

S. I think the words are very pretty. God tinges the clouds with gold from the sun.

T. Yes, they are very pretty and very true, and sometimes very many colors are got out of the sun to paint them. But we will leave this painting of the clouds for another lesson when we shall be learning something about light and color. And for next week let us see who can find the most references to clouds in poetry. Each bring the passages found, written on paper, telling the author and poem.

T. Let us now try to find out how the clouds are made. Let us make some ourselves, on a small scale, and as we want to examine them, we shall try to tether them so that they may not float away too soon from us.

S. Tether a cloud?

T. Yes. Let us see. Where did you put the glass from the broken window the other day. I told you if it were put away in a proper place where we could get it when we wanted it, we might find it come in very useful. Get a few of the larger pieces and we shall make our clouds rest on the glass. If not exactly tethered to the glass we will find our cloud stick to it for quite a little time.

S. Here are five or six large pieces of the glass.

T. Well, the edges are very sharp, as sharp as a razor. You must be careful not to cut yourselves with them. Now that the pieces of glass are quite clean, will you warm yours at the stove, you warm yours on your cheek, you lean yours up against the cool window pane, and you put yours against the open edge of this window where the cold air is coming in. Then after one minute I shall ask each of you to carry the piece of glass rapidly to your mouth and breathe heavily on it, watching the result. Breathe once. Show the glass. Breathe again, and again. Now show it. What do you notice?

S. The cold glass is covered with a heavy mist, and the warm ones are not dimmed in the least.

T. If you want to get a good mist or cloud on your glass what must you do with it before breathing on it?

S. Make it as cold as we can. The colder one had the most mist on it.

T. Well, the window pane is about as cold as anything we can get here. Will you please breathe on it for some time, and every one who can watch the result.

S. A thin cloud comes on at the first breath. The cloud gets thicker.—Very fine drops are forming all over it.—The drops grow larger. They begin to run into each other.—They are commencing to trickle down the pane.—There is one running in a stream.

T. That will do. You have not only made a cloud, but dew, and a mist, and rain drops. Whence came the moisture and the drops of water you have just seen?

S. They could have come only from the warm breath.

T. Must not the breath have been more than simply warm?

S. It must also have contained the moisture, although we could not see it.

T. Have you noticed a kettle of water boiling on the stove?

S. Yes. The steam rushed out of the spout for over a foot.

T. And you could see no steam just close to the spout when it first came out. You could see just as clearly through it as if there was nothing coming out, but when it commenced to spread in the air it became quite a cloud, only it was fading away as fast as it was forming, or else the whole kitchen would have been so filled with steam you could see nothing.

T. A very good observation. The hot steam in the kettle is just as transparent as air. The cloud came when the hot moisture was cooled a little. And clouds fade away in the same manner if you watch them on some dry days. Now just watch those breathing near the stove. Can you see the moisture in their breath? Now let them go out into the cool air to-day and see what you will notice.

S. You cannot see the moisture in the air breathed out in a warm room, but you can see it if one breathes into very cold air.

T. Now let us take this tumbler of water and put some salt into it gradually. You see it disappears. Can I dissolve all this salt in the same way?

S. No. When the water dissolves all it can, the salt will fall to the bottom and remain visible.

T. Well, now, don't you see that when the air is warm a great deal of water may remain so dissolved in the air that you cannot see it. But if warm air is just as full of moisture as it can be without becoming visible, what will happen if it is cooled slightly?

S. Why, there must be a great number of small particles of water like dust appear in the air.

T. That is a cloud of dust—what kind of dust?

S. Why, of course, water dust. Then mists and clouds and fogs are clouds of water dust?

T. Quite correct. And if the air should be made a little warmer what would happen to the water dust?

S. It would be dissolved again and become invisible. And if you cooled it again it would become a cloud or fog. And if you cooled it more, it would collect into fine mist drops as on the window. And if cooled more into rain drops that would become bigger and bigger the more clouds it fell through.