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PHYSICAL GEOGRAPHY

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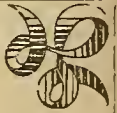




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PROFESSORS HUXLEY, ROSCOE, *and*
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IV.

PHYSICAL GEOGRAPHY.

Science Primers.

PHYSICAL
GEOGRAPHY.

BY

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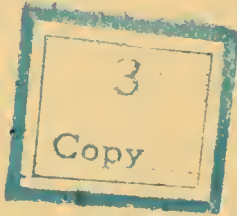
WITH ILLUSTRATIONS.

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SCIENCE PRIMERS.

PHYSICAL GEOGRAPHY.

INTRODUCTION.

I. LET us suppose that it is summer-time, that you are in the country, and that you have fixed upon a certain day for a holiday ramble. Some of you are going to gather wildflowers, some to collect pebbles, and some without any very definite aim beyond the love of the holiday and of any sport or adventure which it may bring with it. Soon after sunrise on the eventful day you are awake, and great is your delight to find the sky clear and the sun shining warmly. It is arranged, however, that you do not start until after breakfast-time, and meanwhile you busy yourselves in getting ready all the baskets and sticks and other gear of which you are to make use during the day. But the brightness of the morning begins to get dimmed. The few clouds which were to be seen at first have grown large, and seem evidently gathering together for a storm. And sure enough, ere breakfast is well over, the first ominous big drops are seen falling. You cling to the hope that it is only a shower which will soon be over,

and you go on with the preparations for the journey notwithstanding. But the rain shows no symptom of soon ceasing. The big drops come down thicker and faster; little pools of water begin to form in the hollows of the road, and the window-panes are now streaming with rain. With sad hearts you have to give up all hope of holding your excursion to-day.

2. It is no doubt very tantalizing to be disappointed in this way when the promised pleasure was on the very point of becoming yours. But let us see if we cannot derive some compensation even from the bad weather. Late in the afternoon the sky clears a little, and the rain ceases. You are glad to get outside again, and so we all sally forth for a walk. Streams of muddy water are still coursing along the sloping roadway. If you will let me be your guide, I would advise that we should take our walk by the neighbouring river. We wend our way by wet paths and green lanes, where every hedgerow is still dripping with moisture, until we gain the bridge, and see the river right beneath us. What a change this one day's heavy rain has made! Yesterday you could almost count the stones in the channel, so small and clear was the current. But look at it now! The water fills the channel from bank to bank, and rolls along swiftly. We can watch it for a little from the bridge. As it rushes past, innumerable leaves and twigs are seen floating on its surface. Now and then a larger branch, or even a whole tree-trunk, comes down, tossing and rolling about on the flood. Sheaves of straw or hay, planks of wood, pieces of wooden fence, sometimes a poor duck, unable to struggle against the current, roll past us and show how the river has risen above

its banks and done damage to the farms higher up its course.

3. We linger for a while on the bridge, watching this unceasing tumultuous rush of water and the constant variety of objects which it carries down the channel. You think it was perhaps almost worth while to lose your holiday for the sake of seeing so grand a sight as this angry and swollen river, roaring and rushing with its full burden of dark water. Now, while the scene is still fresh before you, ask yourselves a few simple questions about it, and you will find perhaps additional reasons for not regretting the failure of the promised excursion.

4. In the first place, where does all this added mass of water in the river come from? You say it was the rain that brought it. Well, but how should it find its way into this broad channel? Why does not the rain run off the ground without making any river at all?

5. But, in the second place, where does the rain come from? In the early morning the sky was bright, then clouds appeared, and then came the rain, and you answer that it was the clouds which supplied the rain. But the clouds must have derived the water from some source. How is it that clouds gather rain, and let it descend upon the earth?

6. In the third place, what is it which causes the river to rush on in one direction more than another? When the water was low, and you could, perhaps, almost step across the channel on the stones and gravel, the current, small though it might be, was still quite perceptible. You saw that the water was moving along the channel always from the same quarter. And now when the channel is filled with this rolling torrent of

dark water, you see that the direction of the current is still the same. Can you tell why this should be?

7. Again, yesterday the water was clear, to-day it is dark and discoloured. Take a little of this dirty-looking water home with you, and let it stand all night in a glass. To-morrow morning you will find that it is clear, and that a fine layer of mud has sunk to the bottom. It is mud, therefore, which discolours the swollen river. But where did this mud come from? Plainly, it must have something to do with the heavy rain and the flooded state of the stream.

8. Well, this river, whether in shallow or in flood, is always moving onward in one direction, and the mud which it bears along is carried towards the same point to which the river itself is hastening. While we sit on the bridge watching the foaming water as it eddies and whirls past us, the question comes home to us—what becomes of all this vast quantity of water and mud?

9. Remember, now, that our river is only one of many hundreds which flow across this country, and that there are thousands more in other countries where the same thing may be seen which we have been watching to-day. They are all flooded when heavy rains come; they all flow downwards; and all of them carry more or less mud along with them.

10. As we walk homewards again, it will be well to put together some of the chief features of this day's experience. We have seen that sometimes the sky is clear and blue, with the sun shining brightly and warmly in it; that sometimes clouds come across the sky, and that when they gather thickly rain is apt to fall. We have seen that a river flows; that it is

swollen by heavy rain, and that when swollen it is apt to be muddy. In this way we have learnt that there is a close connection between the sky above us and the earth under our feet. In the morning, it seemed but a little thing that clouds should be seen gathering overhead; and yet, ere evening fell, these clouds led by degrees to the flooding of the river, the sweeping down of trees, and fences, and farm produce; and it might even be to the destruction of bridges, the inundation of fields and villages and towns, and a large destruction of human life and property.

11. But perhaps you live in a large town and have no opportunity of seeing such country sights as I have been describing, and in that case you may naturally enough imagine that these things cannot have much interest for you. You may learn a great deal, however, about rain and streams, even in the streets of a town. Catch a little of the rain in a plate, and you will find it to be so much clear water. But look at it as it courses along the gutters. You see how muddy it is. It has swept away the loose dust worn by wheels and feet from the stones of the street, and carried it into the gutters. Each gutter thus becomes like the flooded river. You can watch, too, how chips of straw, corks, bits of wood, and other loose objects lying in the street are borne away, very much as the trunks of trees are carried by the river. Even in a town, therefore, you can follow how changes in the sky lead to changes on the earth.

12. If you think for a little, you will recall many other illustrations of the way in which the common things of everyday life are connected together. As far back as you can remember, you have been familiar with

such things as sunshine, clouds, wind, rain, rivers, frost, and snow, and they have grown so commonplace that you never think of considering about them. You cannot imagine them, perhaps, as in any way different from what they are ; they seem, indeed, so natural and so necessary that you may even be surprised when anyone asks you to give a reason for them. But if you had lived all your lives in a country where no rain ever fell, and if you were to be brought to such a country as this, and were to see such a storm of rain as you have been watching to-day, would it not be very strange to you, and would you not naturally enough begin to ask the meaning of it? Or suppose that a boy from some very warm part of the world were to visit this country in winter, and to see for the first time snow fall, and the rivers solidly frozen-over, would you be surprised if he showed great astonishment? If he asked you to tell him what snow is, and why the ground is so hard, and the air so cold, why the streams no longer flow, but have become crusted with ice—could you answer his questions?

13. And yet these questions relate to very common, everyday things. If you think about them, you will learn, perhaps, that the answers are not quite so easily found as you had imagined. Do not suppose that because a thing is common, it can have no interest for you. There is really nothing so common as not to deserve your attention, and which will not reward you for your pains.

14. In the following pages I propose to ask you to look with me at some of these common things. You must not think, however, that it is my wish merely to set you certain lessons which you have to learn, and

to give you some rudiments of knowledge which you must commit to memory. I would fain have you not to be content with what is said in this little book, or in other books, whether small or great, but rather to get into the habit of using your own eyes and seeing for yourselves what takes place in this wonderful world of ours. All round you there is abundant material for this most delightful inquiry. No excursion you ever made in pursuit of mere enjoyment and adventure by river, heath, or hill, could give you more hearty pleasure than a ramble with eyes and ears alike open to note the lessons to be learnt from every day and from every landscape. Remember that besides the printed books which you use at home, or at school, there is the great book of Nature, wherein each of us, young and old, may read, and go on reading all through life without exhausting even a small part of what it has to teach us.

15. It is this great book—Air, Earth, and Sea—which I would have you look into. Do not be content with merely noticing that such and such events take place. For instance, to return to our walk to the flooded river; do not let a fact such as a storm or a flood pass without trying to find out something about it. Get into the habit of asking Nature questions, as we did in the course of our homeward walk. Never rest until you get at the reasons for what you notice going on around you. In this way even the commonest things will come to wear a new interest for you. Wherever you go there will be something for you to notice; something that will serve to increase the pleasure which the landscape would otherwise afford. You will thus learn to use your eyes quickly

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