the Statement.)

#### Enclosure A.

*The Chief of the Chilean Sub-Commission to the Chief of the  
Argentine Sub-Commission.*

HUIHUI CAMP, May 8, 1896.

DEAR SIR AND FRIEND,—

In order to justify before the respective Experts the reasons which have influenced the Sub-Commission under my orders to commence its surveys this year at *the Pass of Santa Maria or Llaimas*, I consider it necessary on my part to recall the antecedents upon which those works were based.

The said works were initiated last year by the fourth joint Sub-Commission on the proposition of the respective Argentine Sub-Commission to survey said pass; commencing by a measurement along the valley of Nompehuen. Before beginning this season I learnt from the Sub-Commission of which you are the worthy chief, that they were not authorized to carry out those surveys and measurements. It was agreed between ourselves that you should consult the Argentine Expert upon this point.

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As a result of this consultation, and on the eve of leaving Temuco where I had gone to start my expedition, I received your telegram dated December 23, 1895, which read as follows :—

“ From instructions received it appears that we are not authorized to erect any landmark north of Reigolil. Consequently our starting-point will be Coloco. Our agreed point of meeting remains subsistent nevertheless. I am,” etc.

DIONISIO PARDO.

\* \* \* \* \*

I found myself in the position of not having time to request special instructions from Santiago. The Agreement between both Sub-Commissions was laid before the Chilean Expert in my report of last year, and, not having been objected to in that part by this official, I did not think myself empowered to act otherwise than according to said agreement. I was even afraid of acting contrary to the stipulations of the Protocol of 1895, referring to the prosecution of the works, owing to the special circumstance of finding myself with two points where the works of last year ended. I decided therefore to complete the survey as far as Santa Maria prior to going to Coloco.

The result of the work has been the erection of two cairns at the Passes of Llaimas and Ñellocahue, at points which the Sub-Commission under my orders consider as belonging to the frontier line between both Republics, and which they would have proposed as boundary marks if the Argentine Sub-Commission had been able to consider such proposition. As they could not do so, the cairns had no other character than that of trigonometrical landmarks of some importance, to which it was advisable to give sufficient solidity to resist the time their ulterior object would demand, according to the decision of the Experts. This character is the only one attributed to them by the Sub-Commissions under my orders.

Having made this statement, I should like to hear the re-

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marks which it may suggest to you, and request you to communicate them to me.

I am, etc.

ERNESTO 2° FRICK.

**Enclosure B.**

*Reply to the preceding Note by the Chief of the Argentine Sub-Commission.*

LAKE QUILLON, May 9, 1896.

DEAR SIR AND FRIEND,--

I have before me your communication dated yesterday, in which you express to me that, in order to justify before the Chilean Expert the reasons which have influenced the Sub-Commission you so worthily preside over, to commence the surveys this year at *the Pass of Santa Maria or Llaimas*, you consider it advisable to make a statement of the antecedents connected therewith, and in it you allude to agreements arrived at with the staff which last year formed the Sub-Commission I preside over, and, referring to the invitation you sent me to continue the survey in that direction, you say that the result of those works has been the erection of two cairns at the Passes of Llaimas and Ñellocahui, and end by saying that you would like to be acquainted with the remarks which I may make on your statement.

In reply I beg to say the following :—

1.—I must not give an opinion regarding the agreement which you may have made with the staff which formed the Sub-Commission last year.

2.—It is true that you invited me to continue the work at the Pass of Santa Maria or Llaimas, and that I replied that I did not consider myself authorized by the instructions I had from the Argentine Expert, to carry out the work except to the south of Coloco. That it is true that I addressed you under date of December 23 last, the telegram which you quote, be-

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cause, by the instructions I had from my Expert, we were authorized, not to erect any landmarks to the north of Reigolil, but to work south of Coloco.

3.—That, respecting the results of the works and the erection of landmarks at Santa Maria and Ñellocahui, I decline all responsibility in works which neither I, nor the Sub-Commission I preside over, have carried out, reserving to myself the right, nevertheless, of laying this fact before the Argentine Expert—a fact which I understand is a violation of the principle that establishes that the erection of landmarks must be made after an agreement has been reached between the demarcating Sub-Commissions, in spite of your declaring that they must only be considered as trigonometrical points of some importance.

I believe that, with the above statement, I give an answer to your communication.

I am, etc.

DIONISIO PARDO.

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### THE ARGENTINE EXPERT ON THE REGION OF REIGOLIL AND MAMUIL MALAL.

[Extracts translated from "*Apuntes preliminares sobre una Excursion a los Territorios del Neuquen, Rio Negro, Chubut y Santa Cruz*," La Plata, 1897, pp. 37-42.]

(Quoted on page 1103 of the Statement.)

IN the afternoon of the 22nd we halted at the Vega de Pulmari, a real promised land, and on the following day, in the company of Señor Keen, the manager of the *estancia* which is being formed there, we started to the west to explore the Vegas de Ñorquinco, renowned for their beauty and *in the neighbourhood of which the demarcation of the frontier with Chile has been commenced.*

That region of Pulmari and its surroundings is one of the most beautiful I have seen in my life, and if well looked after by the nation, would undoubtedly be in a short time a centre of activity, provided its settlement were made with elements suitable to the soil.

But for this it is indispensable to reframe our laws of colonization, which may have been applicable at a time when it was believed that the Argentine fiscal territory was of the general nature of the pampa—a plain; but, now that we fortunately know that we have territories of such variety in their physical constitution admitting of a diversity of industries which will constitute our greatest sources of riches, it is necessary to promote the rational cultivation of the ground and its natural resources.

The landscapes which we come across in our journey are as varied as they are beautiful. The small, blue, deep lakes, like irregular lenses, bordered by araucarias and cypresses, and the white shores of decomposed quartz, form, as seen from above, a pleasing combination, tranquil in its gentle majesty without any harsh sounds or noises. The past, the human inanity, we find in the shape of white skulls and the fractured bones of an Indian cemetery disturbed by silver trinket hunters, and having passed this weird place, we entered a most beautiful plain where we would have liked to have found the dairy-farm which would have completed this enchanting picture. The small lakes of Nompheuen and Norquinco (Plate VII. figs. 1 and 2) filled the centre of the ruins of the advanced fort, evoking past occurrences.

\* \* \* \* \*

We camped at the said spot where the Argentine demarcating Sub-Commission had its camp last year, and on the following day I reached as far as the valley of the Reigolil, where the Indian settlement of Curanemo exists (Plate VII. fig. 3); *I visited the landmark (1060 metres) at the origin of the rivulets which form the continental divortium aquarum which is reached insensibly, as the declivity of ground is less than 5 in 1000 from Aluminé.* (Quoted  
p. 1103.)

*The ravine (Quebrada) is continuous between the western plain and the Aluminé, and without further investigation it is difficult to consider this as the Andean backbone. This Reigolil road is galloped over, under the shade of bamboos and fruit trees, and is one of the few passes over which cattle and beasts of burden can travel in winter time as far as the settlements in the central valley of Chile. The huge masses of Solli-pulli, which is prolonged towards the north-west, cut across by the waters flowing from the comb (hondonada) where the divisional landmark has been erected, seemed to be the continuation of the snowy mountains that I saw from the moraine of Lake*

*Aluminé and from Lake Guayetue*; and the impression I received from this expedition is that *a very careful study of the region will be necessary in order to trace with certainty the frontier line* in it or in its vicinity, *in conformity with the letter and spirit of the Treaties that stipulate it*, and I am convinced once more of the unavoidable urgency that exists of ordering a general investigation of the Cordillera de los Andes prior to effecting the detailed demarcation of the boundary line. *The reader will not be surprised that I should frequently refer to our boundary question pending with Chile, if he bears in mind that it has been my constant idea for 25 years*, and that one of the objects of my journey is to increase my general knowledge of the Andes.

Lake Pilhue, situated near the landmark, is of an indescribable, tranquil beauty, commanded by the slopes of the hillocks covered with dense forests up to their summits. In its eastern extremity there rise a quantity of beautiful and characteristic andesitic columns, which increase the interest of this spot, solitary at present, but which will become one of the great attractions of the region when the railway, which is being constructed as far as the junction of the Rivers Limay and Neuquen, reaches Temuco along the transverse valley of the Reigolil.

\* \* \* \* \*

Mount Uriburu, a mass of black lava, with yellow, red and purple tints on the borders of the ancient crater, filled up with scoriae, towers above the whole panorama. To the north lie the lovely *quebradas* of Nompéhuen and Remuco, wherein runs the road leading to the Llaimas volcano.

We left this valley and, climbing through the forest of araucarias (Plate VII. fig. 4), over lofty transverse ridges covered with erratic blocks, *we left to the west the Quebrada of Coloco, in the middle of which,—on the gentle col which divides the waters feeding the Pulmari from those which form one of the many tributaries of the Reigolil,—a second landmark has been*

Quoted  
p. 1103.

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*erected*, and we descended the valley of Rucachoroy, less picturesque than that of Pulmari, but as fertile and as capable of being utilized as this. Our time is running short, day by day, but, as we advance and reconnoître the region, our interest increases as well as our desire of knowing it in detail ; but it is not possible to linger, because our programme is an extensive one, and I must carry it out. Before reaching Lake Rucachoroy, we again climbed the high granitic plateau, also covered with volcanic rocks, and by night we reached the beautiful valley of Quillen, in the neighbourhood of the lake of that name. I expected to find on its shores the camp of the Fourth Argentine Sub-Commission, which I did next morning.

\* \* \* \* \*

It was established at the entrance of the forest, at an ideal spot. That part of the lake in the light morning mist reminded me of some crayons by Allongé : the rushes seemed to be rising from air, so quiet were the waters and so clearly did they reflect the sky ; the trees in the distance gave a greenish tint to the greyish waters, and only in the centre of the lake did these have a slate blue colour. Mount Ponom presented the curious decomposition of its lava, which has earned for it such an obscene name, and in the background, the rising sun shone upon the shapely and beautiful Lanin volcano, which rose like a fantastic rosy crystal covered with a coat of polished silver. Mount Lanin is the most characteristic and prominent mountain of the territory of the Neuquen, and it was an old friend I had before me for days past, as it may be seen by the traveller from the Sierra de Aichol.

At midday I left the camp of the Sub-Commission, and, crossing the valley, we camped at night at a sheltered place on the high plateau, near the sources of the Pichileufu (1200 metres). On the following day we continued ascending and descending, and crossing picturesque gorges and fertile downs covered with trees, and, having passed the high granitic gap

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of Huahuan (1500 metres), I found myself again in the forest of araucarias covering the grassy glacial deposit on top of the ancient granitic high tableland. This tableland,—which, like an enormous wedge, separates the mountains of more recent origin,—the parallel ranges of which are so near each other more to the north of the Bio-Bio and which have given rise to the apparent interruption of the line of the volcanoes of the west which have given the high relief to the Cordillera,—is an orographical feature which will induce the demarcators of the frontier to proceed with great caution in order to find the true international dividing line.

Quoted  
p. 1106.

\* \* \* \* \*

*When I made that visit the Indians told me that the snow-capped mountain* was called Pillan or Quetrupillan, and I published this statement; later on, however, I recognized my error. The Quetrupillan, *truncated mountain* (*cerro truncado*), rises somewhat to the west and is not visible from that point.

The enclosed Arroyo Pichi-Nahuelhuapi, which conveys its waters to the Aluminé, does not bear this name, although it is given to it in some geographical charts. This name only belongs to the lake where it has its origin; the stream has no name, but the rough and hidden pass (750 metres) is called by the Indians Huahum. We camped that afternoon in the small valley of Huahum (900 metres) which is also called Pilolil by the Indians, on account of some rocks with deep crevices situated on the left bank of the Aluminé, where the stream of the valley flows. I there found sedimentary lands, but I was unable to determine their period because I had not the time to search for fossils.

Early on the 27th I marched along the picturesque Indian road I had traversed so often in times past, and, in a few hours I reached the pampa of Malleco, or the River Malleu, where, sheltered by the andesitic block of the Pungechaf, the tribe of Ñancucheo camped in 1876.

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The valley Malleco (730 m.) extends wide and grassy towards the west, where the river of that name receives the waters of Lake Tromen (950 metres) immediately to the north of Mount Lanin which also gives waters to the Malleco and divides the latter from those of Lake Huechulafquen (830 metres) situated on its southern slope. The neighbouring transverse hillocks, which form the separation between the upper Malleco valley, and that of the Chimehuin, is grassy and densely covered with forest, but the "*pehuenes*" [*araucaria imbricata*] diminish and disappear on reaching the upper Chimehuin. The ancient Indian road between the settlements of Caleufú (cacique Shaihueque), Collon-Curá (cacique Molfinqueupu) and Pungechaf or Malleco (cacique Ñancucho) follows always the waters of the Arroyo Palihue along the pampa of that name, and then penetrates into the *quebradas* communicating with the deep valley of the Collon-Curá, thus traversing the volcanic ridges east of the Chimehuin, the more visible mountains of which are the Cerro Tantan and that of los Perros ; but I went more to the west, between the Tantan and Mount Trinque (1080 metres), until reaching the beautiful valley of the Chimehuin. All the region has been covered at other times by ice, judging by the detritus which cover it.

\* \* \* \* \*

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### SURGEON OYARZUN (CHILEAN) ON THE REGION AROUND HUECHULAFQUEN.

[Translated from "Extracts of the Journal of the Army Surgeon Francisco J. Oyarzun," printed in Serrano Montaner's "*El Litigio sobre Límites*," etc., pp. 86-97.]

(Quoted on pages 1107 and 1108 of the Statement.)

JANUARY 20TH (1883). To-day at 6 a.m. I start from our camp at Maichin (at the junction of this river with the Trancura), in a southerly direction, in order to reconnoitre a lagoon, whence, so the Indians say, issues a river which flows to Valdivia, as well as the River Trancura. Our journey lies up stream along the latter. I take provisions for one day only. I have an escort of eight soldiers of the Antuco squadron, including the farrier in civil dress. I have, as a guide, the same Indian who affirms the existence of the lagoon, in consequence of his having seen it when travelling to San Jose. Another Indian comes as an interpreter.

At 11 a.m. I had advanced a little further south than the point where the river is formed by two branches. On arriving there the guide says that there is no track to the lagoon and that the branch coming from the west is the emissary of the lagoon. The other one which proceeds from the S.E. flows between the volcano Quetrupillan (meaning the Lanin) and a range of low hills.

As there is no other road than along the banks of the latter, we proceed by that route, but on reaching a certain point, the

path deviates from the river. I enquire from my guide where the path leads to and he answers, to the Argentine Republic. In the hope of discovering from the summit with my glasses the object of my excursion, I urge him to go up, and we begin the ascent.

At half-past one we were on the boundary line, within rifle range of the foot of the Quetrupillan to the S.S.W.

What we are looking for (the lagoon), is nowhere visible.

I enquire again from my Indian, and urge him to tell me before returning at least which is the direction in which the said lagoon is to be found. As he points to the south, I remark to him that, in view of the direction of the Cordillera, this must be Argentine territory. He then retracts what he had said, and presently affirms that he had referred to the lagoon of Huechulafquen or Epulafquen, from whose eastern extremity issues the River Uncugnellu—called by the Argentines Chimehuin—which empties its waters into the Limay, and from its western extremity another river which flows to Valdivia.

Though this assertion was decidedly strange, and the existence of such a lake is common belief in Chile as well as in Argentina, curiosity tempted me, and I descended by the opposite slope in a southerly direction. The Cordillera branching off from the volcano in this part inclines to the west.

At half-past three we reached a point about a league's distance from the western extremity of Huechulafquen (this extremity lies in a N. to S. line from the volcano); but not finding any pasture, and as night was at hand, we returned some distance, so as to camp out in a safe place where our tired horses could get their necessary feed. . . .

January 21st.—At 5 a.m. I left my small escort preparing their breakfast, and went on horseback with the guide and interpreter to reconnoitre the lake. As I presumed, there was no river flowing to Chile.

On this excursion some smoke was sighted on the eastern

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shore of the lake. I sent the interpreter for the rest of my people, and at 8 a.m. we began our journey by the northern shore in order to enquire about the smoke, which proved to be that of the Argentine encampment where we arrived at 11 a.m. The camp was situated at a place where the lake is so narrow that it does not exceed 100 m. The Argentines had built a raft to pass over to the other side. The cattle crossed this narrow place by swimming. . . .

As I expressed my desire to call, on behalf of my chief, on Colonel Godoi, the major assured me that at present the colonel was marching along the south shore of the lake, but that he would encamp some five leagues from the place where we stood, and that, as the road which I should follow by the northern shore was excellent, I should arrive at the camp before 3 p.m.

Relying on the information of Major Vidal, I resumed my journey at noon, having as a guide an Indian lent by the Major. I do not wish to blame Señor Vidal, but the road was not what I had been told it was ; there were many defiles on the shores of the lake, where the Indians had thrown down trees which intercepted the path at every moment, exhausting our horses with continuous ups and downs in steep gradients. In spite of these declivities we pushed forward without a halt until 2.30 p.m., when the horses began to flag, on which account, and as we were still five leagues from Colonel Godoi's encampment, which, according to the assertion of two Indians who came from there, was situated on the other side of the drainage channel of the lake, I resolved not to press on, but to rest and feed my horses, which I did until 5.30.

It was then that, having no suitable writing materials, I wrote as follows to Colonel Godoi with a copying pencil on a visiting card :

“ Señor Colonel Godoi : I should have wished to go as far as your camp, in order to convey to you the salutations of the Commander of the Chilean Division, Don M. Drouilly, who is

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encamped on the shores of the River Trancura, on the road to Villarice at Maichi. The bad condition of my horses prevents me from reaching your camp. I remain," etc. Under my name engraved on the card I wrote "Divisional Surgeon."

I might have added that I had no provisions, and that I had already exceeded the time fixed for my return ; but it is difficult to write more on a visiting card. . . .

While the horses were recovering, I consulted my guide and the two Indians who came from Colonel Godoi's camp as to the road that it would be convenient to follow in order to return to my camp. All three were agreed in affirming that there was a very short one which, after crossing two mountain ranges trending from west to east, and then the dividing Cordillera, descended to Trancura some three leagues south of Maichi ; but they also supposed that the Indians had blocked this track with fallen trees, in order to prevent the Argentines from pursuing them further than the dividing line.

If this were so, there was another exit by going up stream to the head sources of the River Mamuilmalal in the lake of the same name (afterwards called by the Argentines Lake Tormenta), and then turning to the south until I reached the point called La Junta, because it is the junction point of the roads which, passing by the Lakes Huechulafquen and Mamuilmalal, lead to Chile.

They further assured me that I should arrive sooner if I took the latter route, as it was shorter and better than the road by which we had come.

In consequence of this information, at half-past five we took a short cut until we struck the beaten track and, after surmounting a ridge of considerable height, we arrived by moonlight and encamped in the valley of Mamuilmalal at half-past eight p.m. . . .

January 22nd.—At 5 a.m. we resumed our march, not by the shortest route, as I feared that the fallen trees had blocked

the path, but by the beaten track by which the Argentine forces had passed a few days before, and which I was sure was open.

I had advanced a little more than a league when I saw behind us some people following us. With my glasses, I was able to ascertain that they were in military uniform, and supposing them to be Argentines I stopped to wait for them. I was not mistaken. It was a troop of fifteen to twenty men commanded by Major Vidal, Captain Don Mariano Vega and Lieutenant and Adjutant Don Eduardo Oliveros Escola. After the usual greetings, the latter delivered to me a letter couched in the following terms :

“ HUCEHULAFQUEN, January 21st, 1883.—Señor Ayudante  
“ (why not surgeon?) Don Francisco Guarjun. . . . I have  
“ the pleasure to answer your kind card of to-day's date, regret-  
“ ting that you have been prevented, on account of the bad  
“ condition of your horses, from reaching my camp, though  
“ you have been so near.

“ In returning your salutation, I pray you convey mine  
“ to your Chief, Señor Drouilly.

“ The officer who is the bearer of this, Lieutenant Oliveros,  
“ will speak to you in my name, requesting you in consequence  
“ to be good enough to explain the presence of armed men in  
“ Argentine territory, as, in due justice to the Chilean army,  
“ I suppose that only some necessity as regards the operations  
“ against the Indians, at present carried on by both countries,  
“ has induced them wittingly to trespass beyond the limits of  
“ the territory, at a considerable distance from the boundary-  
“ line.

“ Having this in view, I have directed my Adjutant, Lieu-  
“ tenant Oliveros, to meet you together with Major Vidal com-  
“ manding the 5th regiment of cavalry.

“ Please convéy to your Chief the expression of my distin-  
“ guished consideration. I remain, etc. ENRIQUE GODOL.”

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After reading this letter, I said to the Argentine officer that I had no objection to repeating in writing, as they required, what I had stated verbally to Major Vidal the previous day, especially as I was not concerned in carrying out warlike operations on their territory, or in any other act which, in my judgment, could diminish the national dignity and sovereignty, as had happened on their side some little time before, when they penetrated to Hueyaltue, Lonquimai, Llaima, etc., where they beat the Chilean Indians, capturing their women and children and leaving many wounded, as I had myself had occasion to verify with regard to a woman and a boy at Lake Hueyaltue.

They (the Argentine officers), though they had commissions of surveyors, excused themselves on the ground of ignorance as to the whereabouts of the divisional line, *a thing so evident to one who is on the ground, that it cannot be overlooked by the merest layman, since even all the Pehuenche Indians distinguish THE PLACE WHERE THE WATERS DIVIDE US, and the Argentines always have these Indians with them in all their incursions, and the Indians are careful to point it out spontaneously, as they halt to breathe themselves and their horses precisely on THE DIVORTIUM AQUARUM.*

They [the Argentine officers] assured me that the Quetru-pillan [meaning the Lanin] was wholly Argentine. It will be seen that, in spite of their surveyors and maps, they were mistaken, or their assertion was not made in good faith; as this place, Mamuilmalal, was at most only three leagues from the divisional line, which passes by the very summit of the Quetru-pillan as I was afterwards able to verify.

At 8 a.m. I took leave of the Argentines and continued my journey with the horses travelling at a walking pace.

After two hours I left Lake Tormenta [Truomen] on my right and to the north, and soon afterwards crossed the divisional line at a height of 1300 metres.

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Towards 11 a.m. we passed very near a small lagoon, situated to the W.S.W. of the aforesaid.

This nameless lagoon (subsequently called Quilleihue) receives a small portion of the waters of the Quetrupillan (Lanin), and *from it issues a stream which carries its waters to the River Trancura, and this runs into Lake Villarica; consequently the lagoon belongs to Chile as well as the portion of the volcano whence its waters proceed.*

From this point the road bends to the south, and the traveller begins to ascend a spur which juts out from the volcano in a N.W. direction. We had to cross almost a league of ancient scoria, and, from time to time, some patches of snow. A strong wind charged with a dense fog was blowing. At 1 p.m. on the descent we reached the junction, whence some of the water from the snows of the volcano descends to Chile.

From here, marching very slowly, we followed the same road as on the previous day, and at 9 p.m. reached our camp, decidedly hungry and wet, as a fine rain had been falling all the afternoon. The commander, highly alarmed at my delay, had a picket of twenty-five men ready to search for me at dawn, guided by our tracks.

Even more astonishing, seeing that he had competent surveyors at his command, is General Villegas' assertion that the volcano Quetrupillan (Lanin) is entirely Argentine, and lies more than seven leagues from the divisional line.

And this assertion is countenanced by Colonel J. Olascoaga, one of the most distinguished contributors to the *Tribuna Nacional*, as this very paper states, in its issue of March 15th. This gentleman, who is an Argentine celebrity, both as a military man and as a geographer, published a map in the issue of *La Tribuna* referred to, which is a perfect mass of errors.

Pl. II.  
p. 345 in  
Statement.

To quote only some of these, I beg to enquire from Señor Olascoaga: Since when has the River Colloncurá risen on the slopes of our volcano Villarica? Where are the Argentine lakes

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of Matreñanco or Pulmari, of Rucachoroi, of Quillen, of Mamuil-malal or Tormenta [Truomen] situated in his map? Where are the rivers which flow from these lakes? How could he possibly locate Lake Aluminé further west than Lake Huey-altue? Where is the place that he calls Maichu [Maichin], and why does he state that Trancura is the same as Travuncura, whose existence is doubtful?

I return the compliment Señor Olascoaga has paid me, making me say what I have not thought, i.e. "that my chief was encamped at Maichu, on the shores of the Trancura (Travuncura)," and in my turn I venture to ask him, when next he publishes maps, not to make, in his cool way, the divisional line pass along our volcano Villarica, which is notoriously known to rise in Chile, and more than fifteen leagues west of that line. . . .

\* \* \* \* \*

I am not versed in International Law, and I can only say that—since they (the Argentine officers) are guiltier in this respect, as can be proved by reliable evidence,—they should not raise the question; but our neighbours have their pleas ready when they are caught in the act. Like innocent babes, they plead ignorance and seek, as Señor Olascoaga does, to mislead (and sometimes succeed in misleading) those who are unacquainted with the region, by saying that *no one can tell, even at many leagues from the divisional line, whether one is in Chile or in the Argentine.*

It is possible that this may happen when the highest crests of the Andean Cordillera are seen from the coast, from the central valley of Chile, or from the Argentine pampa; *but it is not so for one who finds himself on the very summits, after an ascent and a descent, observing at the same time not only the direction of the water-courses, but also a diminution in the volume of the streams as the ascent is being made, until a moment comes at which they vanish, and, on the contrary,*

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*as the descent is made by the opposite slope, other streams increase in volume as one proceeds farther.*

How can the Argentine officers have failed to know that they were in Chilean territory when they descended as far as the valley at Magte (by the Villarica or Rilul Gap), at Dahuelhue (by the Llaima Gap), at Hueyaltue (four or six times by the Gap of the same name or Pino Hachado), at Lonquimay, at Nitrito, at Hueyali, at Rauco, at Queuco, and even at Antuco (many times), killing our Indians at almost every one of these places, and capturing their wives and children though the poor wretches alleged their nationality? . . .

FRANCISCO J. OYARZUN.

May, 1883.

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### GENERAL VILLEGAS (ARGENTINE) ON THE TOPOGRAPHICAL OBSCURITY AS TO THE BOUNDARY.

[Translated from an official communication printed in Serrano Montaner's "*Litigio de Límites*," etc., pp. 84-86.]

(Quoted on page 1108 of the Statement.)

SECOND DIVISION OF THE NATIONAL ARMY, COMMANDANT'S  
HEAD-QUARTERS.

CAMP AT COLLON-CURA, January 30, 1883.

*To Lieutenant-Colonel Don Martin Drouilly, Commander of  
the Expedition to the Cordilleras of Araucania.*

I HAVE received your note dated at Maichú on the 26th instant, with the remarks suggested and measures taken in view of the occurrences which our differences with the savages have caused on that side of the Andes, compelling the Army which guards the mountainous territories to the east of the Cordilleras, to take steps not to give rise to divergences by trespassing in their expeditions beyond *the boundary line of our country with that Republic on the summits and valleys of the Cordillera.*

In previous communications I have carefully pointed out to Colonel Urrutia, Commander-in-Chief of the Army of the south, operating in Araucania, the line of conduct which the Argentine forces are instructed to follow, in order to carry out with good results and well-founded right, their advances towards the nomads and barbarians who maraud in the Andean

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“quebradas”; for I have desired, and desire now, that if, owing to incidents different from normal operations, our outposts should carry out their attacks beyond the Argentine boundary, it should be easy to explain on account of *the topographic obscurity that exists, for ascertaining with good reasons and evident certainty the true and real line which demarcates the Argentine and Chilean possessions*, and to show that these trespasses are not the result of a preconceived plan outside the regular laws by which friendly nations are governed. For these reasons all the forces sent out in pickets or important bodies, carry with them strict instructions “under no pretext to cross to the west the Cordillera de los Andes.” Such is the nature which this grave question presents respecting our army, in the incidents occasioned by offensive operations carried on against the Indians in the present campaign, but this is not the case respecting your country, which with full knowledge has sent scientific commissions to inspect *the volcano Quetru-pillan [Lanin]*, which, as is well known, *belongs entirely to the Argentine Republic, being more than 7 leagues to the east of THE ANDES*; and that the said Commissioner brought as an escort soldiers from the squadron Antuco, armed with Comblain carbines. As you may understand this double inconvenience suggests premeditation, which it is not my intention to overlook, although I considered it only as a deficiency of meditation [*sic*].

Quoted  
p. 1108.

Quoted  
p. 1108.

You are very well aware that it is not permissible for a single individual armed and dressed in uniform knowingly to cross to this side of the Cordillera, because in neither Republic, under the present circumstances, can any arms be admitted other than those belonging to the nation.

The contrary would show a lack of mutual respect on the part of the Governments.

In view of the above, I cannot possibly accept in accord with the chiefs of the Chilean army, a *modus vivendi*, because

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I do not wish to assume powers belonging to the Argentine Government, or to make myself responsible for the consequences which the forces under my command might suffer by reason of my exceeding what is stipulated,—although it may be with reciprocity,—the limits of my powers.

You may be sure that the Argentine forces will only carry out their persecutions as far as it is advisable, unwitting transgression being possible, for it is materially difficult to prevent it, but not a conscious error which might occasion a just and severe protest.

Thanking you for the notice as to the placing of detachments of forces from that Republic on the gaps to the west of the Cordillera, I shall consider it a duty to acquaint you with those of the division under my orders to the east of the same, as soon as they be established, in which operation I am at present engaged.

I am, etc.

CONRADO E. VILLEGAS.

## No. 133.

### DR. LEO WEHRLI ON THE GEOLOGY OF THE ANDES IN 40° AND 41° S.

[Extracts from his Report inserted in "*Revista del Museo de la Plata*," vol. ix.  
pp. 238-242.]

(Quoted on page 1133 of the Statement.)

#### *Résumé Géologique.*

JETANT un coup d'oeil général sur le profil transversal de la Cordillère acquis depuis Puerto Montt au Pacifique jusque dans la vaste Pampa à l'est de la Cordillère, on est d'abord frappé par la prédominance des roches cristallines sur les formations sédimentaires. C'est une différence essentielle contre le profil que nous avons levé, le Dr. Burckhardt et moi, l'année dernière, plus au nord, dans la zone du 35° et 36° latitude sud.

Là, au nord, la montagne est formée par une douzaine de plis clairs des systèmes jurassique et crétacique. Un poudingue jurassique extraordinairement puissant, d'origine moitié éruptive, moitié sédimentaire, peut se poursuivre dans les deux tiers de la largeur de la montagne; viennent ensuite de jeunes basaltes et liparites surtout dans les zones marginales de la Cordillère; ces masses volcaniques jouent un rôle important dans la physionomie de la région comme couvertures de laves étalées au-dessus des formations nues de sédiment, tandis que les roches qui caractérisent les massifs centraux font défaut.

Ici, au sud, par contre, un massif unique de granit forme la base principale du profil. Malgré une série variée de granit,

gneiss, diorite et même de porphyre changeant d'une manière intéressante selon la localité, il reste quand même pour l'ensemble de la tectonique un seul grand massif. Celui-ci commence en dessous du volcan Calbuco (lac Llanquihué), passe par le lac Todos los Santos, forme le pied large du Tronador majestueux, porte, au coeur même de la Cordillère, la ligne divisoire interocéanique des eaux au Boquète de los Raulies et s'étend au Nahuel-Huapi avec une brève interruption jusque vers Puerto Moreno. On peut même, au point de vue magmatique, y compter les collines porphyriques de Puerto Moreno. Des laves modernes, plus basiques, ont alors percé le massif et ont construit le Calbuco, l'Osorno et le Tronador.

Il n'y a que les deux zones étroites de formations sédimentaires au Nahuel-Huapi qui trahissent la nature des Andes comme montagne de plissement. Il semble que ces deux zones soient de faibles représentants des zones sédimentaires plissées que nous avons rencontrées au nord. Les résultats obtenus par M. Burckhardt, en mars et avril 1898, dans le profil entre le Bio-Bio el Las Lajas ne le contredisent pas. C'est une région intermédiaire entre celle de l'expédition antérieure et le Nahuel-Huapi.

Après le vaste massif granitique et après les deux zones étroites de sédiments s'étend, vers l'est, le grand plateau volcanique de notre zone basaltique avec ses tables stratifiées de laves et de tufs plus ou moins horizontaux, d'une puissance qui atteint 1500 mètres. Elle a son origine dans une zone d'éruption dirigée plus ou moins dans le sens du méridien, c'est-à-dire en parallélité avec la Cordillère. Mais cette zone d'éruption n'a rien à faire, au point de vue tectonique, avec les Andes proprement dites. Les basaltes touchent les sédiments au Nahuel-Huapi, tandis qu'au lac Lacar ils percent le granit. Il s'ensuit que la fente est un peu oblique à la direction générale des Andes.

Ce plateau éruptif, c'est-à-dire *le Chapelco*, les montagnes

du Limay entre le Pichi-Limay et le Nahuel-Huapi, le cerro Carmen de Villegas, le cerro Trenque-Malal, etc., je ne les considère pas comme Cordillère proprement dite. Ces accumulations de matériaux volcaniques sont d'une nature complètement secondaire. Elles n'ont rien à faire du tout avec la genèse des Andes. Elles constituent plutôt une espèce de Pré-Andes, un haut-plateau volcanique indépendant qui se relie au bord oriental des véritables Andes.

Mais il faut comprendre cette séparation *cum grano salis*.

Je fais ici la différence stricte et nette parce qu'elle est justifiée dans une région où les basaltes forment une zone propre bien caractérisée. Il est alors permis, et même nécessaire, de les séparer à cause de leur forme orographique et par leur composition géologique. Mais dans le cas qu'il se montre plus tard, sous le microscope, ou par l'analyse chimique, des affinités pétrographiques entre les laves de ces Pré-Andes de l'est, les basaltes du Tronador et les magmas de l'osorno et du Calbuco, personne n'aura l'idée de rayer les trois sommets du Tronador de la liste des Andes proprement dites, ou de reconnaître seulement au pied granitique de ce géant la noblesse pur sang de la Cordillère.

Il est incontestable que les centres d'éruption volcanique se trouvent parsemés dans toute la largeur du profil, quoiqu'on ne puisse pas nier qu'ils forment de préférence des zones marginales. Mais, en tirer une autre conclusion qui établisse des relations entre les forces tectonique et volcanique pour expliquer la distribution des volcans, je n'ose le faire, ne voulant pas me laisser entraîner par les hypothèses spirituelles de M. Suess.

Je ne saurais encore rien dire non plus de la succession des anciennes éruptions. La couche trachytique dans la voûte sédimentaire de San Carlos (Nahuel-Huapi) est d'âge crétacique tout au plus, parce qu'elle est enfermée et plissée en concordance avec une argile à fossiles dicotylédoniens. Plusieurs basaltes (Nahuel-Huapi, Lacar) portent des traces de l'érosion glaciaire,

et sont par conséquent préglaciaires. D'autres tapissent des vallées (de lac) préformées comme dans la Vega de Maipú, etc., et enfin le Calbuco a eu une forte éruption le 29 novembre, 1893. L'action volcanique n'a donc pas cessé depuis le temps mésozoïque jusqu'à nos jours.

Nous avons obtenu l'année dernière le même résultat, quant à l'activité volcanique, dans le profil de Curicó à San Rafael.

Enfin, à l'est, notre profil termine dans un second haut-plateau qui est un peu moins élevé que le premier et qui se compose en général de grès et de poudingues. Il monte d'abord trois anticlinaux et se perd peu à peu vers l'Océan Atlantique dans les plateaux de la formation de la Pampa patagonique.

Des recherches spéciales auront à éclaircir encore les relations stratigraphiques qui doivent exister entre le plateau volcanique et ce plateau de grès.

Le plateau de grès est interrompu plusieurs fois, vers l'est par des tronçons d'anciennes montagnes granitiques et porphyriques aujourd'hui érodées presque au niveau du plateau. Leurs roches ne sont pas les mêmes que dans le massif granitique de la Cordillère actuelle.

Les grès et les poudingues du plateau sont-ils venus de la Cordillère actuelle, ou, de l'est, de ces anciennes montagnes presque disparues? La question n'est pas encore résolue. Dans le sens orographique, le plateau des grès joue, en comparaison avec la Cordillère et avec ces anciennes montagnes, un rôle semblable à celui de la haute plaine de la Bavière entre les Alpes et le Jura de la Souabe, ou à celui du haut-plateau molassique de la Suisse entre le Jura respectivement les Vosges, la Forêt-Noire et les Alpes.

A première vue, il paraît difficile de trouver une coïncidence entre mes profils transversaux des régions du Nahuel-Huapi et du Lacar avec les résultats que le Dr. Charles Burck-

hardt nous a fournis de la ligne du Bio-Bio à las Lajas (39° lat. sud), c'est-à-dire d'une ligne située bien plus au nord. M. Burckhardt a distingué dans sa région, entre la vallée longitudinale du Chili à l'ouest et la Pampa à l'est, trois chaînes sédimentaires et deux plateaux intercalés, à savoir :

- (1) La chaîne de Lonquimay, zone sédimentaire plissée surmontée par le volcan Lonquimay ;
- (2) Le plateau de l'Aluminé qui paraît un plateau granitique avec une nappe néovolcanique ;
- (3) La chaîne du Pino Hachado, zone jurassique plissée avec des nappes néovolcaniques et des centres éruptifs ;
- (4) Le plateau de Las Lajas couvert de laves néovolcaniques, et
- (5) La chaîne de la Vaca Muerta, petit pli simple, mésozoïque, dont la direction semble dévier de la direction générale méridionale de la montagne.

M. Burckhardt compare cette dernière chaîne, dans sa relation avec les Andes, au Jura suisse en comparaison avec les Alpes ; c'est au point de vue tectonique, une ramification latérale qui forme une petite montagne à elle-même.

Les deux chaînes occidentales, celle de Pino Hachado et celle de Lonquimay, séparées entre elles par le plateau interandin granitique de l'Aluminé, sont considérées par M. Burckhardt comme Cordillère proprement dite, et il trace une ligne géologique centrale de la haute Cordillère par le plateau de l'Aluminé coïncidant à peu près avec le méridien 71° 30'.

Si je prolonge cette ligne au sud, elle suit la direction de la Cordillère et passe sur le granit du Nahuel-Huapi, justement entre les deux zones sédimentaires de mon profil. Serait-il donc possible que ce fussent les mêmes chaînes, ou seulement celle de l'ouest et qu'elles auraient été érodées au-dessus du granit du Lacar ?

Du reste, il me semble hasardeux de prolonger une certaine ligne à une si grande distance, n'ayant pas de bonnes cartes,

car, dans l'intervalle, des chaînes peuvent disparaître, d'autres s'élever ou se perdre comme la Sierra de la Vaca Muerta. (Du moins je n'ai pas rencontré cette dernière chaîne dans le profil de Lacar à Collon-Cura.)

Le plateau de Las Lajas correspondra donc, quant à la tectonique et à l'orographie, à notre zone basaltique, et peut-être encore à une partie du plateau des grès. En tout cas, on ne peut pas considérer le Cerro del Perro comme une prolongation venant du nord, tel qu'on a déjà voulu le faire. C'est simplement un ermite, le Cerro del Perro !

*La Cordillère proprement dite commence seulement à l'ouest du plateau basaltique : pour la région du Bio-Bio, d'après M. Burckhardt, à l'ouest du plateau de Las Lajas ; pour notre région du Lacar, à l'ouest du Chapelco avec le granit, SANS QU'ON PUISSE, c'est évident, TRACER UNE LIGNE DE SÉPARATION BIEN NETTE.*

Outre ce profil transversal, l'expédition a livré encore beaucoup de résultats d'intérêt géologique plus général et concernant à peu près les points suivants : question de la genèse des grands lacs ; déviations de rivières ; un profil de sondages au Nahuel-Huapi ; phénomènes des glaciers actuels au Tronador ; ancienne glaciation double au Nahuel-Huapi et ailleurs ; volcanisme actuel du Calbuco et ancien du Tronador et du Limay ; température des lacs, etc., etc.

Un très grand nombre d'altitudes ont été fixées par différences barométriques. M. Charles Bruch a observé au moins trois fois par jour les baromètres et thermomètres.

Il est absolument impossible dans ce rapport court et préliminaire d'entrer dans les détails. Je les réserve pour le rapport final qui est en préparation, de même que celui de notre première expédition de 1897.

MUSÉE DE LA PLATA, juillet, 1898.

DR. LEO WEHRLI.

## No. 134.

### DR. ZAPALOWICZ ON THE EASTERN CORDILLERAS between 40° to 41° S. lat.

[Translation of Extracts from "*Das Rio Negro—Gebiet in Patagonien*," von Dr. Hugo Zapalowicz, Royal and Impl. Chief Auditor. Wien, 1893.]

(Quoted on page 1134 of the Statement.)

. . . To the south of the Volcano Villa Rica, on the Chilean side, rise the volcanoes Riñihue and Puyehue (Rohde), at nearly equal distances of about 70 kilometres. In the same south-easterly direction as these, one finds, on the Argentine side, and indeed in the continuation of the direction of Riñihue, *the mighty Sierra Chapelco*, and in that of Puyehue, *the high granitic chain on the northern bank of Lake Nahuel-Huapi*. These two southern lines, which, parallel with the northern one, traverse the main ridge, probably answer to similar volcanic clefts.

Now it is remarkable that *the greatest mountain heights should place themselves in a row along the lines mentioned*, for, apart from the vast cones of the volcanoes, there also rise the side branches of the main ridge, as for instance, the Sierra Chapelco, at a considerably greater height than the main ridge itself. On my journey *from Lake Lancar [Lacar] to Lake Nahuel-Huapi through the middle of the Andes*, I noticed also the south-easterly trend of all the lesser mountainous branches of the main ridge. The upper courses of all the tributaries of the Limay have the same direction : all flow, *within the sphere*

*of the Andes*, in longitudinal valleys, and only the valley of the Limay itself, in its upper part, can be regarded as a transverse valley. The mountainous ramifications appear to be linked together by transverse ridges and, out of such transverse ridges, the main ridge—the Cordillera de los Andes—is principally formed. *As, however, can already be concluded*, on the basis of the map, the main ridge itself again shows a tendency to deviate from its N. to S. main direction to a south-easterly one, parallel with the trend of the neighbouring spurs, and this is also evidenced in the strongly curved run of the eastern boundary of the granite mass. *The main ridge*, which probably consists entirely of granite, appears, at all events as a rule, *to be constantly lower than the neighbouring spurs*; it forms *the frontier between Argentina and Chile*, and *the water-parting between the two Oceans—except in the region of Lake Lancar [Lacar], where the ridge is interrupted and the frontier, as well as the water-parting, appears to be diverted eastwards for a short distance.*

Quoted  
p. 1134.

It can, therefore, be asserted that *the Andes*, from Villa Rica Pass to Lake Nahuel-Huapi, consists of *a row of mountain chains running parallel to one another* in a N.W.–S.E. direction, similar to the Sierra de la Angosturas, which, on the Chilean-Argentine frontier, are joined together 'by a transverse ridge running, in general, north to south, similarly to the geographical condition of the whole of the Andes system. . . .

The Quilqui-hue valley on the whole offers few opportunities for drawing conclusions in its lower parts and its bed, for, around the stretch of about 15 kilometres upwards, is a broad level Pampa. Where then, the valley narrows higher up, the road leads to fort Maipú over low hills, while the stream turns off towards the N.W. to Lake Loló. The flat hills almost give one the impression of a broad, furrowed dam separating the valley of Quilqui-hue from that of Lake Loló. Nearly through the middle runs a flat granitic ridge which easily escapes obser-

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vation and which resembles a tongue-like continuation of the granite mountains in the N.W. *This insignificant granite ridge is that which forms the water-parting between the Quilquehue and Lake Lancar, and is at the same time the water-parting between the Atlantic and Pacific Oceans.* THE WATERSHED just here descends considerably from the Cordillera heights and turns aside from the main direction some distance towards the east, in which, however, the granite here also follows a part of the oceanic divide.

The dam-like hills have an altitude of about 995 metres above the sea ; on both sides, but especially on the western, the side facing Lake Lancar, one notices the remains of old sea-shore terraces mostly bordered by regular plains, which now and then show traces of side moraines ; *in reality, however, they have nothing to do with moraines.* From the western side of these hills runs a small stream, which flows towards Lake Lancar, but before this it traverses the perfectly level bed of a large valley-basin about 10 kilometres long, lying 870–875 metres above the sea. The latter terminates in the west in a quite low, swelling stretch of ground rising gently to a height of 830 metres, on which stands the Argentine frontier-fort of Maipú. (The frontier between Argentine and Chile separates from the watershed just in this neighbourhood and runs transversely through Lake Lancar.) The stream mentioned cuts through the Maipú hills and reaches a deep-lying shallow valley (760 metres) which ends further westward at Lake Lancar with a level shore covered with fine and coarse pebbles, 745 metres. On its northern and southern sides the wonderfully beautiful, large *Andean lake* appears to be enclosed by steep rocky walls, on which, at a relatively considerable height above the surface of the lake, I noticed washed-out belts running horizontally, coinciding with the old lake level. It can therefore be assumed with all certainty that the lake, at a time not very remote, spread over the 760 metres level of

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the valley surface, and at a still more remote period of time, also took in the valley surface of 805–870 metres, and reached close up to the before-mentioned granite ridge. *It is further to be presumed that, at a still earlier period, the waters extended over the granite ridge into Patagonia, that is, that a kind of Magellan Straits existed here, and the Andes were turned into a group of islands. Evidence of such extension of the sea is, however, not present on the surface of the continent. Still, one can well assume that, at that remote period of time, Patagonia was covered by a shallow sea out of which meanwhile rose vanished districts of older lands with the later tertiary fauna ; that, in the shallow sea, the enormous masses of sandstone of the Rio Negro formation were deposited and, towards the Andes, mighty eruption streams of andesite broke out, which latter, in consequence of its invariable extension in layers and its intimate union with vast masses of tufa on one hand, and sandstone on the other, points to an immense submarine activity of the volcanoes at that time. As the land rose, and the sea proportionately receded, it is possible that, in the Andes and on the stretches of land adjoining on the east, a vast sheet of water existed, from which large quantities of water poured, passing over the still little elevated foreland towards the Atlantic Ocean. With the continual recession of the waters, the river valleys deepened, and the lakes emptied successively more and more. In this way one can explain the origin of those great terraces in the valleys of the Rio Negro and Limay, the proportionate distribution of the Patagonian pebbles on the upper parts of the table-land, as also on the terrace-levels themselves, and the lack of these pebbles in the region of the Vertiente stream (which, before the main recession of the waters, was protected by the Sierra de la Angosturas).* . . .

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### DR. SIEMIRADSKI ON THE EASTERN CORDILLERAS between 39° and 40° S.

[Translation of Extracts from "An Exploring Expedition in Patagonia," by Dr. Josef V. Siemiradski, private tutor to the Impl. and Royal University in Lemberg, in "*Petermanns Mitteilungen*," 1893.]

(Quoted on page 1136 of the Statement.)

\* \* \* \* \*

[P. 53] THE Patagonian high plateaus are dominated in the centre by ancient crystalline undulations running N.W. to S.E., more so than the north-eastern Central Pampa, and this together with the arid downs gives the landscape its undulating character.

Apart from layers of sand the surface consists of rounded pebbles of granite, porphyry, etc., of local origin. In the immediate neighbourhood of the hills, which are all embraced under the term "Mahuidas" or Mountains, the pebbles are more angular. They are not more than a few inches in diameter. Especially in the lower layers of schist, which average 10 metres in thickness, they are bound together into a conglomerate by a white, chalky, cement-like matter. There is no trace of any glacial formation. The layer of pebbles is perfectly horizontal. In the ravines of Colorado and Rio Negro the geological formation of the north Patagonian Plateau can easily be recognized.

Between the older crystalline mountain ranges which, with few exceptions, do not exceed the sand dunes in elevation,

everywhere is to be found the same fine-grained, white, marly sandstone which appears on the slopes of the eroded valleys of the central pampa. The system of beds is apparently horizontal, but at the same time, in the upper part of the Rio Negro, is to be noticed, between the colony of Roca and the conjunction of Neuquen and Limay, a gradual outcrop of white sandstone, —visible for a distance of many miles,—under which appears a red sandstone distributed broadcast in the whole region of Limay.

The beds are barely perceptible, but, for a belt of about 200 metres wide, there is a dip towards the Atlantic coast, and a corresponding very noticeable rise in the elevation of the plateau towards the west, so that in the neighbourhood of the Cordilleras it rises to a height of 800 metres, and at the more recent volcanic plateau of the Cordilleras even to a height of 1000 metres. Faults and changes of formation through friction, etc., in this tertiary sandstone region, which is said to be of the Cainozoic or lower Eocene period, are only noticed in the region of the *first Argentine Cordilleras "de los Angosturas."* Fossilized woods and imprints of leaves, which denote the upper Eocene period, are only found opposite the colony of Roca on the banks of the river Negro in the border beds of the red and white sandstone.

(P. 56) The Patagonian sandstone plateau rises more and more towards the west, so that it reaches, at the foot of *the Cordilleras de Catalin*, a height of from 800 to 900 metres. Of course this sudden elevation of the plateau is associated with an area of dislocation which has raised the sandstone locally and, through the frictional contact with andesitic lava, has converted it into quartz and jasper, while this same black porous lava spreads itself out for many miles above, and, together with white, tufaceous limestone, forms the highest levels of the table-land which in places reaches an altitude of 1000 metres.

Between Nogueira and the course of the River Collon-

Cura, we cross *a chain of mountains, pierced by wild ravines and rising about 1500 metres above sea-level*, which bear the name of *Cordilleras de las Angosturas*. Composed chiefly of granite-gneiss these Cordilleras, which trend in the direction of the meridian, are interspersed in many places with recent lava from the Andes. The Eocene or Cainozoic sandstone, violently disrupted, penetrates into the interior of the mountains. The surface is mostly covered with glacial deposits. The glacial deposits descend in terraces into the Collon-Cura valley, the edges of the granite are rounded off cup-shape. *This chain of mountains crosses the River Limay* and, in the southern Rio Negro region, forms the district which in these desert parts abounds with water and which is so much frequented by Indian hunters. Although treeless, the Cordilleras de las Angosturas is one of the most beautiful and charming districts in this region, inasmuch as there is at hand in every valley rich pasturage and good drinking water in profusion. This is the dwelling-place of the Indians (Pehuenches), driven out of Tandil by the Caciques Ankartu and Percira. Westwards of this first mountain-chain the plateau consists of volcanic tufa and lava crusts up to Collon-Cura. The elevation of this plateau is at least 800 metres, for the bottom of that very deep Collon-Cura valley lies 620 metres above sea-level.

A glance at the accompanying map shows us that the zone, 5 geogr. miles broad, lying between the Collon-Cura and the second andesitic Cordilleras which bound the lake district on the eastern side, is rich in running waters and rises in terraces. These three terraces, seen from the left bank of the Collon-Cura, stand out sharply defined from one another ; they fall, however, in point of fact, in gentle declivities and owe their origin to the diluvial glacial deposits, which descend from the foot of the Cordilleras to the Collon-Cura and Limay valleys. The Cordilleras themselves, with their pillars, columns, and craggy walls, as they appear everywhere in the andesitic region,

remained free from glacial deposits. The few vast moraines left many patches of the plateau uncovered, and piled themselves up in heaps of granite pebbles in the numerous river basins and their adjacent ravines. The northern or western slope towards the Cordilleras is rounded off in every valley and covered with glacial remains, whereas, on the opposite side, rise rugged rocks of gray tufa with alternate layers of red or black porous lava. It is still to be noticed that the adjacent angular andesitic fragments consist principally of heaped up blocks of granite, not over a foot in diameter and considerably rounded off, which finds its explanation in the fact that the granitic mountain chain from which they originate lies behind the small rock wall at the back of the Andes, and the blocks, before they fell on the ice plain spread out at the foot of the latter, must have been brought down by mountain torrents.

The River Collon-Cura is from 200 to 300 metres wide, fairly smooth and rapid, but everywhere easily navigable for boats. There are also several, admittedly fairly dangerous, fords for beasts of burden and horsemen, viz., in the neighbourhood of Enrequin (Fort Charples).

On the left bank it receives no tributaries, but several important ones from the right. The largest among these is the Chulin-huin, which takes its source from Lake Huechu-Lafquen. Joining the Collon-Cura through the mouth of an inaccessible ravine, it winds its way through a rich and fertile valley round the three-cornered point of the granitic mountain Tipi-Leuque (Cerro de los Perros). The valley is thickly inhabited by "Estancieros," mostly officers of the Roca expeditionary force. Here is situated the little frontier town of Junin de los Andes (Huirica-Melleu); then, further down, the Ranches Pehuil, Kum-lil and Kofu-rhue, commonly so named after their former inhabitants, viz.: Commandante, Conejo and Fosfori. The River Chemin-huin is navigable for timber-rafts, and all the year round many consignments of cypress and beech wood

arrive at Carmen de Patagonas from the woods to the west of Junin.

The River Chemen-huin [Chimehuin] receives two tributaries on its right bank : 1st, the small but very rapid stream Curhue (the Arroyo Collunco, shown by Rohde, does not exist; there are only at the mouth of the Curhue two dissimilar arms). 2nd, the larger and more important Quilquihue, about 50 metres wide, the broad, fertile valley of which forms properly the continuation of the Chemen-huin valley up to the interior of the Cordillera. *The elevation of the Andes passes here is very small.* According to Rohde the elevation of Junin de los Andes above sea-level is 680 metres and that of Lagoon Lolo 730 metres. The valley of Quilquihue is, just as those of Chemen-huin and Collon-Cura, valued on account of its mild climate, as sheep can remain here in the open through the winter without danger. Lagoon Loló does not lie exactly on the spot indicated by Rohde, and is also considerably larger than he makes it, viz., it extends 5 leguas (25 km.) in a N.W. to S.E. direction. It is enclosed between two granite ridges which are covered with a luxuriant wood of beeches, cypresses and reeds (tacuará). *The lagoon is only separated from the large, far-stretching lagoon Pirihueico by the single ridge of the granite main Cordillera.*

Strange to say, in the extension of the Quilquihue valley towards the west, we meet with a valley called Huechu-Ehuen (Maipú), which scarcely separated by a low hill, contains a small stream coming from the Cordillera Chapel-co, and flowing into the large Lagoon Picau-llu (Lacar) which is drained to Chili. On Rohde's map there is no trace of this valley to be seen.

*Mount Chapel-co, 2400 metres high, forms the highest point of the water-parting, as on one side Arroyo Huechu-Ehuen runs westwards, and on the other Arroyo Chapel-co joins the Quilquihue which flows eastward.* Quoted  
p. 1137.

Mount Chapel-co, as well as a narrow ridge on the left bank

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of the Quilquihue, consist of red andesite (neoplutonic). On this chain also the first cypresses are seen, which, together with robles and Tacuara-reeds, cover the steep precipices of the Huechu-Ehuen valley with the most luxuriant forest growth. In the valley of Huechu-Ehuen, the lower part of which is marshy and produces numerous clusters of apple-trees, lies the Tolderia of Caciquen Curu-Huinca (Black Thief, meaning Christian, as in the araucanian language the terms are synonymous). *Close by is an ungarrisoned fort [Maipú] completely fallen into ruins [1892].*

The next tributary of the Collon-Cura is the insignificant Quimque-metreu, further on the rapid and dangerous Caleufu, which takes its rise in Lagoon Metiquina, and lastly the very small Arroyo Caleofurhue. I was not able to visit Lagoon Metiquina; according to the reports of the Indians there, it is of elongated form, exactly in a line with the Lolo and Traful lagoons (*between two Cordilleras*). Lagoon Filohue-huen, as given by Rohde, does not appear to exist, and the Lagoon de las Manzanas is obviously a myth.

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(P. 58) The second Argentine Cordilleras (I take the Cordillera de las Angosturas as the first), presents a narrow and steep wall of trachyte, which is covered with patches of cypress forest, attains a height of over 2000 metres, strikes the River Limay close above the mouth of the Traful and then follows its right bank to the lowlands of Nahuel-Huapi.

The Rivers Traful and de las Manzanas flow between walls of black andesite, several hundred feet high, which present to the geologist the most magnificent groups of detached pillars. At the mouth itself, as well as for a distance of about a mile up the Limay, there is a variety of tufa rocks, in the forms of ruins and pillars, the like of which are only to be found in the Rocky Mountains. The mountains on the upper Limay are bare and barren and only inhabited by llamas and ostriches.

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In the deep valley the mighty and increasing Limay winds its way with a thousand twists and turns, the clear waters of which are of an emerald green colour.

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On the northern side [of Lake Nahuelhuapi] rises, at some distance, a high wooded trachyte cone, while the hills immediately on the shore consist of granite and syenite. The south-western shore is composed of rugged granite rocks which change immediately into snow-clad eminences. The compact snow-covering in midsummer is a proof that these mountains (Boquete de Perez Rosalez) must be over 2000 metres high. In the distance is to be seen the white cone of Tronador. The south-eastern shore rises quite gently to the proportionately low Patagonian tableland. The height of Nahuel-Huapi is 620 metres according to Rohde.

*The Cordillera in Patagonia is low, and the mountain passes are especially so,* as the water-parting lies mostly outside the main Cordillera in Argentine territory. There are several roads to Chile; one runs from Junin de los Andes along the shore of Lake Huechu-Lafquen and at the foot of the Volcano Quetrupillan towards the Chilean frontier-towns of Pucon and Panquin, a second through the Huechu-Echuen valley along the Lacar (Picaullu) and Pirihueico lagoons towards Valdivia, and a third over the N.W. extremity of Lake Nahuel-Huapi towards Osorno and Union. South of Nahuel-Huapi there is no pass, not even for pedestrians, though Rohde shows the long-sought highway towards Chile (Paso Bariloche) exactly at this spot. There is certainly a highway between Argentine and Chile, viz.: the Pass of Lonquimay, along which Chilean ox-carts can advance as far as Lagoon Aluminé; the stretch of ground in the Aluminé valley has however, not yet been explored: it is accessible for horsemen all the year through; it is nevertheless avoided on account of its stony bottom. However, a Chilean ox-driver gets his two-wheeled "catanga" over such roads with

Quoted  
p. 1137.

astonishing dexterity, where even horsemen have to dismount ; it only depends on the width of the road, the rest is surmountable for a Chilean ox-cart. In winter of course all roads are closed.

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(P. 59) We will now return to the Collon-Cura, in order to obtain a knowledge of its upper course, as well as of the rivers Catalin and Aluminé. The greatest mistakes in Rohde's map lie exactly in this region.

Above the mouth of the Chemenhuin the Collon-Cura flows between two dissimilar banks ; on the right hand sides till the old glacial terraces of the granite mountains of the neighbourhood of Junin fall away. A valley, with a small stream, occupies the middle. The chain of hills on the left bank of the Chemenhuin is placed by Rohde far too near the Collon-Cura ; in general the distances between isolated points in the valley of this river are shown too small. For instance, the distance between Junin de los Andes and the mouth of the Chemenhuin, in a straight line, amounts to 35 kilometres, and by road 50 kilometres, whereas according to Rohde it comes out at scarcely half this distance.

The left bank of the upper Collon-Cura consists of a rock wall, rising 300 metres above the level of the river, and only difficult of access in a few places, and which below consists of a kind of white sandstone, trachyte tufa, but above consists of an extended covering of black or red porous block lava.

Eastwards the horizon is bounded by the granitic Cordilleras de los Angosturas, the highest peak of which (approaching 1500 metres), lies opposite the Chemenhuin valley. A broad green valley, although without water, descends from this mountain westward, and terminates near the confluence of the Catalin and Aluminé in a wild ravine. From here, exactly due west, is to be perceived the magnificent cone of the Volcano Quetrupillan [Lanin], separated from us only by a low jagged

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(in late autumn) snow-covered Cordillera. In the first edition of Rohde's map, on the spot indicated, is shown, on the southern shore of Lake Pirihueico, a large volcano which Rohde named Riñihué; this is none other than Quetrupillan (Devil's-fire). In the second edition of the same map the Volcano " Riñihué " is shifted somewhat to the W., which seems to be in accordance with fact, as Quetrupillan (Rohde's Riñihué) lies outside the Cordilleras and is clearly and distinctly visible from a very great distance—namely from the neighbourhood of Cura-Cautin. As against this, on the place where Quetrupillan is marked there is absolutely no very high mountain; on the contrary it represents the lowest point of the Cordilleras. This error can hereby be explained, that both volcanoes on Rohde's map (Quetrupillan and Riñihué) would fall into the same line of sight when seen from the mountains of Catalin—i.e., that one and the same mountain is placed on two different spots, once according to Chilean maps correctly (Riñihué), but then incorrectly from personal observation (at a distance), by which means, the mountain, although lying on the other side of the higher Cordilleras, would be apparently placed on its ridge.

Deep hollows branch off from the confluence of the Aluminé and Catalin, which end above with the before-mentioned lava plateau. In the northern portion of the plateau, as far as the River Catalin, the block-lava is covered with enormous deposits of volcanic sand, upon which is a scanty growth of grass and myrtle-shrub.

The way leads downward, in a northerly direction, through a beautiful valley with groves of myrtle and beech. A picturesque cascade and a small stream enliven the neighbourhood. At the mouth of the valley stands a solitary, deserted " Rancho." The Catalin river lies before us. It is shallow, with a stony bottom, scarcely 30 metres broad and easily forded anywhere. Gynerium and myrtle-bush compose the vegetation. Both slopes of the valley rise gently; on one side towards the Pata-

gonian plateau in the region of the source of the Pichi-Picun-Leufu, on the other side towards the narrow gneiss granite chain of the Cordilleras de Catalin. Northwards, over the table-land, are to be seen the peaks of high mountains—an extension of the Cordillera de las Angosturas towards N.

The valley gradually grows narrower. Ultimately the roads divide near the frontier-post of Catalin: towards N. the road goes to Ñorquin and Chosmadal, in the other direction a path leads S., along a green, fertile valley to the foot of the Cordillera de Catalin.

In the valley of the river there are many kinds of gray clay-slate or argillite exposed, which, to infer from their analogy to those in the N.E. district, must be of the Jurassic period. For the rest there is nothing else but gneiss everywhere, with N.W.–S.E. bearings, which in places is broken into by veins of black lava.

The vegetation, becomes more and more luxuriant; large tracts are covered with beech-groves. Among these are to be found a few single apple trees and the first araucarias (*A. imbricata*), conifers or pines.

*The Cordillera de Catalin* lies in the direction of the meridian, is 10 geographical miles long and not more than 5 kilometres broad. Its highest peaks lie to the N., and attain an altitude approaching 2000 metres. The western declivity is richer in pine forests than the eastern. The principal stone is a red granite gneiss, which is split up by numerous andesitic eruptions.

Between the western declivity of the Catalin chain of mountains and the Aluminé stretches a prairie 1000 metres high, which is intersected by deep and narrow ravines. The banks of the Aluminé are, according to our map, only approachable at two places. The southern one leads through a valley commencing with a huge dam of lava, thickly overgrown with forests of apple trees, to the Pass of Malleco, where the road

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over the Volcano Villarica branches off towards Tolten and Valdivia, the second leads to the road towards the upper Bio-Bio.

The rocky sides of the hollows consist entirely of a black andesitic lava. I cannot, at this point, refrain from mentioning a peculiar meteorological phenomenon here: namely, that all day long, on the break-neck pathway which leads from the Patagonian plateau to the Aluminé valley, an extraordinarily violent current of air prevails, which, rising vertically upwards, is positively dangerous for caravans, while on the table-land, up to the edge of the pass, the air is perfectly still.

The River Aluminé is over 100 metres broad at the ford, and 1 metre (at low water level) deep, the current being strong and dangerous for beasts of burden.

Along the right-hand bank of the Aluminé, which Rohde represents as a uniform tableland, stretches a whole chain of extinct volcanoes, whose summits reach an altitude of at least 1500 metres. This series of heights is independent of the Chilean Higher Cordillera, lying several miles to westward. It lies exactly in the prolongation of the eruption fracture, which, southwards from Junin de los Andes to Lake Nahuel-Huapi, is represented by the andesitic Cordillera "de los Cypreses." The northern termination of this volcanic break reaches the region of the source of the Bio-Bio, without crossing this river. Myrtles and beeches grow in the interior of these craters, while the surrounding country is covered with widespread grass plains. The last inhabited locality on Argentine territory is the North-American estancia (dwelling) of Mr. Andrews, in Pulmari. In winter time the snow here often lies to the depth of a metre, while in the Aluminé valley, lying barely 100 metres lower, cattle can live in the open throughout the winter. The Pulmari valley is large and fertile, but of the seven lakes in the neighbourhood, as given on Rohde's map, I could only find one

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single one ; possibly there may be some further westward towards the Cordillera ; at any rate there have, most distinctly, never been any on the spots indicated by Rohde. Likewise, the number of tributaries to the right side of the Aluminé is much smaller, namely nine, and among these only three are of any importance (Malleco, Telelfun and Pulmari), the others being quite small streams, whereas Rohde, only above Pulmari, shows twelve. On the left side there are five (according to Rohde three); at the same time not one of them is on the spot indicated by Rohde. On the whole one cannot help forming the conclusion that Herr Marignac, who should have surveyed this region on behalf of Rohde, has either never been there, or had not the slightest knowledge of geographical surveys. A superficial glance at my sketch and that of Rohde's " trigonometrical survey," is sufficient to prove the accuracy of this sentence.

Even with this the number of Rohde's inaccuracies is not exhausted. For instance, he shows, on the east bank of the Aluminé between Pulmari and the upper Bio-Bio, a mountainous region, whereas it consists of a tableland with a uniform elevation of 1000 metres.

Lake Aluminé is not the source of the river of the same name, and moreover lies further eastwards than Rohde places it, and far from the Cordillera. South of this large, very picturesquely-situated lake, rises an extinct volcano, from which the Lapilli originate which are for miles so widely spread out, in a thick layer, over the surrounding country.

Numerous small rocky islands contribute much to the beauty of this mountain lake. On the north-east side the lowland is bounded by a steep, rocky wall, principally consisting of grey granite and andesite. The elevation of the lagoon above sea-level amounts to nearly 900 metres. The vegetation consists of scattered patches of pine forests, beech groves, tacuará reeds and apple-trees. During the same night, although it froze hard on the tableland lying 100 metres higher,

we experienced no frost by the lake (commencement of April). *The River Aluminé rises a couple of miles further northward, exactly in the prolongation of a tributary of the Bio-Bio flowing in the direction of the meridian ; the sources of both are probably in common and the valley corresponds to the line of great volcanic disruption to which the recent lavas in the neighbourhood owe their origin.* The volume of water in the stream does not increase as it leaves the lagoon, although it is fed from numerous sources, overgrown with pine woods, between the head of the valley in the neighbourhood of the Bio-Bio and Lagoon Aluminé. A steep precipice of the granite formation leads from the watershed, which is over 1000 metres high, to the broad and fertile valley of the upper Bio-Bio, at the point where this river takes a sharp bend from its original easterly direction to a north-westerly one, after picking up from the south a small rivulet which falls in a picturesque cascade from the granitic upper plateau.

Whether the Bio-Bio comes from a lagoon or simply flows down from the volcanic Yaimas, I do not know, but this much I can state, that the Lagoon Hualletue is not its source. This latter, a small lake lying in a beautiful region at the eastern foot of the Lonquimay Pass, forms, the same as Lagoon Aluminé, a water-basin, without affecting the volume of water of the Lonquimay, which runs out into the Bio-Bio a little below the frontier-post of the same name. Besides, the frontier-post of Lonquimay is not on the Bio-Bio, but lies in the before-mentioned valley at the foot of the volcano Lonquimay.

The vegetation on the upper Bio-Bio is rather poor, although the mountains are in most parts covered with luxuriant grass. The pine growth ceases suddenly, whereas numerous myrtles appear on the river. It is westward of Fort Lonquimay that we first enter upon the unbroken primeval or virgin pine forest of the Chilean Higher Cordillera. Up to an altitude of 1500 metres there is nothing but large beeches with small

tacuará reeds. Higher up follows the pine zone, and, still higher again, beeches of another kind. At a height of 2000 metres, between the Volcanoes Lonquimay and Yaimas, there is a sandy tract, unwooded, with isolated patches of snow, and the descent is by a hellish road (highway—camino carretero) into the Cautin valley. First beeches, then a narrow belt of pines and finally the gorgeous sub-tropical flora, consisting of innumerable evergreen trees, slender myrtles, laurel trees, beeches, etc. (Rauli, Olivio, Laurel Radal, Avelano, Yauke, etc.). The tacuará reed becomes larger and larger until it reaches the dimensions of its relative Brazilian species; finally, on emerging on to the plain we meet with gigantic creepers and tree-ferns. The character of the country throughout is subtropical.

(P. 61) According to my view there are, in South America, obviously two large mountain systems to be distinguished: one, old primary or palaeozoic, with a N.W. to S.E. bearing, which,—with the exception of the older portions of the Andes, the coast Cordillera and the whole of the so-called spurs of the Andes in the Argentine pampa, belongs to Bolivia, Paraguay and Brazil; and a more recent one, with a bearing towards the meridian, which has predominated from the Triassic or Secondary period until to-day. Within the more recent system we can distinguish three periods of eruption: 1. augite porphyry and stratified porphyry (Jurassic or Oolitic to Cretaceous); 2. basalt (chalk); and 3. andesite (Tertiary and Post-tertiary). The third period of eruption is solely confined to the Andes. In the south are two eruptional divisions of andesitic lava; one runs on the western declivity of the superior Cordillera and stretches to the frontier of Peru, the second lies on the east side of the same Cordillera and stretches northward only as far as the source of the Bio-Bio, southwardly probably to the River Gallegos, but certainly extending to Lake Nahuel-Huapi.

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### SEÑOR GUILLERMO COX ON THE CORDILLERAS AROUND LAKE LACAR.

[Translation from Extracts of "Viaje a las rejiones setentrionales de la Patagonia," in "*Anales de la Universidad de Chile*," vol. xxiii. 1862-1863.]

(Quoted on pages 1141 and 1145 of the Statement.)

#### INTRODUCTION.

(P. 3) THE gradual descent of the culminating line of the Chilean ridge, from the high crests of Mount Aconcagua to the rock of Diego Ramirez which seems to be the southern boundary of the vast system of the Andes ; the ramification of the latter as it reaches the Straits of Magellan, which is the most notable feature hitherto discovered in that mighty and continuous upheaval of the terrestrial globe ; the arms of the sea which penetrate into the Cordillera from west to east, from the latitude of the Chacao Channel as far as the Straits mentioned ; and the narratives, more or less in accord, of persons dealing in timber on the mainland of the Province of Chiloé, from which *the existence of deep gaps in the Cordillera is deduced, which facilitates a passage without ascent, to the Argentine provinces as well as to that transcordilleran part of Chile hitherto known by the name of eastern Chile or Patagonia,*—caused me to entertain the hope that a careful exploration of those unknown localities might perhaps result in palpable benefits to commerce and to science. Guided by this idea, I paid special attention to collecting as many data as it was possible for me to obtain on such

an important subject ; I consulted the narratives of all the travellers who had written upon the Patagonian regions ; I collected with care the data given me by old and respected inhabitants of Chiloé ; and I also made some partial expeditions, the result of which, although unfortunate, for reasons to which it is needless to refer here, far from discouraging me or causing me to abandon my first idea, simply strengthened my determination.

In fact, the easy crossing of the Andes along 41° South Latitude was already a well-known fact ; it was also known that the mighty River Limay, which at present gives its name to the River Carmen or Negro, took its rise from the vast lake of Nahuel-huapi, as I intimated to the Government in a previous epoch, and finally, that the distinguished pilot Villarino, starting from the Atlantic, had gone up-stream in a westerly direction for 600 miles ; and, as its general course, from its mouth as far as the western part of Lake Nahuel-huapi, was 725 miles, it was evident that a route of 125 miles by land or by the river would be sufficient to place Chile in easy communication with the waters of the Atlantic,—avoiding in this manner the arduous crossing of the Andes, the dangers of the Cape, and the delays consequent on such a lengthy journey. The causes which compelled Villarino to desist from his enterprise were due to the impracticable idea he had of reaching by that route as far as Valdivia ; for, if that intrepid traveller, instead of going northwards, had taken his course by the southern branch of the river, we could have counted upon knowledge which we still lacked ; but it was not so. Therefore, a journey from west to east, following the course of the river from its main source, which is Lake Nahuel-huapi, situated only at three days' journey from Puerto Montt by a very accessible road, seemed at least destined to diminish the distance by land between the Pacific and the Atlantic. I made this observation to your Government, and, my idea having received a hearty

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acknowledgment, I started on my journey, a narrative of which I now publish, with no other ambition than to be useful to humanity and to my country.

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(P. 169) The Lifén Gap, or Rancho Gap, as it is called by some, is a depression of the principal line of the Cordillera. The ridge of Lipela is the true pass ; the Follil reaches as far as the foot of it, and then turns to the right. The path lies on the border of a perpendicular cliff, sometimes between high rocks, and at other times enclosed between two walls of earth,—the bed of a veritable torrent in winter : to cross it, it is necessary to abandon the stirrups and cross one's legs over the horse's neck ; any baggage has to be carried over on the men's shoulders ; this operation is repeated at each of these narrow places and at other points where the declivity is very steep.

Quoted  
p. 1141.

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(P. 170) The plateau of Inihualhue is circular, a short grass covers the ground, across which a rivulet flows gently. Near by, on the right, a great mountain with snow on its summits was to be seen ; we halted to rest our horses and arrange our packs. . . . The height of the summit, as given by the aneroid barometer I carried with me, is 922 metres.

The horses and baggage being ready, we commenced to descend again ; the descent was not so steep as at the beginning of the Lipela ridge. We skirted the ridge on the right of a valley stretching from west to east, through which flows the Queñi stream, whose valley ends at the lake of the same name, and which, after, deviating to the north-east, joins Lake Laca.

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(P. 173) *February 20.*—It rained all night ; naturally it was to be supposed that we should rise early ; we were up at dawn. With daybreak the rain ceased ; after having taken our usual breakfast of roast mutton, we started on the march along the Queñi stream. The declivity is gentle ; small pam-

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pas, covered with tall grass and with the same yellow flowers we had noticed at Chihihue, alternated with the forest along the road we followed. Near the ridge, on the two slopes of the Cordillera, the flora is almost the same. The Cordillera on the left followed this valley without interruption as far as Lake Queñi, but, opposite the latter, the Cordillera on the right has a perceptible depression and forms a gap. It must be reckoned a distance of twenty-eight kilometres from Inigualhue to Lake Queñi. Shortly before reaching it, we crossed the stream which, there, is almost a river.

Lake Queñi, 562 metres above the level of the sea, is of a triangular shape ; each of its sides is about two kilometres in length. It empties its waters into Lake Lacar through the River Chachim. We avoided a difficult ascent, by following its shores for some time ; our horses were up to their bellies in water. We again climbed the slope and marched to the north-east for some 12 kilometres ; the valley ends by deviating towards Lake Lacar. Going over swampy ground we reached the ferry ; shortly before we had crossed a rivulet, the name of which our men could not give us, but which flows into the Chachil. This "ferry" was not the same as that we had passed when we were returning from Paillacan. This narrow is called Huahum ; it is some eight kilometres west of another one, and between the two the River Chachim joins the Lake Lacar.

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(P. 175) The ferry . . . is an arm of the river 80 *metres wide*, and from 7 to 8 feet deep, and seemed to contain quite a number of fish, judging by the leaps which some of them were making on the surface of the water ; this arm, deviating to the north-east, flows into Lake Pirihoaico, the waters of which are discharged into Lake Riñihué, the latter emptying itself into the Pacific by means of the River Calle-Calle. We shall deal with it at more length when giving a general description of Lake Lacar.

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(P. 176) *February 21st.*— . . . At last we skirted *the Cordillera which serves as a northern barrier to Lake Lacar*, and crossed a rivulet. (Quoted  
p. 1142.)

*This ridge is a deviation to the east of the Central Cordillera ; it is of moderate height ; at some places covered with forests, at others the crests appear bare, as a consequence of the floods produced by the thaw, which have swept all before them. There are only trunks of trees which seem like candles placed on an altar. We marched almost at the same distance from the lake and the crest, getting sometimes nearer, and sometimes farther from the former. We found, now and then, small plains where bulrushes were to be seen in great numbers, which made us think that these small plains must be lagoons in winter. Descending to a depression, we found two lagoons called Curilaufquen, which means, in the Chilean tongue, black lakes. A few duck and water-fowl swam on the surface. At last we reached the foot of Mount Trumpul, a mountain of a remarkable shape. From the opposite side of the lake its wall is perpendicular, it rises from the meadows and is some 150 feet high ; on the other side it has the same declivity as the [surrounding ?] ground, some 25°.*

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(P. 175) Beyond the house of José Vera, Lake Lacar ends ; we may now give a general description of it.

*At this point the line of water-parting, abandoning its north to south direction, deviates about 80 kilometres to the east, becoming depressed at the same time and enclosing Lake Lacar which—situated in appearance on the other side of the Cordillera—discharges its waters into the Pacific.* (Quoted  
p. 1142.)

The lake lies 530 metres above the level of the sea, and extends from east to west. It commences with considerable width, about 6 kilometres. The northern ridge of the Queñi valley borders it to the south as far as the River Chachim, where it abuts. From this point the southern ridge of the

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same valley draws nearer to the lake and borders it to the east, sinking almost completely. The peak Culaquina is the most notable of the mountains to the south; Mount Trumpul, among those to the north. The northern ridge stretches at some distance from the shores of the lake, leaving an extensive plain where the Indians have their crops and pastures: the properties of Huentrupan and Hilario are to be found there. The Spaniards had constructed some forts on those same shores, knowing very well that, once the gap was passed, there was no other way of reaching the pampas but by the northern shore. At some 32 kilometres from its head Lake Lacar narrows and forms the ferry of Nontué, which is 40 metres wide; it then broadens again and forms another sheet of water 8 kilometres in extent, where the River Chachim, the outlet of the Queñi flows. It again narrows at the ferry of Huahum, some 80 metres wide, and, continuing with the same width for some 20 kilometres, joins Lake Pirihuaico. This latter lake extends from east to west for some 30 kilometres; it is narrow, not attaining 4 kilometres in its widest part; its outlet is the River Callitue, which joins the outlets of Lakes Panguipulli and Calafquen situated to the north of this parallel on the western side of the Cordillera; it then takes the name of the River Shoshuenco and discharges into Lake Riñihué. This lake lies north-west to south-east for some 20 kilometres, with a width of from 2 to 5 kilometres. Its outlet is the River Valdivia.

We thus see a lake, the Lacar, which *at first sight seems to be situated on the other side of the line of water-parting, and nevertheless discharges its waters into the Pacific Ocean*; its eastern extremity is not more than 15 to 20 kilometres distant from the great tributaries to the Atlantic.

(Quoted  
p. 1142.)

Whoever should pass the Cordillera without noticing such a singular case, would be still more surprised were he to hear the Indians of Huentrupan relate that, an Indian from Valdivia, called Paulino, having crossed to the other side for trading

purposes, the winter snows closed the pass over the gap ; being pressed by certain circumstances, he joined two other of his countrymen who were in the same predicament, and went on horseback as far as Lake Pirihoaico ; there they constructed a canoe, and, by the River Callitue, they reached Lake Riñihué, exciting the wonder of the inhabitants of Valdivia by this journey, which revealed so many mysteries respecting the natural formation of those regions. At first it was believed to be a fable, but afterwards the truth of the fact was verified. Don Atanasio Guarda told me that he himself had lent horses to the Indian when he disembarked, to enable him to reach Futronhue, whereof he was a native.

\* \* \* \* \*

(P. 181) *February 23.* . . . The valley at the entrance of which Trureupan and Huentrupan live, is from two to three miles wide at its head ; it is confined on the north by a chain of mountains covered with forests, *a ramification of the northern barrier of Lake Lacar*, and on the south, by another chain of bare and arid mountains, *a ramification of the southern barrier*. These southern mountains have a peculiar aspect ; from the sandy ground which constitutes them, there rise at intervals basaltic vertical prisms in the shape of walls, towering one above another, and giving these hills the aspect of real fortifications with bastions : small green patches represent the loopholes, especially one which is marked on the map, behind the huts of Trureupan, which is a very notable one ; I have named it Cerro de la Fortaleza [Chapelco]. At the end of eight or ten kilometres the valley widens very much to end in swampy plains, and on the left it joins another valley which stretches towards the north. As the valley along which we marched is covered with water in winter by the floods of the streams, it is not traversed at its bottom, but along the slopes of the mountains on the south ; and in summer, by force of habit, the same road is used. We continued by the path which meanders capri-

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ciously along the slopes of the hills, sometimes higher and sometimes lower, meeting occasionally with pine forests.

\* \* \* \* \*

(P. 183) We entered a valley, in which flows a rivulet of unknown name, the banks of which are covered with dense apple orchards. The valley stretches as far as a mountain, whence a beautiful panorama may be seen. It is very extensive; facing the north, we saw, on our left, the central crest of the Cordillera, at the extremity of which, a little outside its general direction and overtopping the neighbouring mountains with its snow-capped summit, Volcano Lagnin [Lanin], or Piñones, rises. At the foot of these mountains the valley of the Huentrupan is situated.

At the place situated perpendicularly below the crest, where we believed the huts of Huen were to be found, we could see a small body of water which, owing to its position in regard to ourselves, we conjectured to be a portion of Lake Lacar; but Motoco, to whom we spoke about it, told us that it was another lake called Quilquihué, whence the Trepelco rises, a river which flows into the Pihualcura, an affluent of the Chimehuin. *After having crossed this ridge*, we reached a plateau over which we marched for some miles, at the end of which we descended into a quebrada. Above this quebrada basaltic prisms may be seen. At the bottom of the quebrada the valley of Yafi-yafi commenced. Many of the streams we had found full of water on our last journey were now dry. The valley is bordered on the right and left by the hills which connect it with the great plateau that may be seen on the map; basaltic prisms on the summit of the hills seem masonry walls constructed to support the earth of the plateau. We crossed the river two or three times; finally, at night, seeing a herd of horses at some distance, we halted before reaching them, and decided to pass the night at this spot.

\* \* \* \* \*

## GEOGRAPHY.

(P. 439) The southern Cordillera is notably lower than the northern one, and its eastern as well as western branches hardly deserve this name when compared to the mighty body from which they derive their origin. Hence the several low, and more or less accessible, gaps to be met with from the sources of the Tolten as far as the parallel of Reloncaví Inlet. The same flatness of this ground and its broad plateau explain the presence of Lakes Nahuelhuapi on the east and Todos los Santos on the west. The series of lakes which may be seen between Villarica and Llanquihue, including this, are only bordered, on the side of the plain, by heights almost imperceptible at first sight. Their outlets, which determine the basins of which I shall speak presently, far from presenting the aspect of the torrential rivers of the north, are, as a general rule, tranquil, and lend themselves to boat navigation for long and frequent stretches.

\* \* \* \* \*

(P. 440) The long valley which leads to the Ranco Gap is formed by two branches of slight elevation that begin at Lake Ranco, sometimes widening into pretty plains, or narrowing so as to give place to one of the tributaries of Lake Ranco. The greatest width is at Arsquilhue, where the plains have some extension; from Maihue these branches form a gorge where the torrent Foyil runs down, and abut on the gap, at the Lipela ridge. They are prolonged to the other side, forming the Queñi valley. The northern ridge abuts on Lake Lacar, where the River Chachim, the outlet of the Queñi lake, enters it. The southern ridge approaches the lake, forms a pronounced bend in Fortress hill [Chapelco], *surrounds the lake, becoming depressed*, detaches a branch to the north, which terminates at the Volcano Lagnin [Lanin], and trends westwards, enclosing the waters of Lakes Lacar, Pirehueico, etc.

Quoted  
p. 1142.

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Therefore, *this ridge, which surrounds Lake Lacar, may be considered as a great inflection that the central line of the Cordillera makes to the east* of some 20 leagues' radius. To the north of this lake the Central Cordillera again takes its north to south direction.

\* \* \* \* \*

(P. 440) The Rio Calle-Calle has its origin in Lake Lacar, <sup>Quoted p. 1143.</sup> formed by the waters and snow of the Cordillera. This lake communicates with that of Pirehueico, which discharges its waters through the Rio Callitue which joins the outlets of Lakes Panguipulli and Calaufquen; it then takes the name of Rio Shoshuenco and empties itself into Lake Riñihue. The outlet of this lake runs to the west, and is called Rio de los Ciruelos as far as the mission of Quinchilca, where it is joined by the river of the same name; and, further on, by the Coli-leufu which also comes from the south; and near the mountain Quita-Calzon it is called Calle-Calle, a name which it preserves as far as Valdivia, where it is joined by the Rivers Cruces, Futa, Angachilla and others; in its whole course it receives over fifteen streams and rivers.

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### THE COASTS OF THE INLETS ON THE 52ND PARALLEL AND ADJOINING LANDS ARE DISCOVERED AND TAKEN POSSESSION OF BY CHILE IN 1558.

[Translation of Extracts from "Relacion de Viaje al Estrecho," written by Juan Ladrillero, printed in "*Anuario Hidrográfico de la Marina de Chile*," vol. vi. (with annotations), pp. 479-486.]

(Quoted on page 1535 of the Statement.)

THERE runs southward another channel between the said island and the continent for ten leagues,<sup>79</sup>—where the middle of said leagues lies E. to W. from the port of San Lazaro, as aforesaid, and twelve leagues to the N.W. of the extremity of the Bay de San Lazaro, and eighteen from its northern extremity,—and I entered by the said channel in the belief that it was the Strait, as it lies by 52°, as stated in Magellanes' account.

We sailed by the said channel S.½S.E. and ten leagues to the S.W. until we came to an island<sup>80</sup> of six leagues perimeter; and the said channel was one and a half and two leagues wide. To the S.E. of said island, there lies a smaller one,<sup>81</sup> where the channel widens to three leagues, but before widening the channel is so narrow that it is scarcely a bowshot's distance, and there

<sup>79</sup> Canal Sarmiento.

<sup>80</sup> Carrington Island, situated at the southern extremity of Canal Sarmiento.

<sup>81</sup> Newton Island, between which and the continent runs Collingwood Channel which widens in this part.

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are some islets before it widens.<sup>82</sup> Where the channel widens to three leagues, two other channels join with it from the N.<sup>83</sup> the one trending to the N.N.W. within the ten leagues.

From this island, just mentioned, the channel runs seven leagues to the S.W.½S. to another island,<sup>84</sup> and hence the channel turns to the N.N.E. for four leagues where it branches into two channels, the one running to the N. between some high mountains,<sup>85</sup> and the other to the E. and we followed it for five leagues with the same bearing to the E., and towards the middle of this five leagues, another channel<sup>86</sup> running to the N.E. comes by the N.

After sailing these five leagues we saw a narrow in the channel not wider than a bowshot's distance,<sup>87</sup> and very deep, with stronger currents than a mill-stream, which became narrowed to half a bowshot's distance, after which the channel widened to three leagues; and on the S.E. a channel,<sup>88</sup> of one and a half leagues, runs to the W.S.W. Another, three leagues wide, ran from the N. towards the S.E. On the ridge of a mountain range there was a bell-shaped rock, and at the foot of it a port<sup>89</sup> sheltered from every wind except the N.E., and in the middle of the said channel is an island<sup>90</sup>; it runs to the N. for two leagues, where the channel widens; and five leagues further there is an island,<sup>91</sup> and the bay is five leagues wide, and in this part there are four channels, the first of which is towards the S.W. (?), and it runs to the E.S.E., and we sailed by it; it ran six leagues to the E.S.E. as far as a point of sand where

<sup>82</sup> South-western extremity of Carrington Island.

<sup>83</sup> Both channels are shown on the chart, but left nameless.

<sup>84</sup> Union Channel and the Island of Ancon sin Salida.

<sup>85</sup> Canal de las Montanes.

<sup>86</sup> These Channels are nameless, but may be seen on the chart as the explorer has been very accurate in every detail of this part.

<sup>87</sup> Kirke Narrow.      <sup>88</sup> Little Hope Inlet.

<sup>89</sup> It is easy to see on the chart which is the port to which Ladrillero refers.

<sup>90</sup> It is marked on the chart.

<sup>91</sup> Focus Island, being so named by Lieutenant Skyring on account of being the meeting point of numerous channels.

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many whirlwinds blew, and we sailed five leagues hence to the S.S.E., and at this place I TOOK POSSESSION, being in 53° and more; and from WHERE I TOOK POSSESSION we saw that the channel followed south for another five leagues, where it seemed to end, and so we turned back,<sup>92</sup> and seeing that it was not the Strait, we returned to *Reyes* Island [Focus Id.],<sup>93</sup> which was three leagues from the mouth of the channel, and I called it so because we reached it on the Epiphany (January 6th, 1588); and we sailed five leagues to the N.E. to the E., where we came across another channel and followed it, the ground being of good appearance and deer numerous, and where wheat might be sown, as well as corn and other grain; and from here the Cordillera ends, and it was only plains towards the E.N.E. as far as the North Sea, as it seemed;<sup>94</sup> and from the summit of a ridge we saw a channel of which over fifteen leagues was to be seen and which stretched to the E.N.E.,<sup>95</sup> and it was more than one and a half leagues wide. We sailed on our search by the other channel I have mentioned, by which we ran three leagues to the N.W. a quarter to the N. from *Venados* Point, and from here it runs five leagues to the north, after

<sup>92</sup> Obstruction Sound, through which Ladrillero sailed.

<sup>93</sup> At the junction of the channels and in front of the island lies Pascua Bay, so called by Lieutenant Skyring, 270 years after Ladrillero's expedition. In both cases the origin of the name was the same, viz.: the Christian holiday recorded by the former was the "Pascua Florida," and by the latter the "Pascua de los Reyes" (Epiphany), these being the eve of their arrival at said places.

<sup>94</sup> The course of time, with the progress of geography, has proved Ladrillero to be right when he placed the southern extremity of the mountain chain which forms the Cordillera de los Andes and the beginning of the extensive plains reaching the Atlantic. The difference of climate is also accurate; the temperature being more like that of northern regions classified as temperate. The deer were not chamois as the Spaniards supposed, but were "Huemules" (*Cervus chilensis*), which, like all their race, live equally well in forests and high lands or in marshes or swamps, as happens in the Diana Plains, which Lieutenant J. T. Rogers of the Chilean Navy thinks ought to be called Diana Swamps on account of their being impassable. In the years 1878-79 this officer explored by land the eastern end of the channels visited by Ladrillero.

<sup>95</sup> There being no bearing for this channel, we assume it to lie S., and suppose it to be Skyring Water on account of the distance.

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which five leagues it turns eight leagues more to the N.W. and one league to the N. where we found a river of great volume [*Rio Serrano ?*], which issued from between snowy mountains ; and seeing that it was not that which we were in search of, though the channel was still one league and one and a half leagues wide, we turned back and passed by the main channel,<sup>96</sup> where we found another river of fresh water of a very strong current and between great snowy ranges. We turned back and followed another channel that we had left before after following it four leagues from Venados Point, and this also came to an end after sailing four leagues to the N.E.,<sup>97</sup> and seeing that we did not find the Strait, nor any issue to the channel, which seemed to run towards the plain ground I have mentioned, being only four leagues therefrom, we turned back to Venados Point, where within an hour the two crossbow men killed fifteen deer, and we went to Reyes Island, crossing the channel which was six leagues wide, where we saw two more channels, and followed one of them<sup>98</sup> thinking to find a pass, by which we sailed to the N.E. and N.N.E. for eighteen leagues where it ended in a very deep bay one league wide.

All this land is the end of the mountains from Venados Point and Reyes Island, and it is all flat ground towards the North Sea (Atlantic Ocean) and ground of good appearance ; and towards the South Sea, very great snowy mountains of rock and forests of oak and cypress trees, and red timber and white timber and yellow timber, all excellent fuel, and make a very good fire, the soil being all rock ; and I take that to be the reason why it is so good to burn, and the ground being so good and very cold, the natives here need it greatly, as they go naked.<sup>99</sup>

<sup>96</sup> Last Hope Inlet, the waters of which are rendered fresh by the rivers that it receives at its extremity, where a beautiful glacier also exists.

<sup>97</sup> Worsley Sound.

<sup>98</sup> Canal de las Montanas, already mentioned.

<sup>99</sup> During the centuries that elapsed from Pascua de Reyes de 1558 to " Pascua de Resurreccion " Easter Day, in 1830, there was no attempt to find

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The people of this land are of a pleasant disposition ; the men and women small, of a goodly figure and body, as it seems. They are clothed in deer skins tied at the throat, and extending down as far as the knees. . . . They eat their meat and shell-fish raw, and if sometimes they roast it, it is very little, so as hardly to warm it. They have no houses and no hamlets. They have canoes made of cypress bark and of other trees. In these they convey their women and friends and children, and with some rods and barks that they have in their canoes when they settle in a place, they build a small hut where they are sheltered from the rain and snow. We did not see that they had any weapons, though we took from them some women and boys, and set the women free. The latter are very small. These people are of a kindly aspect, and the boys more so than the women.<sup>100</sup>

This land lies by 52°. The weather prevailing in this Bay of San Lázaro is the same as in the other bay near the sea in the month of December and January ; north winds that blew for twenty-four hours very strongly ; thence they turned to blow from the sea, and so for three or four days, and they turned back to the north and there is much wind, and it always rains. When it blows from the north it is very dark and overcast, and when it blows from the west and south it is clearer and it does not rain so much. When the west wind ceases the horizon gets clear towards the west and the south. In this said channel and in Reyes Island and at Venados Point, it is usual to

a passage towards the Magellanes Straits by any of the channels through which Juan Ladrillero had sailed. As a proof of the degree of confidence which this explorer inspires, in order to allow a comparison to be made, we transcribe some lines of the descriptions made by Skyring and Kirke, the British officers who made an exact survey of these intricate channels.

(Quotation follows.)

The British explorer sailed, one by one, through all the channels which congregate round Focus Island, and to the survey of every one of them may be applied what Lieutenant Skyring said of Obstruction Channel.

(Another quotation.)

<sup>100</sup> (Note about the Indians.)

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have a clear horizon towards the North Sea. The sun shines . . . (?). For the rest of the time when the winds from the north and west blow, going through the Cordillera towards the South Sea, there is rain and darkness, and sometimes winds from the S.S.E. and E., though rarely. When they blow they are clear, but this happens in January.<sup>101</sup>

<sup>101</sup> The information contained in Ladrillero's description as refers to the inhabitants, soil, animals and climate, is in accordance with that given by Captain Parker King in his lecture before the Royal Geographical Society. Mr. Bynoe, referring to the land which surrounds Pascua Bay, says that "it is very similar to the prospect of the English parks ; beautiful clusters of trees, straight and high, separated from one another by spacious lawns covered with grass."

## No. 138.

### CHILE'S OFFICIAL DEFINITION, IN 1888, OF THE BOUNDARY BY THE CONTINENTAL DIVIDE IN THE REGION OF THE INLETS.

[From the Records of the Chilean Congress.]

(Quoted on page 1553 of the Statement.)

*Instructions to Captain Serrano for a survey in 52°.*

SANTIAGO, December 24, 1888.

THE Government wish to acquire a precise and detailed knowledge of *the Andean region* in the neighbourhood of the 52nd parallel of south latitude ; and, as such region is still almost unknown, have decided to commission you to make a detailed investigation of it in conformity with the instructions herein stated :—

I. In the first place you will study the *divortium aquarum* of the Andes, from its intersection with the 52nd parallel towards the north, as far as the termination of the sea-arm known as Last Hope Inlet [Estero de la Última Esperanza] ; you will construct a map of this region and will trace on it the line which separates us from the Argentine Republic,—which line, in conformity with the Treaty of July 23, 1881, must pass between the streams (*vertientes*) which flow towards one side and the other.

Quoted  
p. 1553.

To carry out this work, you will ascend by the rivers which disembody into the Pacific, and survey the sources of those

which flow towards the Atlantic, determine their hydrographical basins and the geographical co-ordinance of their sources by means of astronomical observations or by triangulations, and measure the heights of the principal points of the anticlinal line and more remarkable surrounding mountains.

II. You will draw on the map the principal cordons of the Cordillera with their different ramifications, stating their height, and supplement the said map with the photographic views most conducive to the formation of an accurate idea of the configuration of those regions.

III. You will make a hydrographical map of the outline of the coast of the neighbouring channels, connecting it with the works which may be carried out on land.

To make this map you may commission the Commander of the *Magallanes*, giving him, for that purpose, the necessary instructions.

IV. You will take photographic views of the mountain ranges, *of the various places through which the anticlinal line passes*, and in general, of all those regions which you may consider advisable for the better illustration of the map.

V. You will collect all these various works under one cover, and deliver the same at this Ministry together with an explanatory report.

To carry out this work the gunboat *Magallanes* has been supplied with all the materials that have been considered necessary, and her Commander has been instructed to proceed to Lota to coal and place himself under your orders.

The Commander of the *Toro*, at present in Punta Arenas, has been instructed also to place himself under your orders, to accompany you to the ground of the operations and to give you all the help that may be necessary. The Governor of Punta Arenas has also orders to help you in whatever manner may be possible, and to place at your disposal the horses under his charge for the demarcation of our boundaries.

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This Ministry has deemed it advisable to appoint as your adjutants, Major Roberto Goñi, Second Lieutenant of the Navy, Don Roberto Maldonado, Midshipman Alejandro Benitez, and Señores Carlos Soza and Antonio Polloni, all of whom you will find on board the *Magallanes*.

As a great portion of the work you will have charge of will have to be performed through virgin forests, mostly impenetrable, you are hereby authorized to call at Ancud to engage fifteen woodmen, paying each of them wages not exceeding 30 pesos a month, and as much as 125 pesos to their foreman. You are hereby also authorized to engage the necessary guides at Punta Arenas.

Once the works are completed, you may return to this capital on board the *Magallanes*, or on one of the mail steamers, as you may think advisable ; and, in this latter case, you will give instructions to the Commander of the *Magallanes* to return to the Department, touching first at Ancud in order to land there the woodmen engaged for the expedition.

The Government trust that you, with the aid of all the materials placed at your disposal and employing on your part all the energy necessary, will carry to a satisfactory termination the work entrusted to you, notwithstanding the difficulties which you will have to overcome.

I am, etc.

DEMETRIO LASTARRIA.

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## No. 139.

### DR. OTTO NORDENSKJÖLD ON THE BOUNDARY QUESTION NEAR THE 52ND PARALLEL.

[Translation of an Extract from "*Fran Eldslandet*," Stockholm, 1898, p. 234.]

(Quoted on page 1560 of the Statement.)

\* \* \* \* \*

IN order to arrive at an agreement, Argentina availed herself of the difficult position of Chile during the war against Peru and Bolivia, and the Treaty of 1881 was made. Chile got the Magellan territories south of 52° south lat.; only those parts of the Land of Fire which lay to the east of the Straits were to belong to Argentina. All the rest of the country was divided between the two States, so that the chain of the Cordilleras should form the boundary line here, as it does in the north; and a little foresight and goodwill have now put an end to all this frontier question once for all.

But such was not to be the case. Whether it was caused by the ignorance of those who had to deal with the matter, or whether, as seems more probable, an ambiguous contract was drawn up on purpose to avoid too lengthy deliberations,—at all events, as the Treaty is worded, it cannot be adhered to. "The frontier between Chile and Argentina is formed by the Andean Cordilleras, and the boundary line shall follow their highest summits, which form the watershed between the oceans," says the first article; but, at that time, it ought to have been well known that it is not the highest summits which form the watershed, that the latter generally follows a much lower range

of mountains, lying more to the east, and that, between this lower range and the chain of the Andes proper, extend wide and often fertile valleys. These valleys, often very valuable, which have only become somewhat known of very recent years, form the most important point of dispute between Chile and Argentina.

It is difficult to express an opinion about the question, which of the two States is nearer the right in this matter. I do not know, from personal experience, the northern parts of the frontier-districts in question, but it seems to me, that the literal interpretation of the Treaty would there be more favourable to Chile, because *the absolute height itself seems to be a less important characteristic than the especially mentioned characteristic of being a water-parting*, so long as one keeps within the Cordilleras proper. Much more intricate does the question become in the southernmost parts of the continent, in the districts within the latitude of the Ultima Esperanza, which I explored during last summer. The chain of the Cordilleras is quite broken off in these districts, and the watershed follows almost imperceptible hills of Patagonian character. One asks oneself whether the Treaty does not refer to the watershed as a more important feature than the absolute height ; but, on the other hand, it puts as the most important condition, that the frontier shall follow the Cordilleras, which in this case would mean that it should go as near to the coast as possible.

Quoted  
p. 1560.

As the question is so difficult to solve, there seem to exist only three possible means of arriving at an interpretation : war, or an entirely new treaty agreed upon in an amicable manner, or to intrust the question to the arbitration of a friendly power. The last alternative was decided upon in the early part of the year 1896 ; and the joy of Chile was great,—for, notwithstanding her superior force, at least at sea, she had always tried to avoid war,—when an agreement had been made to intrust the disputed questions to the arbitration of England.



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