

T H E S I S .

Subject, Springs of the Monongahela Basin.

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"I'll show thee the best springs." Tempest.

If there is anything about an old homestead which one can never forget, it is the spring. To the old spring we have wandered many times when we were tired and weary and after drinking of the pure and sparkling water we felt inspired and went away feeling much better than when we came. The reason that we cannot forget the spring at the old homestead is because it remains unchanged, consequently we are able to recognize it in after years although everything else may have changed.

In the woods or on the mountain side, follow the path and you are pretty sure to find a spring; all creatures are traveling to and from it night and day. You will usually find it marked by a tree that the woodman has mercifully left standing or by an overhanging bank or ledge, making it shady most of the time around the spring.

Springs are vital points in a landscape; they have decided the sites of large cities. The site of Boston was decided by a large and excellent spring. When a farmer wishes to select a site for his home he always selects a spot which contains the good spring.

There seems to be a perpetual springtime about a spring for the grass is always green and the ground is never frozen. The spring contains warmth in winter and coolness in summer.

The source of springs are the rain and snow which fall from the clouds. Part of the water sinks into the earth and is found in the form of springs. Some strata readily absorb the water while others will not allow the water to pass through it at all; such strata are said to be impenetrable. Strata of limestone, sand, and sandstone absorb water readily. These alternate with clay beds which are impenetrable.

Water sinks into the ground and is absorbed by the porous strata until it comes in contact with the clay bed which stops it. It is then collected in reservoirs the overflowing of which causes springs.

Excellent provisions are made for them in the geological strata. The great rocks are cleft asunder that the water may find a way out. The water as it passes through the earth toward the spring cuts for itself little imperfect channels by dissolving away the strata so as to make a natural drain. This is well illustrated when pipes are put underground for the purpose of drainage.

Springs are found under many different conditions; sometimes we find the water trickling down over a great precipice as it comes out of the side of the hill or mountain or issuing up from an outlet in a rock. Then we also find it rising noiselessly to the surface of a green field

and again we find it bubbling up in a valley as if some mighty force were below it.

What is more delightful and charming than a spring on a mountain side? The water in such springs is exceedingly cool and pure. Although these springs are usually small, yet they never dry up and they are much sought for by hunters. Such springs are often the sources of mighty rivers.

Many springs have their outlets in the beds of rivers and are unknown to us, but the trout have found them and they gather around these springs to cool themselves in summer and to warm themselves in winter.

Water collects between the strata of the earth and it would be held there were it not for the crevices in the rocks which permit the water to find its way to the surface, or on the mountain side it may find its way out from between the strata where the different

layers are broken off. If the geological strata is vertical or has a great dip the water is not collected in large veins but is rather held as it falls, consequently it oozes out slowly upon the surface.

There are two different kinds of springs in the Monongahela Basin, viz. perennial or constant and intermittent.

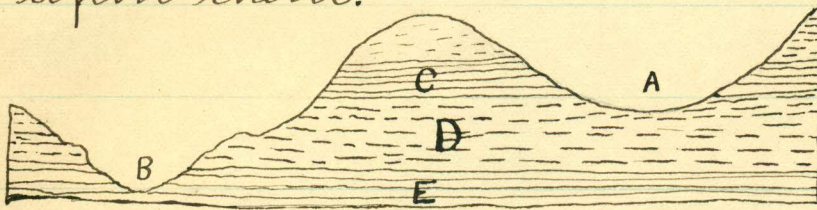
Constant springs are those which are collected in reservoirs down deep in the earth. They have large reservoirs and drain a large area. They flow all the time and drouths have no affect on them because they do not depend directly upon the rains for their supply. These springs are below that part of the earth's crust which is not affected by the seasonal changes, therefore the water is cool all the time and has the same temperature as the place from whence it comes. The water from these reservoirs often finds its way to the surface

by means of faults which are displacements of strata or places in the earth where the strata is not continuous. Water in these springs finds its way down in the earth below the impenetrable rocks by means of fractures on the mountain tops. Here the strata stands in a perpendicular position allowing the water to pass between the impermeable strata.

Intermittent springs are those which flow on beds near the surface of the earth. They are variable in the amount of water which they deliver, as they depend directly upon the rains. They usually fail in time of drouths. Their temperature varies with the seasonal changes, being warm in summer and cold in winter. Their temperature varies with the seasons because they are not below that part of the earth's crust which is not affected by the seasonal changes. These springs drain only a small area and flow abundantly during rainy sea-

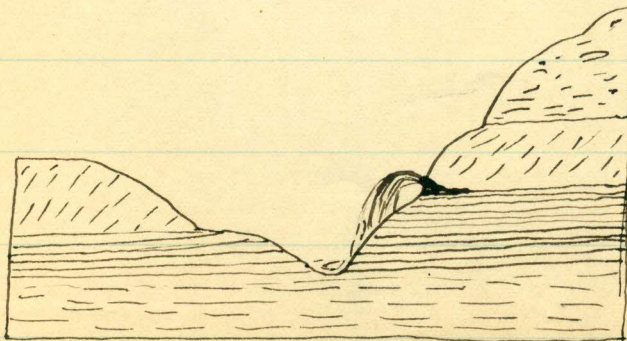
sous.

The constant springs are the most desirable because the water in them is purer and cooler and we know that we can always depend upon them.



Surface spring.

C and E are impervious clay-beds, and D is a bed of sand or gravel, which in the upper portion, ^{at A} is exposed on the surface, or is only overlaid by loose soil and after being covered for some distance by the clay-bed C it makes its appearance again at B, where the valley cuts it through; here the water collected over the area, A, is discharged.



Hill-side spring.