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The Patagonian Andes: Discussion

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Argentine society—from President and people—that it is quite impossible for me to endorse such a verdict. I do not believe that the English as a nation are unpopular, whatever may be the case with individuals. I think that we are trusted in South America, on both sides of the Andes. Certain political events which transpired whilst in that country fortunately tended to establish a confidence in England's political honesty which had perhaps been a little shaken by the Boer war. I am no politician, but I have little hesitation in attributing the successful attainment of the boundary settlement to the firmness and statesmanship of the Presidents of the two Republics, who were unanimous in their efforts to secure peace and good-will between the two countries, and spared no pains to assure me of their support in the arrangements which I proposed for securing a delimitation rapidly and effectively. The prestige which distinguishes General Roca as a soldier, no less than his great ability as an administrator, has already secured for him the unusual honour of a double period of presidency. Probably no country in the world's history has made such strides in material advancement as Argentina under President Roca's administration. To President Riesco of Chile I owe an equal debt of gratitude for his personal kindness and support throughout my investigations. Failure was impossible with such practical assistance as he gave me. I know no more delightful city to visit than Buenos Aires; I know no more beautiful country than the *entourage* of Santiago. If I had time to speak of the future, of the magnificent field for agricultural and commercial development afforded by Argentina, or of the yet latent possibilities that lie unexploited in the heart of Chile, I should like to speak of these southern states as a whole and undivided, as supplementary one to the other, as combined in an all-peaceful enterprise to establish a new and powerful factor in the development of the world of nations.

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Before the reading of the paper, the CHAIRMAN (Colonel G. E. CHURCH, Vice-President) said: It is our good fortune to-night to have with us our colleague Sir Thomas Holdich, who has been doing work in South America eminently conducive to the peace of that part of the world, and we also feel that this evening we are to have a paper read by a gentleman thoroughly able in all that appertains to the knowledge of orography, of wide experience in North-West India, and now in Patagonia, a region of the world which in my youth I used to regard as the dumping-ground for the surplus manufactures of Nature. I call upon Sir Thomas to read his paper.

After the reading of the paper, the following discussion took place:—

Dr. J. W. EVANS: I have very little to add to the magnificent paper we have heard to-night. I am sure the Society ought to be warmly congratulated on having such a paper before it, especially for the interesting and graphic description we have had of this magnificent meridional valley which runs through the whole mountain region of Patagonia from north to south to the east of the main heights. This region has only been, so to speak, disclosed to the outside world during the last

ten or fifteen years, and yet, unlike most newly discovered regions at the present day, is neither a sandy desert, an arctic waste, nor a tropical forest, but a country possessing a temperate climate, and having perhaps the most magnificent scenery in the world; a country, too, of which there is every reason to suppose that one day—not perhaps very far distant—it may be populated by as sturdy and intellectual a race as inhabits any part of Europe. There is, perhaps, one small point on which I may comment, Sir Thomas Holdich distinguished between the regularity of the Andes in the other part of the chain and the tremendous amount of variation in the direction of the ranges and other irregularities which occur in Patagonia. I think that the regularity which most people associate with the Andes in other regions exists rather in the maps than in Nature. The more we know of the Andes, especially in the state of Ecuador, the south of Colombia, and the north of Peru, and indeed the eastern Andes throughout the greater part of Peru, the more we realize that in many places, instead of being a regular chain, they are a system of peaks in which it is very difficult to find any succession at all. I think we may especially congratulate ourselves that the lecture we have had to-night is one by a traveller who has perhaps seen more of the great mountain masses of Asia in the Himalayas and Afghanistan than any other man in the world. He has now taken up a new ground for his explorations, and nothing is more interesting than to hear the impressions of a man who has had such wide experience. I can only hope that some day circumstances may direct Sir Thomas's attention further to the north to the great plateaus high above the sea, where the conditions are similar to those with which he has been so long acquainted in Asia. There, too, there are frontiers to be delimited, and I think the states on either side of these undetermined frontiers will be fortunate indeed if they secure the services of Sir Thomas Holdich to mark them out. Then once more will he at the same time do an inestimable service, not only to the cause of geographical science, but to that of peace and international harmony and concord.

The CHAIRMAN: In connection with Patagonia, it would be ungracious to forget the name of Charles Darwin. He it was who first attracted the marked attention of the scientific world to the wonderful geological changes which had taken place in that remote portion of the Earth, and I think I am justified in calling upon Major Darwin to-night to give us a few words regarding what has been done there by his father.

Major DARWIN: I must thank you for your very kind allusions to my father's work in South America. When he went there he was quite a young man, and really an inexperienced man in geographical work, and I cannot help feeling it is a satisfaction to learn from Sir Thomas Holdich that, notwithstanding all the years that have passed since he did that work, his views are still generally accepted. I am certainly not in a position to discuss those views, and I would only like to say that I am quite sure that my father would have been perfectly ready to abandon those views if it had been proved by subsequent explorers that other views were more in accordance with the facts; but that they have not been abandoned is certainly a satisfaction to me. But I do not wish to speak so much of my father as of Sir Thomas Holdich this evening. We English people all know, and know only too well, that arbitrations have generally given dissatisfaction to both sides, and I think always to one side. Now, Sir Thomas Holdich has had the very great satisfaction of dealing with an arbitration which, as far as I know, has given, generally speaking, satisfaction to both sides—and that is a marvellous performance. I had almost said Sir Thomas Holdich had had the luck, but it is no matter of luck; the problem was a geographical problem, and his Majesty, if I may say so, was well advised to appoint on the commission an eminent geographer like Sir Thomas

Holdich. And when a geographical problem is dealt with by a geographer like Sir Thomas, it is not a matter of luck that the award gives satisfaction on both sides. I hardly think that we of the Geographical Society have taken sufficient note of the fact that one of our Vice-Presidents has been dealing with this extremely important problem, and has dealt with it so admirably. We may congratulate Sir Thomas Holdich on his paper to-night; but I think we may congratulate him on something far more important than that. I do not think there is any deed whatever of which a man should be more proud than having helped to maintain peace between two important countries, and having, to a certain extent, helped to turn hostility into friendliness, and that is a pride which I think Sir Thomas Holdich may have.

Señor VICTOR EASTMAN: I thank you for the honour of calling upon me to make a few remarks in connection with the important paper which Sir Thomas Holdich has read to-night. I must admit that I was not prepared to be honoured in this manner. Still, in connection with the paper, I am afraid I have very little to say, save that it is worthy of a distinguished geographer. But before I take my seat, there are two points upon which I wish to speak—first, the kind allusion to our navy; many of you know that our first lesson in naval affairs was received from a British officer, the undaunted Lord Cochrane; then, again, many of our officers have received their finishing touches on British decks: and, secondly, to thank Sir Thomas Holdich for his kind remarks on His Excellency Señor Riesco, the President of Chile. It will be, I am sure, agreeable for him to know that his name is revered in Chile very much indeed, and it will always be gratefully remembered there.

The CHAIRMAN: There is but very little that I can add to the interest of this occasion, and the compliments which have been paid to our friend Sir Thomas Holdich have been not only well deserved, but well earned. We feel especially honoured that a Vice-President of our Society should have been selected as a peace-maker between Chili and the Argentine Republic—the very hope, the very focus of South American advancement; the one on the Pacific side of the continent, the other on the Atlantic. On the Argentine side there are no less than 250,000,000 sterling of British capital involved in the peaceful development of the country, and in Chili English capital has been poured in with great liberality for the working of its mines, its agricultural and pastoral resources. Therefore, had war taken place between these two important countries, it would have meant, not only an immense financial loss to the world, but the sinking of the hopes regarding South America perhaps for a century. The states to the north of Chili and the Argentine are yet making their way up from the misery in which Spain left them, and now, just as they are emerging from that condition and showing their capacity for self-government, when they are producing men of the highest intelligence, far-seeing energetic people, we ought by all means to encourage every effort that can be made for good fellowship and goodwill. I understand, from the paper which we have heard, that President Riesco and President Roca have lent all their energies to the preservation of peace; that Sir Thomas has been aided abundantly by the admiralities of both countries, and by their telegraphic departments; that, in fact, neither expense nor effort has been spared which in any way could aid his mission.

A few words, perhaps, regarding the geography of the Andes. The double range, which spread out in Bolivia to a width of about 500 or 600 miles, holding in that space plateaus, 14,000 feet elevation, suddenly close in from the east and unite at Mount Aconcagua, that giant peak, 23,080 feet high. At about 33° of south latitude thenceforward the Andes are only a single chain, and it is interesting that at this point there is the transverse barrier of Chacabuco, which runs from the main range

to the coast sierra. On the north of this the country is arid as far almost as the equator, but south of it commences a moister belt, and from Santiago down to about lat.  $41^{\circ} 30'$  you have that very beautiful valley which lies between the main range of the Andes and the Pacific coast sierra, which is one of the most beautiful valleys that I have ever travelled through in South America. At the latitude named, it dips under the ocean, and we then have the remains of the coast sierra extending down to the Straits of Magellan, and numberless inlets and every imaginable deviation of ocean and river, which make the coast of Patagonia such a wonderful field for scenic effect. On the east side of the Andes, we have what Darwin has said is one of the most wonderful Tertiary and shingle formations in the world. Take it from Bahia Blanca and from about 700 miles south along the Atlantic and 200 miles inland, we have a cap 50 feet thick of shingle, all of which represents some eight successive movements of elevation from the sea-bottom upwards, eight terraces with all their margins well defined as having been on the edge of the sea-shore, but now elevated to from 300 to 400 feet above sea-level. They represent the wonderful denudation of the Andes. If you examine the map, you will find that north of Lake Titicaca there is a transverse barrier called Vilcanota; north of which the rivers flow northward and enter the Amazon. That knot is the governing-key point of Andean geography, and south of it is Lake Titicaca, which is now only the shrunken remains of what was once a lake of 106,000 square miles, which poured southward through the longitudinal gorges of the Andes, and reached the Atlantic at and near Bahia Blanca. Therefore, all that region is perhaps one of the most interesting, not only geographically, but geologically, that can be found in the world, and, as Sir Thomas has said, Nature has been working there on a vast scale. It has thrown out from a hundred fiery mouths volumes of lava, which have given Patagonia a hard basaltic cap of from 300 to 400 and 800 feet thick in places. It has been one of the most active places on the globe as regards igneous action, and almost rivals Ecuador. I will not detain you longer, but it remains for me to convey your very sincere thanks, which I know you will cordially vote, to Sir Thomas Holdich.

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## THE OROGRAPHY OF ASIA.\*

By Prince P. KROPOTKIN.

### I. INTRODUCTORY REMARKS.

DURING a five years' stay in Siberia I made several journeys which offered me special opportunities for gaining an insight into the leading features of the orography of this wide region. In 1866 our small expedition realized at last what had been the dream of the Siberian Expedition of 1860. We crossed in its full width the mountain region which fills up the space between the Lena and the head-waters of the tributaries of the Amur. From Irkutsk we went first northwards to the gold-mines of the Olekma region. We followed the course of the Lena, excavated in the horizontal layers of Red Sandstones, probably

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\* Maps, p. 280.