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UNITED STATES DEPARTMENT OF AGRICULTURE — Radio Service — OFFICE OF INFORMATION

CHATS WITH THE WEATHER MAN — Friday, December 12, 1930

ANNOUNCEMENT: Our old Ob. Server has again been chatting with the weather man at the United States Weather Bureau. It seems they had some discussion about some of the instruments for measuring the weather ----- the barometer, wasn't it, Mr. Ob. Server? ***

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We were talking about the aneroid barometer.

Ane-roid is not a girl's name. Aneroid comes from two Greek words. It means "not wet."

You know, it is one of those little round, flat tin-box affairs, with a lot of figures around a dial. I have one hanging up in my house. Maybe, you have, too. Some people who try to figure out the figures on some aneroid barometers, seem to think that the aneroid barometer is all wet, as the saying goes.

There is no liquid of any kind in it. There is no mercury in it. There is no alcohol in it. Whatever confusion there is about it, is chiefly in the minds of some people who try to read it.

Mr. B. C. Kadel, chief of the Instrument Division of the United States Weather Bureau, says the trouble is that many of those who own aneroid barometers just don't understand them. He admits, that those figures found on the dial without apparent beginning or end, may be what throws them off.

To understand those figures, let's forget Annie for a time, and think about the mercury barometer.

Take a little glass tube, a little more than thirty inches long, and sealed at one end and open at the other, and fill it with mercury. Then stick it open end down into a cup full of mercury. What happens?

Why, only part of the mercury runs out of the tube into the cup. Mercury weighing enough to just balance the pressure of the atmosphere stays in the tube. When you set up a yardstick alongside the tube, you find that the upper end of the mercury in the tube is about 30 inches above the surface of the mercury in the cup.

That is, you do if you live in a low place like Washington, D. C.--- I mean one that is near sea-level. If you tried that same experiment, at the top of a skyscraper, 500 feet high or on top of the Washington Monument, you'd probably find that the column of mercury in your glass tube was only 29½ inches. That would be because you would be above some of the atmosphere.

If you were on top of the Allegheny Mountains, you might try the same experiment, and your column of mercury would stand only about 27 inches high. And so on. The higher up you go, the less air there is to press down on the mercury in the cup and so the shorter the column of mercury the air will hold up.

But no matter where you are, high-up or low-down, if you keep your barometer in one place continuously and read it often, you find that the column of mercury varies a little in height. You'll find it varies from day to day, and even from morning to afternoon. But the biggest variation you get is usually less than an inch above or below the average.

That being the case, you will have use for only a few of the figures on your yardstick. Barometer manufacturers, Mr. Kadel explains, not only leave off the useless figures, but the unneeded part of the yardstick as well.

Now then, let's take another squint at our old friend, Annie -- Aneroid Barometer.

It is a simple little instrument. Just a little flat round metal box sealed air tight with solder and exhausted of air. One flat end of the box is secured rigidly to the frame of the instrument. With no air inside, and the air pressing on it outside, the two flat ends of that tin box would be crushed together. That just wouldn't do.

To prevent that, Mr. Kadel explains, the manufacturer attaches a spring to the other flat end of the box, to hold the two ends apart. That has to be a good, strong spring, too. It has to hold back against a pull of 50 pounds or more, depending on the diameter of the little box.

So far, that's simple enough. Well, that is almost all there is to it. When the pressure changes, the free end of the box moves a tiny bit inward or outward as the case may be. That's the way Annie measures the changes in the pressure of the atmosphere. That movement of the free end of the box is magnified by a train of levers which communicate the motion to the hand or pointer you see on the dial.

The numbers that run around the dial, the chief of the instrument division says, are taken from our same old yardstick. They have been chosen by the manufacturer of the aneroid barometer in the same way as those on the mercury barometer. In fact, a measured mercury column is used by the manufacturer to find out where to put the markings.

This simple explanation helped me to understand how barometers work. Of course, when it comes to actually building an aneroid barometer -- well that's something that takes unusual skill and special equipment, Mr. Kadel assures me. --------Now, I know you are thinking about the same thing I was when he told me all this.

Some of us literally live on a lower plane than others. If the reading of the barometer varies, as it does, with elevation, how can we compare results, say on the mountain top with those on the sea-shore? How can barometers at different elevations speak the same language, as it were?

Of course, that's just a simple problem in addition. The quaint old weather custom, is to add to the reading made at a high location a quantity that represents the weight of a column of air extending downward to sea level would have.

But right there, the Instrument Chief tells me, is where some of us sometimes get befuddled with our barometers. Some manufacturers attach special devices to the dials to do the adding for us. And some of us just set the reading far enough ahead to include the amount we would have to add.

Mr. Kadel insists that since the amount to be added is more at one time than another, both those systems are unsound. It is plainly impractical to try to dodge the job of doing that simple problem in addition.

Now, here is the way he taught me to test my aneroid barometer to see if it is working right. You just take the barometer with you up on a hill or a high building, and watch the action of the hand on the dial.

That hand should vary about one-hundredth of an inch for each ten feet of change in level.

To find out if your barometer is correct, make a reading about 8 o'clock in the morning; if it is summer time, you add one inch for each thousand feet up. In the winter, the air is colder and weighs more, so you add about an inch and a tenth for each 1000 feet up. In the fall and spring, you split the difference, and add one and five-hundredths inches.

Then you watch the newspaper for the published value for your nearest Weather Bureau Station. If you barometer agrees within 5 ot 6 hundredths of an inch with the Weather Bureau barometer, it is about as good as you can ordinarily expect.

And, by the way, Mr. Kadel says, hang your barometer in the house. The pressure is the same in the ordinary room as it is outdoors. And don't be confused by an extra hand that is sometimes fastened to the glass cover over the face of the instrument. It is only a marker to save you the trouble of remembering the reading the last time you looked at Annie.

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ANNOUNCEMENT: You have just listened to a description of that much misunderstood instrument, the aneroid barometer. Two weeks from today, we will have another chat with some of the specialists of the United States Weather Bureau. Station presents these talks in cooperation with the United States Department of Agriculture.

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National Oceanic and Atmospheric Administration

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