

CHATS WITH THE WEATHER MAN

Friday, September 16, 1932

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Speaking Time: 10 Minutes.

ANNOUNCEMENT: And now for another chat with the weather man of the United States Weather Bureau. A couple of weeks ago, one of these weather scientists told us about some of the work of the Second International Polar Year, from August 1 this year to August 31, next year. Today we are to hear something more about that Second Polar Year.

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We might start with the lines from the old song;

"Wait 'till the sun shines, Nellie,
And the clouds go drifting by" - - - - -

Only the clouds we are going to talk about are seen mostly at night; up in the Arctic, and higher up in the air than ordinary clouds are ever found. In fact, these rare clouds are one of the mysteries of meteorology.

From all accounts, however, these mysterious clouds are a beautiful sight to behold. Observers have named them nacreous clouds from a French word that means mother-of-pearl. They glow in all colors of the rainbow.

Mr. Leroy T. Samuels, of the United States Weather Bureau, says that a couple of years ago an unusual number of those rare high-flying, iridescent clouds were observed at different places in Norway, Sweden, and Finland. When plans began to be laid for this Second Polar Year, meteorologists saw in it a fine chance to make exact measurements on such remarkable clouds up there in the stratosphere fifteen miles or more up. They planned observations at different parts of the globe, especially in the Arctic and Antarctic where iridescent clouds seem to appear most often. So now our meteorologists and those of many of the other 32 countries taking part in the Second Polar Year are on the lookout for nacreous clouds. Or rather they will be next winter, especially those of them working in the extreme North.

Mr. Samuels tells me that these mysterious and beautiful luminous clouds appear with certain weather conditions in winter. They are best seen early in the morning before sunrise and late in the evening after sunset, and may remain luminous for two or three hours. As you may have guessed, these iridescent clouds probably get their light from the sun below the horizon. They can even be observed illuminated by the moon. They are beautiful, but that is not their chief interest to the weather man.

Weather men wonder what these clouds are made of. Nacreous clouds fly at heights far above those at which ordinary clouds are formed. It is, of course, uncertain whether the substance forming the nacreous clouds is water, though it is difficult to see what else it could be since iridescence is usually interpreted as indicating the presence of water droplets. If the meteorologists can find out the temperature of the air at the heights of these nacreous clouds, the temperature may give them a clue to the composition of these rare clouds.

The investigators will endeavor to send up balloons equipped with instruments to get those temperature records. Some of those radio meteorographs, by which temperatures at the different heights are automatically transmitted to the listening meteorologists on the ground by means of radio signals may be used to ferret out those facts.

In any case, where it is possible, the meteorologists aim to get accurate measurements of how high those clouds are. They may do that by photography, the same way they determine the height of the Northern Lights, or by theodolite observations from two stations at the ends of a sufficiently long base-line.

For instance, in the observations of the aurora borealis or Northern Lights which form part of this country's participation in this Second Polar Year, scientists at Point Barrow, and at Fairbanks, and at Nome, Alaska point their cameras at the same star and each take a photograph of the aurora at exactly the same instant.

The distance in a bee line between two theodolites (which are somewhat similar to surveyors transit) far enough apart being known, Mr. Samuels tells me, it is possible by triangulation to accurately calculate the height of the clouds from the elevation and azimuth angular measurements of fixed points on the clouds.

Maybe you wonder what difference it makes how high those clouds are?

But I gather from what Mr. Samuels says that is highly important. There are sometimes iridescent clouds seen at moderate heights, which are not these real high nacreous clouds of the stratosphere, but simply the commoner types of Alto Cumulus and Alto Stratus. The meteorologists want to make sure they are dealing with the real thing. But that is merely incidental. They also want to know how fast those high nacreous clouds are moving. Clouds, like straws, show which way the wind blows, and how fast.

Scientists would very much like to know more about the way the wind blows up in the stratosphere, and how fast. And that air movement is part of this old globe's wind system, a highly important part, of the winds which bring us fair weather and foul, hot waves and cold.

Mr. Samuels points out that theodolite observations of the rare nacreous clouds provide a means of determining the wind movements at heights which can otherwise be obtained only from meteor trails. During this Polar Year all methods of getting facts about the upper air currents will be used to the greatest possible extent.

Of course, the wind direction and velocity in the lower levels of the atmosphere are determined by means of pilot balloons. Observations of small pilot balloons by means of theodolites, made from 2 to 4 times daily at 70 Weather Bureau stations in the United States. These observations show the wind direction and velocity at all levels up to 4 kilometers (2-1/2 miles) or more above the ground. During the Polar Year, pilot balloon observations are not only being taken at our regular pilot balloon stations in Nome, and Juneau, and Fairbanks, Alaska, but also at Point Barrow, the northernmost tip of our Alaskan territory.

The drift of ordinary clouds is also being watched as never before in the history of meteorology. Mr. Samuels tells me 15 stations in the northern part of the United States have been equipped with nephoscopes to make detailed observa-

tions of the drift of clouds. A nephoscope is a black mirror mounted on a circular frame which is graduated in degrees, and provided with a movable sighting device.

That cloud mirror is set out in the open on a level stand where it will reflect as much of the sky as possible. As the image of the cloud drifts across the mirror, the exact direction in which the cloud is drifting can be read with a high degree of accuracy. When the height of the cloud is known, the distance the image moves across the mirror in a given time can be used to compute the speed with which the cloud is moving. The speed with which the cloud is moving is, of course, the speed of the wind at that height.

Those nephoscopes will be used to observe our ordinary clouds every day, during the Polar Year. But, as we have said, the nacreous clouds far up in the stratosphere are not everyday affairs. They occur only under certain conditions. Such rare happenings may prove to be a key to more definite information about the causes behind more usual weather conditions. And the meteorologists will not only note the clouds themselves, and measure their heights and speeds, but will also observe the weather conditions that go along with those clouds.

In some of the northern countries, when any of these rare upper-air clouds are sighted, the fact may be announced by radio so that laymen can join in the observations. Laymen can easily see those beautiful mother-of-pearl clouds and may be asked to report to the nearest Weather Bureau station their description, including such facts as the time, position, and size of any nacreous clouds observed, the colors at different parts of the cloud sheet as well as all of their changes.

As Mr. Samuels explains, cooperation in the work of the Second Polar Year is world wide, and observations on this one rare puzzle of the upper air alone will range from the simple visual studies made by laymen to the collection of data by the latest scientific instruments in the hands of trained meteorologists.

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ANNOUNCEMENT: You have just listened to a short account from Mr. Leroy T. Samuels, of the U. S. Weather Bureau, of one feature of the work being carried on by meteorologists in this Second Polar Year, extending from August 1, this year to August 31, 1933. In our chats with the weather man, you may hear of other features of the investigations as the Polar Year wears on.

National Oceanic and Atmospheric Administration

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