Program 11 - PICTURE GALLERIES IN THE SKIES - December 2, 1940

SOMETHING TO DO AND TALK ABOUT FIRST

This broadcast is intended primarily to teach the cause of cloud formation and how to recognize the different kinds of clouds. It is hoped, however, that pupils will be led to an appreciation of the beauty of clouds too, and thus add a feature for enjoyment which is often neglected. If the sky is full of clouds today, observe them, help the children find pictures in them, identify the different kinds.

Call attention to the simple lessons of physical science such as warm air rises; warm air can hold more moisture than cold air. Place a small piece of ice in a tumbler of water to show what happens when the moisture held by the warmer air contacts the tumbler. Breathing against the window pane will illustrate the same point.

Ask the children:
Why are icebergs often covered by fog?
Why are you cooler on a hot day with wind blowing than on a hot day with no wind?

DO YOU KNOW THESE WORDS?

cirrus)
stratus) These are all names of kinds of clouds. The children
cumulus) should be familiar with them and their import.
nimbus)

condensation evaporation water vapor precipitation

LISTEN FOR THESE IDEAS

1. Why is it that water vapor, invisible near the earth, becomes visible in the upper strata of air?
2. What different kinds of clouds are there? How is each kind formed?
3. What are the different water forms? How is each formed?
4. Why is it that it hails only on hot days?

SOMETHING TO DO AND TALK ABOUT LATER

1. Why is fog found first in low places?
2. Watch a kettle boiling. Why can't you see moisture near the spout?
3. Is the steam in a locomotive visible or invisible?
4. Draw the different kinds of clouds.
5. Breathe on a cold window pane. What happens? Why?

Wisconsin School of the Air
Afield with Ranger Mac
December 2, 1940

CLOUDS - PICTURE GALLERIES IN THE SKIES

Hello Boys and Girls:

Clouds form patterns in the sky,
Against a sea of blue,
Edged with strands of silver thread
Where the sun breaks through;
Fleets of sails go billowing by
Snowmen turn and tumble,
Covered wagons roll along
On wheels that almost rumble.

You could guess from that little bit of imaginative verse that today we are going to talk about clouds. Clouds are interesting to watch as they form and travel across the sky. As a boy, I used to lie on my back for hours at a time and watch them gather and change form. By using the imagination a little, one can see all kinds of things - mountains piled high one after another, animals of many kinds; old men with beards, sharp noses and rumpled hair; gnomes like those we see in illustrated stories of fairies; silvery sailboats smiling a sea of blue, or being tossed on whitecaps of a troubled sea.

Clouds make picture galleries in the sky
Moving pictures too,
Technicolored naturally
Against a sea of blue.

Water is one of the most common compounds we have. It is made up of two elements - hydrogen and oxygen. In the chemistry laboratory, it is called H20. When we see it winding like a ribbon through the landscape, we call it a stream. When it comes down in little round liquid masses, we call it rain. When it falls in white flakes, we call it snow. When we see its feathery patterns on the window pane, we call it frost. When we see it in tiny globules in the heart of a rose or on blades of grass, we call it dew. When we see it on the cheek of a child, we callit tears.When we see it, shooting out of the spout of a teakettle, we call it steam. When we see it fall in the form of frozen marbles of ice, we call it hail. When we see it form a solid covering over a pond, we call it ice. When we see it forming a colorful necktie across the heavens, we call it a rainbow. When we see it so finely divided that it floats over the surface of the ground, we call it fog. When we see it floating high in the air in white and sometimes

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nail and sleet; fog and clouds - these are all called the forms of water. But there is a form of water which we cannot see, and that is water in the form of vapor. You have all heard the story of the Prince who became invisible when he put on his cap of darkness, and who made far journeys through the air on his magic carpet. That sounds like a miracle, but it is no more of a miracle than when a drop of water which we can see and touch, vanishes before our very eyes - dons its cap of darkness and dissolves into thin air. When your mother hangs the clothing on the line after washing, each little particle of water that clogs that fabric soon dons a cap of darkness and disappears into the atmosphere, leaving the clothing dry. When water changes to vapor and is taken into the air, we call that process evaporation. So drying clothes on a line is simply changing water from the liquid form held in the fabric of the cloth to a form we cannot see- the form of vapor when it is held in the air.

You have heard your mother say "This is a good drying day." By that she may mean that the air is dry and not damp; for if the air is damp it already has about all the water it can hold. Or she may mean that the air is hot, and hot air will take moisture quickly and hold more of it than cold air. Or she may mean that the air is moving, that it is windy, and on a windy day cloths will dry sooner because more air moves over them than on a still day. These are things that you see every day of your life, as common as the air itself. So you know that the air is filled with invisible water; water that has donned the cap of darkness and has become invisible - vapor.

But there is a key-word which brings back this unseen vapor so that we can see it and touch it; takes it out of the atmosphere; knocks off the cap of darkness and again we have drops of water which we can see. Now that key-word is "cold". Cold is the important word to keep in mind. Let's take some very common examples. The breath of a horse, or your own breath, is invisible on a warm day, but during a gold day the vapor in your breath is changed into very small particles of water,

called mist, as soon as it is expelled from the nostrils and comes in contact with the cold air. This process of changing vapor into water is called condensation. Many of us are unfortunate enough to have to wear spectacles. They are not such a bother on warm days, but in winter the glasses get cold out-of-doors, and as soon as they are brought into contact with the warmer air of a room, they become covered with a mist. This mist is fine particles of water captured from the air by that magic word "cold." The cool window pane at evening may be dimmed with mist caught from the air in the room that comes in contact with it. If you were to examine that mist with a lens you would find it composed of tiny particles of water. If the night be very cold, we find this mist changed into a solid form in exquisite ferns and trees and stars, called frost.

Now I think we can go outdoors and see what happens there. At the end of the day, the surface of the ground cools more quickly than the air above it If the ground becomes cool enough and the air is filled with vapor, then this vapor is captured from the air, is condensed, and dew is formed. If the weather becomes very cold during the night, then the dew freezes and the crystals which are formed we call hoar frost. Now let's see how clouds are formed. You know that warm air rises and cold air sinks. The warm air near the surface of the earth may be filled with water vapor and be entirely clear; but as it rises, it comes in contact with the cooler air, then the water vapor condenses and becomes visible as a cloud. The cloud is made up of very, very tiny droplets of water which are so light they float in the air. When only a little water condenses the clouds are light colored. When a large amount of water vapor condenses the clouds are dark colored. If the air into which these clouds pass gets colder, more water vapor will condense. THEN THESE TINY DROPLETS JOIN TO MAKE LARGER DROPS. Finally they get so heavy that the air cannot support them and they come tumbling down as rain. Sometimes this rising air will strike temperatures that are below the freezing point, then the water vapor condenses so quickly that it forms fair-like crystals called snowflakes. So you can see that snow is formed just like forst is formed, only it is done in the upper air instead of near or on the ground. Sometime you allow a

darkly colored masses, we call those masses clouds. Rain and snow; dew and frost;

few of these flakes to fall upon your coat sleeve, or better yet let them fall on a pice of black cloth. Then examine a flake with a pocket lens, if you have one, if not, use the naked eye. And you will see a jewel more beautiful than any ever fashioned by the hand of man. Examine as many as you will, and you will find them all different; and yet they are all alike it having six spokes. All perfect little wheels with six spokes, always six, and each spoke decorated with perfect little leaflets and ferns; each of the six spokes on the same flake decorated just alike, but no two crystals just alike; each one a snow star, the sweeping of heaven's floor. We miss out on one of the marvels of winter when we fail to observe the snowflake. When you shovel the walks and paths, as we have had to do of late, think that with every shovel full you are handling myriads of jewels, then the work will not begin to be as hard.

Did you ever examine a piece of hail? You will have to wait until next summer to do it, but when you do, you will find that a hail stone is made up of layers of ice. Maybe you have noticed that it hails during summer thunder storms when there are strong upward rushing currents of warm air. This is what happens. Small bits of ice form in the cold air high above the earth. These fall into the warmer air and are covered with water. Then they are caught by the upward currents of air and sent into the cold upper air where they freeze again. This process goes on until the balls of ice become too heavy to be held up by the currents of air and they fall to earth. Sometime these hailstones are as large as bantum eggs. It is only on warm days that these strong upward currents of air take place, and so it is only on warm days that there is hail. When rain forms in the upper atmosphere and falls through a cold layer of air on its way to the earth, then it comes to the earth in the form of sleet.

But let's get back to the clouds. There are four types of clouds that every trailhitter should know. The first are the cirrus clouds. Cirrus means featherlike. They are made up of tiny crystals of ice and always look white. They are the highest ones in the sky, sometimes as high as nine miles above the earth. Maybe your dads call them "mare's tails."

The next one of the common kind of clouds is the "stratus." Stratus means layer, and stratus clouds are the narrow bands lying parallel to the horizon. They be as low as 400 feet, but they are usually about 2000 feet above the surface of the earth. Yesterday morning when I looked into the eastern sky, the sun shone through the different layers of stratus clouds making a scene that would make your heart shout; looked just like heaven turned inside out. These stratus clouds are really low fogs, and the kind that the moon plays "peek-a-boo" through.

The clouds that make the picture galleries in the skies are the cumulus clouds, for they roll up in all kinds of interesting shapes. Cumulus means "piled up", and there is exactly what these clouds do. They are huge, white, rounded masses with flat bases, that look like snowcapped mountains. These clouds are formed by warm moist air rising into the cool air where the water vapor is condensed into the white mist which we can see, and know as a cloud. Really, there isn't any difference, except in size, between your breathing the warm moist air from your lungs into the cool air forming a young cumulus cloud, and that of the warm moist air rising from the earth and condensing into the white mist when it strikes the cool air of the upper atmosphere. The only difference is in size, no difference in the way it works.

The fourth cloud which we want to be able to recognize is the Nimbus clouds. These are the rain and snow producing clouds. When they come up suddenly and are dark we call them thunder-heads. But they have no particular shape, and are the kind that extend over the entire sky and give it a gray cast - the kind that makes the day dark and dreary, if you will allow any day to be dark and dreary.

We have had a heavy fall of snow since our last trip afield, and it has caused us much inconvenience, and some people have said some very unkind remarks about it, but that snow is a blessing during cold winter weather. It forms a blanket over the surface of the earth that keeps the earth's heat from escaping. This fluffy snow blanket is full of air, air that is held captive among the snow

few of these flakes to fall upon your coat sleeve, or better yet let them fall on a pice of black cloth. Then examine a flake with a pocket lens, if you have one, if not use the naked eye. And you will see a jewel more beautiful than any ever fashioned by the hand of man. Examine as many as you will, and you can never find two alike. Examine as many as you will, and you

crystals. This makes a splendid blanket, just as a fuzzy wooly blanket makes a warmer blanket than one that is tightly woven. The bear that is sleeping in its den beneath the roots of a tree, finds this blanket of snow a benefit. So does your dad, if he has a field of new alfalfa or a field of winter wheat, for it will keep the soil from heaving. When water freezes it expands. You have seen how it breaks bottles, and if it didn't expand it would not form the covering over our lakes and ponds. And so the ice in the surface soil of a wheat or alfalfa field expands and buckles or heaves. But when it does it, it holds fast to the stems and leaves of the young plants and tears them loose from their roots. This is one cause for the winter-killing of plants. So, complain as we will, this snow is a blessing.

And so our trip for today comes to a close. Ranger Mac hopes that this little discussion will help you to see picture galleries in the skies, and will make your hikes afield just a bit more joyous. For

Clouds make picture galleries in the sky
Against a sea of blue
Edged with strands of silver thread
Where the sun breaks thru.

Good luck, and

May the Great Spirit
Put Sunshine into your Heart
Today, and forevermore ,
HEAP MUCH!