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978-1-107-65152-4 - The Surface of the Earth: Elementary Physical and Economic Geography

Herbert Pickles

Excerpt

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## I. RAIN

On a warm day after a heavy shower of rain, you will have noticed that the surface of the road quickly becomes dry. What becomes of the water? Some of it is carried away by drains, but perhaps you have sometimes seen the road **steaming** and discovered that part of the moisture passes into the air, in the form of water-vapour.

When wet clothes are hung in the open air, or placed before a fire, they lose their moisture in the same manner. Wherever a sheet of water is exposed to the air, the same process, called **evaporation**, is constantly in progress. Think what a great quantity of vapour must daily pass into the atmosphere from the surface of great oceans thousands of miles in extent.

We must now consider what becomes of the moisture which the atmosphere has gained. You have seen clouds floating across the sky, sometimes white and beautiful when they reflect the sunlight, but often, and especially in wet weather, black and heavy-looking.

Sometimes clouds are to be seen hanging about the summits of hills and mountains, and if you were to ascend a hill thus capped with cloud your clothing would become damp or even wet.

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*Rain*

From the summit of a mountain, clouds may sometimes be seen floating at a lower level. The photograph on the opposite page was taken during the Balkan war from a warplane when above a bank of clouds.

The river shown is the Maritza. On its banks is the city of Adrianople, concealed from view by the clouds.



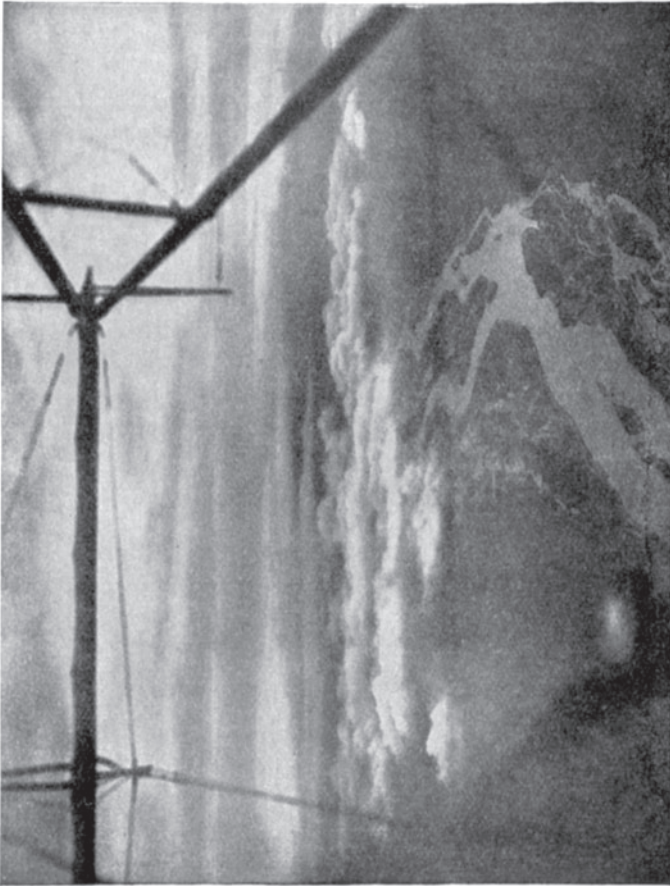
Rain-clouds—breaking up.

When a cloud is very near the surface of the earth we call it **fog**.

You will have guessed by now that clouds are composed of tiny drops of water, derived from the moisture which is always passing into the atmosphere by the process of evaporation. The change has been produced by cold. Water-vapour is an invisible

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Above the Clouds. A photograph taken from a warplane.

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gas, but when cooled it changes into a mass of tiny drops of water. Fill a tumbler with cold water and place it in a warm room. Though you cannot see any moisture in the atmosphere of the room, the outer surface of the tumbler soon becomes *clouded*, and you may even see drops of water trickle down its sides.

Clouds are carried along by winds over the land, and are caused by mountains to pass upwards to cooler



Clouds forming about the summit of a mountain. (Dent Blanche.)

levels in the atmosphere, where further **condensation** takes place, and rain falls upon the earth.

You will therefore expect that mountainous districts receive more rain than flat areas.

If you examine a rainfall map of the British Isles you will find this to be true. The wettest place in England is Seathwaite, a village situated amongst the mountains of the Lake District.

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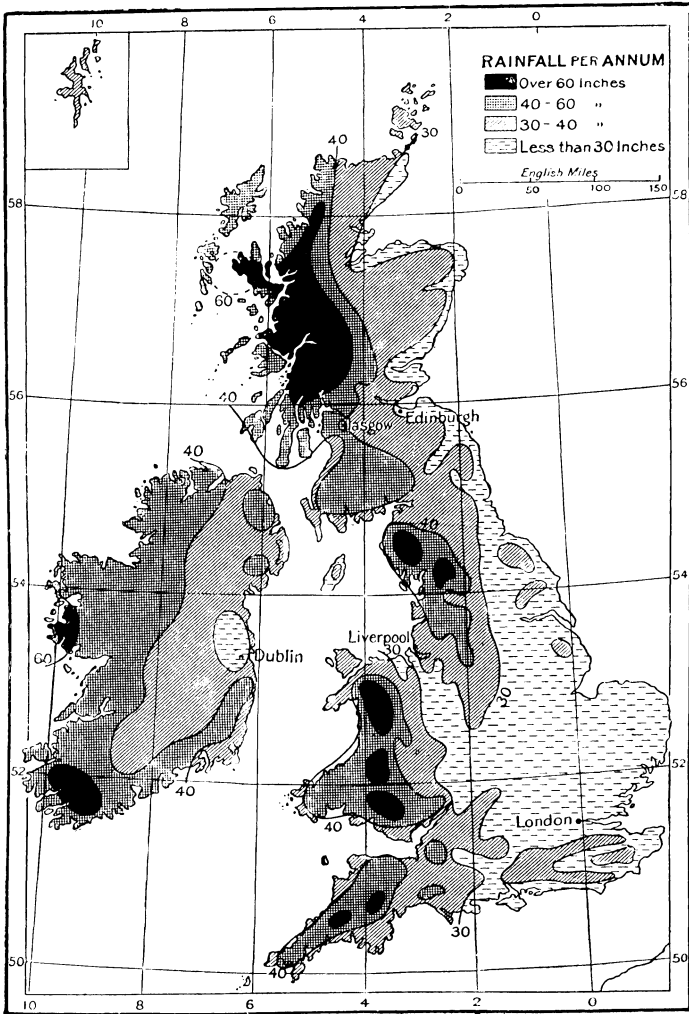


Fig. 1. Rainfall map. British Isles.

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You will notice that the western side of Britain—the more mountainous part of the country—is much wetter than the eastern. Our rain-bearing winds come from the west and south-west—from the Atlantic Ocean, and lose a great deal of their moisture during their journey over the high land.

In order to make a rainfall map, it is necessary to measure the amount of rain which falls day by day. Take a dish with vertical sides, and place it outside on a wet day. If you find the water collected by it is half an inch deep, you say that the rainfall for that day is **half an inch**.

But collecting rainwater in a dish would not be an accurate way of measuring rainfall. Some would be lost, for you know that evaporation is always taking place; besides loss might occur by splashing. So a vessel specially constructed to prevent loss is used. It is called a **rain-gauge**, and its parts are shown in Fig. 2.

The vessel *A* carries a funnel which collects rain and passes it into vessel *B*. Then by means of a measuring-glass, the rainfall on the area equal to the top of the gauge can be found.

Many hundreds of these rain-gauges are in use in the British Isles. They are examined every day, and a record of the rainfall throughout the year is made.

The records are sent to a central office in London, and used in map-making.

Snow is of course collected by the gauge, and when melted is registered as rain.

It has been found that at the summit of Ben Nevis, the highest mountain in the British Isles, the rainfall is over 200 inches per annum; at Fort William, near

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the foot of the mountain, it is about 100 inches ; whilst on the east coast of England, the annual fall is only 20 inches.

At Seathwaite (mentioned above) the yearly rainfall is well over 100 inches, the average for a number of years being 130.

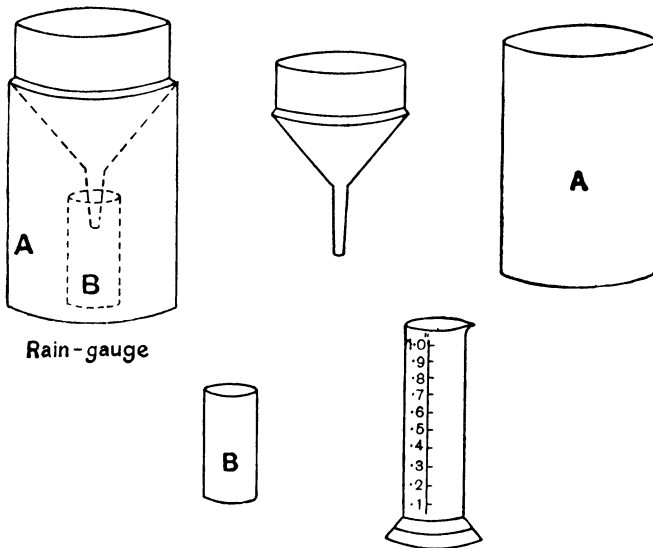


Fig. 2. Rain-gauge and its parts.

The measuring-glass is drawn on a large scale to show the graduations clearly. It will hold a quantity of water which, spread over an area equal to the top of the gauge, would be one inch deep.

Rain is necessary for plant-life. Where it does not fall in sufficient quantity, agriculture can only be carried on by means of irrigation ; i.e. drawing water from rivers along channels cut through the cultivated tracts. This is done in Spain, Italy, Egypt and many other countries.

The richest vegetation in the world is found in the basins of the Amazon and the Congo, where the climate is hot, and rainfall is very heavy. Regions where rainfall is very slight are desert. There is hardly any vegetation, and therefore no animal life. The Sahara in North Africa, and the central part of Australia are great tracts of this kind.

India, unlike England, has two well-marked seasons. A hot wet season begins in April, and extends to October. During these months, rain-bearing wind blows from the Indian Ocean over the land. It is called **the Monsoon**.

From October to April the climate is cooler and dry. The wind blows from the land to the ocean.

When rain falls upon the earth then, some, which fails to sink into the ground, passes back into the atmosphere. Another portion helps to support plant-life.

The rest may flow over the surface of the land as rivers, or sink into the earth. What happens to these two portions we shall consider in the next chapter.

#### EXERCISES

1. Make a diagram to show (roughly) the height of the land along a line from St David's Head to Harwich. Write on the diagram the rainfall in inches at a number of places, and so show its relation to altitude and distance from the west coast.
2. On an outline map of England shade areas which would have heavy rainfall if moisture-bearing winds came from the east.
3. Using a rainfall map of the world, make a list of regions which have heavy rainfall, and a second list of places where rainfall is very slight.



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## II. RIVERS AND THEIR WORK

When rain falls upon the earth, some of it sinks into the ground and makes its way deeper and deeper, until its downward course is stopped by something, such as a bed of clay, through which water cannot pass.

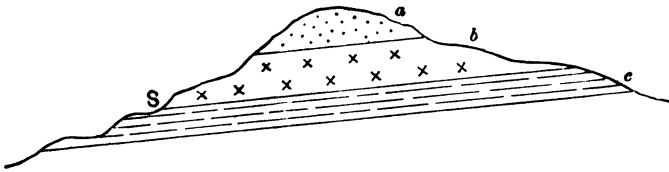


Fig. 3. Section of Hill, to show origin of Spring at *S*. *a* and *b* are porous beds; they store water which is prevented from sinking lower by the impervious bed *c*.

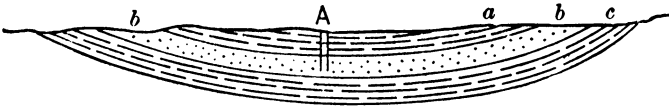


Fig. 4. Artesian Well.

*a* and *c* are impervious, *b* is porous. No spring will be formed, owing to the basin-like arrangement of the beds; but the water stored may be reached by sinking a shaft at *A*.

The water then finds its way along the surface of the clay, and in course of time probably reaches daylight again at a lower level. There it comes bubbling out of the ground, and we say there is a **spring**. Perhaps you have noticed a belt of moist or marshy land along a hill-side; it marks the junction of porous beds, through which water passes, and impervious ones.

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*Rivers and their Work*

Very often spring water contains mineral matter which it has dissolved during its underground journey. Sometimes the water is even warm, especially in those areas where volcanoes have once existed.

Mineral waters are often of value because they assist in the cure of certain diseases. People go to



The mouth of Gaping Ghyll.  
(Diameter, 15 to 20 feet.)

Harrogate in Yorkshire, to Marienbad and other places on the continent to “take the waters.” The warm springs at Bath have been famous since the days of the Romans in Britain. But perhaps the most wonderful hot springs in the world are those of Yellowstone Park in North America. Many others are known in Iceland and in New Zealand.