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Take a Step without Making a Sound

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Winter is here — time for snow and some peace and quiet. In fact a good Canadian winter with lots of falling snow can offer some of the quietest moments in the whole year.

You can check it out for yourself immediately after a fairly heavy snowfall. Stand still and pause, noticing that what you are hearing is muted, softer and lower in tone. Even the brilliant crack of a breaking tree branch is transformed into a gentler splinter noise.

Blame it on the snow. It falls in the form of delicate flakes, each one representing a slightly different arrangement of tiny ice crystals with spokes pointing in every direction. When these irregular shapes begin to pile on top of one another, the result is far from orderly. That bed of freshly fallen snow may look smooth and uniform, but it is actually a jumbled array of intricate little structures, sitting together at all kinds of different angles.

Rather than a dense collection of flakes, then, a snowbank consists mainly of the air pockets in between the flakes. For a demonstration of just how much empty space is in there, fill a container with freshly fallen snow and bring it inside to melt. You should notice just how little water you end up with. Most of what you collected in the jar was air.

All that air gives a snowbank some remarkable properties, including how it affects the way sound travels. Noise reaches our ears as three-dimensional waves, with a shape and size that is determined by surrounding material. These waves are conducted through the air, but will bounce off solid surfaces. Even though freshly fallen snow may look like a solid surface, the air inside lets sound travel throughout the bed of snow. Where hard ground would reflect these waves, the snow absorbs them. This is why the volume gets turned down in a snowbound setting.

So can you really take a step without a sound? You'll notice as you walk along, even as your feet sink into the freshly fallen snow, the sound from each step is muffled. Why? Because a reduced portion of the sound waves make it through the jumbled array of snowflakes and air pockets to arrive at your ears.

The effect does not last, however. If you keep stepping in the same place, your steps will become louder. As you press down and compact the loose snow, you eliminate the sound-capturing pores of air inside.

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Even without your help, gravity or wind will encourage individual snowflakes to collapse upon one another. Piles of snow settle into a more uniform structure, containing less air and, therefore, capturing less sound. Depending on the weather, a snowbank can even form a hard crust, which will begin to reflect sound just as the bare ground would do. Soon enough, you should be hearing the world much as it was before the snowfall.

Nevertheless, winter does offer us this brief pause in the way life normally sounds. The next time the air is filled with snowflakes, listen carefully and wait for the silence to embrace you. It could rank among your most memorable experiences of the season.

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