On Spherical Maps and Reliefs: Discussion

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Before the reading of the paper, the PRESIDENT said : We are always very glad to welcome so distinguished a geographer as our Gold Medalist, Monsieur Elisée Reclus. We are always sure, whenever he addresses us, of having something most interesting and important to listen to. To-day he has promised to give us an account of the relief and other maps which have been lately, I believe, invented for the purpose chiefly of education. I will ask Monsieur Reclus to explain the maps to the meeting.

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

MR. MACKINDER : I need hardly say that I have listened with the same pleasure that I am sure every one in this room has to our distinguished brother geographer from across the sea. M. Reclus has been at work on these new cartographical methods, as I happen to know, for some years past, and I may say that we already have at Oxford a copy of the map of the western portion of the Mediterranean, which I see here exhibited as a sample. I would like, if I may, to take this opportunity, when so many who have influence in the matter of geographical teaching are here present, to urge that in connection with our new public authorities, we should try to convince people that in order to teach geography properly, it is necessary to spend more than has been spent upon material. For young children especially, good and abundant material is very important. It is true that these models of M. Reclus will cost far less than the old plaster models. Obviously they are much superior from other points of view. I take it they cannot be damaged so easily, and that they can be stored much more easily. But when all is said and done, you will still have to pay considerably for apparatus. At the present time there is a great tendency to employ, in the way of maps, the cheap and nasty. This is partly due to the comparative rarity of critical knowledge as to what is a good and what a bad map, but also partly to the fact that people have not appreciated the damage done to the minds of the pupils if the apparatus is bad.

There are only two other points I should like to put to M. Reclus. I venture to say that what we most want are some convex maps of larger portions of the surface of the globe. We want our students to grasp, for instance, the true form of the North Atlantic. That is an exceedingly difficult thing to drive home, and a false image of it early impressed on the mind has all manner of bad consequences later on. The relative distances across the Atlantic in different latitudes are obviously hard to appreciate when the map is printed on the flat piece of paper. Again, take British North America. The British dominions there must on the flat be either distorted or exaggerated. What we want is a map on the round of the whole of North America. I know M. Reclus may reply that we have globes for this purpose. But the globe is cumbrous and costly; it cannot be hung on a wall conveniently; it has to stand on a table, and is difficult to use with a class. Personally, I feel that for teaching, the most valuable adaptation of these globular maps would be to replace for many purposes the globe itself.

Now, with regard to reliefs, there is one point that appeals to every one who has to do with a plaster model : it is this—that you are looking at the scenery from the bird's-eye point of view ; you are looking down upon it, whereas you look ordinarily at scenery from alongside—horizontally, if I may so put it. I cannot help feeling, therefore, that a certain exaggeration may under most circumstances be allowed. Let us consider, for instance, a model of the Alps and the Plain of Lombardy, a very important region in historical teaching. I agree that a well-made map of this region on the flat will of course mean a great deal to a geographer, but I find from experience that most students who examine even an imperfect model of such an area, carry away a vivid impression, such as they would obtain

from no map. Yet if you represented that region of the Alps and the Plain of Lombardy on the true scale, you would not get a sufficient relief to produce any effect. We must beware of becoming purists in this matter of cartographical truth. After all, the model is rather a weapon of teaching than a means of investigation. In schools time is limited, and you must be content with producing an impression of relative truth and producing it quickly, and afterwards the fact of exaggeration can be separately impressed. Of course, I am not now speaking of models of quite small areas like the Cape peninsula, which can be represented on the same vertical and horizontal scales, but rather of relief maps.

It is quite clear that M. Reclus with Mr. Patteson has got hold of a method which admits of rapid and accurate multiplication of models by means of hydraulic machinery and of a great reduction of cost.

MR. RAVENSTEIN: I am sure we are all delighted to see so distinguished a geographer as Prof. Reclus amongst us in what apparently is perfect health and in such excellent spirits. I have but little to say on the subject before us, because Mr. Mackinder has anticipated me in many respects. The scale of the maps of the continents in all our good school atlases is identical. But as, for educational purposes, we require maps of particular portions of the Earth, and often of certain towns, we must necessarily introduce other scales, which bear, however, a definite proportion to the scale of the general maps. Multiplicity of scales ought, of course, to be avoided. Now coming to relief maps, and to globes especially, I thoroughly agree with Prof. Reclus as to the system on which geography ought to be taught. There is no better method than the so-called *Heimatkunde*, which teaches a child by personal observation of geographical features. We geographers claim the Earth as our domain. Geologists and botanists may claim a particular kingdom of the Earth, but we claim the whole, and therefore on our school excursions we do not teach our children to look only at the shape of the land; for when a child asks the name of a plant, and why some plants are confined to marshy soil and others to the dry uplands, we cannot tell the child that this is not geography, and send it to some other teacher for information. Our children ought to be trained to observe all things. It is very curious that when I was a boy I read a good many advertisements—they were mostly from ladies' schools, and I think the ladies are sometimes far in advance of us in this respect—in which it was stated that "the use of the globes" would form one of the subjects taught. But where are globes used now? I think the equipment of no school can be considered complete without a globe. No man who calls himself a geographer, or who claims some knowledge of geography, and wants to read his newspaper intelligently, ought to be without a globe on his table. It is one of the most useful things; there is no apparatus like it. You can measure long distances on it, and there is no map on which you can do the same except in a roundabout way. Now, coming to models, I may remind Prof. Reclus that more than sixty years ago my own father, in conjunction with Bauerkeuer, introduced a method of producing cheap reliefs by embossing maps printed on paper. More recently Major Cybulz and others produced beautiful reliefs by a galvanoplastic process; these, however, had to be coloured by hand, and were consequently expensive. I must admit this, that the method of producing models recommended by Prof. Reclus yields results which are superior to anything done hitherto. I certainly think we ought, in every school, to have a number of typical relief maps, and if these typical relief maps are done on a large scale, we might in most instances do without exaggerating the vertical scale, because they could be taken up in the hand and the relief could be studied from different directions. But in addition to these large-scale reliefs, we are to have those discs which M. Reclus promised us on a former occasion, and which would include entire

continents or larger surfaces of the sphere, and if those discs are to show the relief of the ground, then I do agree with Mr. Mackinder that we ought to exaggerate the vertical scale. If you look at Signor Pomba's beautiful model of Italy, now at the South Kensington Museum, and upon which there is no exaggeration of the vertical scale, you can certainly trace the Alps, and they do not impress you as constituting that formidable obstacle between north and south which they constitute in reality. I do think that if Signor Pomba had exaggerated his heights, his relief would have been more effective. And if this applies to the Alps, how much more would it apply to our hills in Wales or Scotland? They would almost disappear, and we should gain no correct notion of their actual height, and the formidable labour required to climb some of them. We all feel grateful to M. Reclus for having once more brought that important subject before us.

Dr. HERBERTSON: We are all very much indebted to Prof. Reclus for bringing these curved maps and models, which Mr. Patesson has constructed under his direction. A year and a half ago M. Reclus was good enough to present one of the curved maps to the School of Geography in Oxford, and I have constantly used it. It seems to me we cannot exaggerate the importance of having a collection of uniform maps constructed on a spherical surface such as M. Reclus proposes to make, more particularly for reference purposes.

In connection with the question of the scale of models, it seems to me that we ought, as far as possible, to have models, not merely with the true vertical scale, but also with exaggerated heights; just as in making a section through a country we draw it first of all on a larger scale to show details, and then reduce it to obtain the true slope. If we take the Thames basin, for instance, it is quite impossible to make a model on the true scale from the 1-inch map. For many purposes a model of the Thames basin on the 1-inch scale is valuable, but in order to make one we have to exaggerate the heights considerably. In teaching the morphology of the land it is necessary to use every possible variety of material, especially for regions which students cannot see—maps of all scales and models of all scales. Every different way of representing the land's surface has a certain merit, and serves to show some detail in a better way than others. It is only by comparing various methods of representing the surface of the land that we come to have a true conception of it. The typical models at a cheap rate will be a great boon to all teachers of geography, and I thank M. Reclus for showing us the beautiful specimens of maps and models which he has brought to-day.

Prince KROPOTKIN said he thought the models which M. Reclus had brought were certainly a great step in advance in the real teaching of geography, and anything which would tend to produce such models at a cheap rate would be another step in helping to spread a true knowledge of geography. With regard to the question of whether such models ought to be made true to scale, he pointed out several of the drawbacks which models with an exaggerated vertical scale were offering for the spreading of correct ideas concerning geological phenomena (glaciation, etc.); but he agreed, also, with Mr. Mackinder and Mr. Ravenstein as to the necessity of having two different sorts of maps. How would it be possible to represent, for instance, the plateau of the great continent of Asia, 3000 feet high and 2000 miles wide, if they were not allowed to exaggerate the vertical scale to a certain extent or even to a great extent—even so much as ten times? Again, in Kent, a difference of 100 feet in the altitudes sometimes made all the difference between the healthy ground of the plateau and the unhealthy clay of the lower levels; it must be shown on a relief map; and if it was intended to represent Kent on a scale where 100 by 300 feet would be a noticeable feature, it would be necessary to increase the size of the relief-map beyond all bounds. The vertical scale

has thus to be exaggerated. But as a corrective to that, after having shown a model on an exaggerated scale, they ought immediately to show one true to scale. He thought maps constructed both on the real scale and the exaggerated scale ought to be found in every well-appointed school. When so much money was spent on useless things, such as ironclads and the like, surely they ought to be able to find the money for what was absolutely essential in carrying on the work of education! He was also very much in favour of the wider use of globes. Children and students ought to have something which would really represent the Earth. It had been urged that globes were expensive. Well, so long as the demand was small they were likely to be expensive, but let the demand be great, and there would be hundreds of inventors ready to supply well-made globes at a comparatively small cost. In conclusion, he congratulated M. Reclus on his perseverent efforts in obtaining true representations of the Earth's surface, and Mr. Patesson on having made the discovery of a practical method for making relief-maps.

MR. ANDREWS: There is one lesson which I think is more important than any other that we can draw from the excellent exposition M. Reclus has given us, that is to try to get as near as possible to nature. In early days we were content merely to look at shadows, like Plato's prisoners in the cave; now by means of pictures and accurate representations of the Earth's surface in different forms, we are trying to get some idea of what countries are really like, and when we deal with history we try to realize the character of the passes or of the regions through which armies marched, and of the various difficulties and obstacles that lay in their paths. Now, this attempt to get near first-hand knowledge seems to me to be the root of the matter in geographical success. There is still a tendency to make geography merely a record of statistical information. I think that we try to do a great deal too much—that is to say, that we make a mistake in trying to cover the whole area of the world. It would be very much better if we first of all worked out more thoroughly certain detailed areas. We forget that what we have to teach is not statistics, but a method of understanding geographical information which will enable students to use other factors and data when they come before them in their after-career. Therefore I think what M. Reclus has said this afternoon, and what he has shown us in these most admirable maps, should be very valuable from this point of view, if it also enforces the lesson that to get more first-hand knowledge and to study in greater detail a small portion of the world, and to understand the relations of the different phenomena in that district—such as, to take an instance, mountains and forests, and their connection with life and history—is of more value, and will help more to form a habit of thought, which should be the aim of our geographical teaching, than to look at shadows all over the world. I have nothing more to add except to emphasize this very important point, the treatment of some part, at any rate, of our work, the study of a small area in a more detailed manner. I can only thank M. Reclus for his most valuable and interesting exposition.

MR. COBDEN SANDERSON: I only wish to intervene for one moment. The gentlemen who have hitherto spoken have, I think, been all geographers conversant with the subject and with matters of geography fully in their mind. I beg to speak as a layman in this matter, and as a layman to thank M. Reclus not only for the construction of these maps and for his contributions to geography proper, but as an inspired teacher of geography, who shall not merely communicate to us knowledge of the facts, but shall excite our wonder and admiration for the world itself, which is the subject of geography. It is for that contribution to human knowledge and human aspiration that I beg as a layman to thank M. Reclus for his life-long contribution to the great work of humanity.

Prof. RECLUS: I have to thank you, and especially Mr. Mackinder and Prof. Ravenstein and Dr. Herbertson, for what you have said with regard to the usefulness of globular discs, and especially of those which would represent a large part of the Earth's surface. I speak here, not as a geographer, but as an artist; and I think nothing would be more wonderful than to have a model of very extensive parts of the Earth, with the real curvature and the real proportion shown, in such a place, for example, as this hall of the Royal Geographical Society. You would then have an opportunity of seeing the whole of the globe as well as the various parts. It is very difficult when you see only Spain and the South of France, and the western shores of the Mediterranean, for instance, to realize that it is only about 150th part of the Earth. That is because the curvature is very small; but with the curvature very large, you would immediately say this is a tenth or a twelfth or a fifteenth part of the surface of the Earth, and so would get a clearer idea of the relative proportion of that part of the country with which you were dealing. I think the idea is to be realized, and I thank you for having hinted at it. But now another thing—the real and vertical scale. I do not agree with the remarks of all these gentlemen, although I think it is necessary sometimes to exaggerate in scientific demonstrations. For instance, if you want to show the different tracks for the tunnelling of the English channel between France and England, you would not see the mere line which is made by the sea, and so you are obliged to deepen that ditch between France and England, and to show that it has a certain depth you are obliged to exaggerate. There are occasions in teaching where exaggeration is absolutely necessary. But then I think it would be better to have the two things, to have the exaggeration which could be shown on the map, and the true line to show the true state of things. Now, some one referred to that beautiful map of M. Cesare Pomba. I am a great admirer of it, and I think it is a very good idea to show Italy with its true curvature and the Alps in their true proportion. When we see them on a model in their true proportion, we are generally astonished, and perhaps say, "They are not very high; I thought they were higher. When I am in Milan or Verona and see them before me, they seem so majestic; of course they must be higher than that." And so we lose our illusion. But I think the reason for this is because we have had a bad education. For example, in certain atlases we see France with its mountains, and not only the Pyrenees and Alps, but also the mountains of the interior, and they are shown in such an exaggerated way, in proportion of one to five or more, and then we say: "How splendid, how well-shaped that relief is! that map is very nice." But it is false; and taught by that, you are led to think that nature has more relief in reality than she has. I think we ought to keep as much as possible to the truth, and if relief is not sufficient to show itself, then let us represent it by a difference of colour. For example, in this map of Spain we have tried to show all the heights from 1000 to 3000 metres and more by a difference in colour, because it is impossible to represent them by real relief. I think there are two schools, one of perfect truth, and the other with a certain condescension towards the illusions. Well, I think this second school is not the good one. As a descendant of the old Huguenots, I prefer sticking to truth.

The PRESIDENT: I think, before I ask you to pass a vote of thanks to M. Reclus, I ought to say that we as a society are bound to further the views which we believe to be correct, and which M. Reclus has expounded to us now on two occasions when he has been so kind as to pay us visits here. He has impressed upon us the importance of the use of globes, and the importance of teaching by means of globes. He has reminded us that in the days of the Renaissance they were universally used. Sir Francis Drake and Cavendish and

Frobisher certainly took globes like that to sea with them, and puzzled out their problems on the globes, and it is far easier to understand problems in geography by using a globe, than by drawing imaginary spherical triangles on a plane surface. I understand from Mr. Reeves that he has now introduced the plan of teaching nautical astronomy and the problems of geography by means of globes. M. Reclus has pointed out to us the importance of these relief maps, to enable us to understand that we are looking at a rounded and not at a plane surface. And then with regard to the larger-scale maps, he has, after much thought, adopted Mr. Patteson's plan of using metal and printing on it, instead of the old plan of moulding. These improvements are all very important for educational purposes, and as he has most kindly, as I understand him, presented our Society with these two models, it will be our endeavour to make his plan known as widely as possible amongst men engaged in education, and so we trust that this immense improvement—and it certainly is an immense improvement—in the method of teaching geography will gradually be introduced into this country, and that a large demand will arise for these relief maps. I would ask you to pass a vote of thanks to M. Reclus for his great kindness in coming over here to address us, and for bringing with him these maps for our instruction and use. I ask you to pass a vote of thanks by acclamation to M. Reclus.

ANTARCTIC SLEDGE TRAVELLING.

By the **PRESIDENT.**

THE great work of the Antarctic Expedition was achieved by sledge travelling, and the clearest way of giving an idea of the extent of this work is by presenting it in tabulated form. The autumn travelling occupied from February 18 to April 3 under most rigorous conditions of climate.

The spring travelling comprised two main expeditions to the south and inland to the west, two supporting parties, and one dépôt party.

There were also ten reconnoitring parties to explore the region nearer the ship. Five went out in the intense cold of the early spring—one towards the mainland to south-west, another towards the mainland to west, and three to examine the island of the volcanoes. Of the five later parties, one was to Cape Crozier, another along the west side of Mount Erebus, two to the land to the south, and one to explore a smaller volcanic island. Altogether eighteen sledge parties.

AUTUMN TRAVELLING.

Date.	Officers.	Men.	Temp.	Days.	Remarks.
Feb. 18-22	Shackleton Wilson Ferrar			5	To the island 15 miles south-south-west. Ascended peak of island, 2720 feet, and found clear road to the south. Returned with considerable information as to the lie of the land.