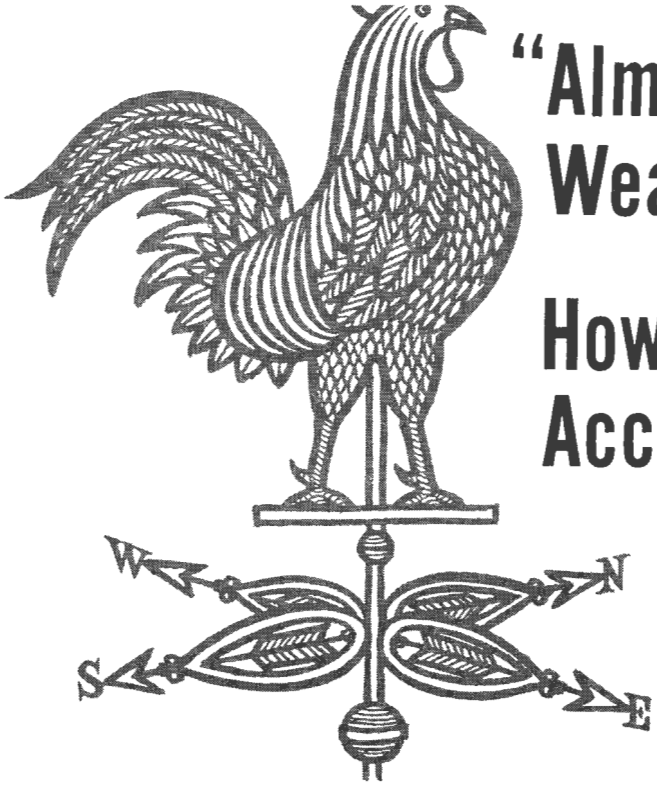
Volume 15 | Number 12 Article 5

6-1-1961

"Almanac Weather" - How Accurate?

R. H. Shaw
Iowa State University



"Almanac Weather" How Accurate?

You can check up on the weather forecasting skill of your almanac or, for that matter, your own skill and that of any other long-range forecaster.

by R. H. Shaw

YOUR ALMANAC said that it would rain, and it did. Did whoever wrote the almanac know what he was talking about? Not necessarily. Chances are that he knew little, if anything, about forecasting the weather. But he probably had some past weather records available — and, from them, he probably knew something about the chances for rain in any given month.

A professional weather forecaster, too, has past weather records available. He has, in addition, a lot of information on the present weather situation. And we assume that he has some forecasting skill whenever he makes a prediction. Any person who can reason logically and who has some past weather data can make some correct forecasts, but does he have any forecasting skill?

A forecast made by using only past temperature and precipitation data and no present weather data is a forecast based on *chance,* not skill. We can call this a no-skill or zero-skill forecast. To have any skill, a forecaster must be right more often than he or you or I could be in forecasting by chance alone.

How accurate is your almanac in its long-range forecasts? You can check up on its "skill"—or, for that matter, on your own skill or that of any other long-range forecast. In this article, we'll consider only long-range forecasts that give a day-by-day forecast further than 5 days ahead, such as your almanac. Similar schemes, however, could be developed for checking on any type of long-range forecast. For simplicity, we'll consider mainly precipitation, as rain or snow.

R. H. SHAW is professor of agricultural climatology, Department of Agronomy.

Rain and Snow . . .

The first information we need is the average number of days with measurable precipitation each month. For Des Moines (and these figures will work quite well for most of Iowa), long-time records show the average number of precipitation days per month as listed in the table. Also shown in the table are the average number of these days with 1 inch or more of snow.

Assume first that each day's weather is independent of another's. This isn't true; there's a certain persistency about the weather. But this procedure makes our first step simpler.

Summer Weather: Let's use July as an example. Notice from the table that, on the average, July has 9 days with 0.01 inch or more of precipitation. Since July has 31 days, take 31 slips of paper. Write "rain" on 9 slips, "no rain" on 22 and put them into an empty fishbowl or hat. Mix well and, without looking, draw one slip from the bowl or hat. This is your chance forecast for July 1; the next slips are for July 2, July 3, etc.

Winter Weather: The procedure is a bit more complicated for months when snow may fall. You must decide whether it's going to rain, snow or both. Let's try January as an example.

The table shows that January has a long-time average of 7 days with 0.01 inch or more of precipitation; probably most are snow, but some may be rain. There are 2 of the 7 days when more than 1 inch of snow can be expected. We'll ignore trace amounts of snow.

Label 7 of 31 slips of paper as "precipitation" days. You'll have to decide which are to be rain or snow. For this example, let's call them all "snow" days. Most of our winter precipitation is snow. April and October have had a few days with snow, and May and September have had snow on very rare occasions. If your almanac

Average number of precipitation days and days with heavy snow at Des Moines.

Month	Rain[1]	Snow[2]
January	7	2
February	7	2
March	9	2
April	10	½
May	12	0
June	11	0
July	9	0
August	9	0
September	9	0
October	8	0
November	7	1
December	8	2

[1]A precipitation day is one with 0.01 inch or more precipitation (rain, or water equivalent of precipitation).

[2]Days with snow or sleet of 1 inch or more.

or other long-range forecast says nothing about the amount of precipitation, you needn't either. If it does, however, then you should also. In this case, label 2 of the 7 "snow" slips as "heavy snow," meaning 1 inch or more. Then make your "chance-draw" forecast as in the summer example.

Modified Method: Since weather does tend to be persistent from one day to the next, you can, if you wish, take this into account in your chance-draw forecasts. July again, as an example, averages 9 days with rain. Rather than to forecast 9 rainy days to occur at random, you might use only 3 "rain" slips (each representing 3 consecutive rainy days) instead of 9 individual slips; or you might use one 3-day slip, a couple of 2-day slips and two 1-day slips, etc. (Most long-range forecasters do predict rain on 2-3 consecutive days.)

Checking Up . . .

To get a true comparison, verify your chance-draw forecast in the same way you check your almanac or other long-range forecast. Most long-range forecasts aren't made for a specific farm or community. They may cover an area of one or more states. Thus, it isn't quite fair to check the forecast by only your own specific location — even though this is the only place that it may mean much to you. If the forecast covers a larger area, however, then it's only fair to verify it that way rather than by a smaller area. But, obviously, the larger the area covered by the forecast, the more difficulty you'll have in getting the information needed to check it and the more difficulty you'll have in verifying it. This is because of the wide range of weather which may occur at the same time over a large area.

To verify a forecast against the actual weather at your location, you can make your own direct observations. (But bear in mind that even the daily forecasts don't always jibe with the weather at your specific location; predicted showers may occur but still miss your location.) So to be fair, follow newspaper, radio and television weather reports to verify the forecasts by a broader area, say your county.

Right or Wrong? Particularly if you use the modified method that recognizes weather persistency, you'll have to be firm and consistent in rules for right or wrong. If a forecast is for a 3-day period of rain, you might say that it's "right" if it rains during that period. If it doesn't, the forecast is "wrong"; likewise, it's wrong if it rains outside of the forecasted rainy period. But what if it rains just a day or two early or a day or two late? You could say, "The forecast came close, so it's really correct." But this is hedging.

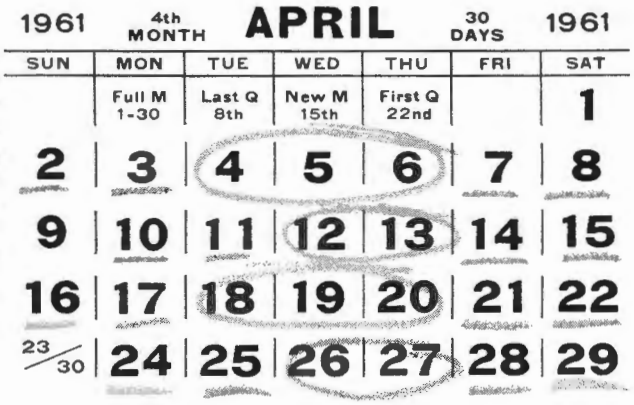
Hedging can lead to all sorts of trouble in verifying a forecast. Say that for April, instead of forecasting 10 rainy days at random for your chance-draw forecast, you used the modified method and forecasted two 3-day and two 2-day periods of rain as circled on the miniature calendar. Now, if you hedge 2 days early and 2 days late, then the 4 underlined days on each side of the circled days would be counted correct. Thus, a rainy day occurring during any of the extended periods could result in a "correct" forecast.

But, with this kind of hedging, the forecast can hardly miss if you consider both the circled and underlined days! Likewise, a forecast hedged in this manner doesn't do much forecasting other than to say, "We're going to have some weather." Your verification, hedged in the same manner, will say mainly, "Yes, we had some weather."

You can see the difficulties in hedging. The important thing is to use the *same* method of verifying your forecasts and the almanac or other long-range forecast. If you hedge on one, hedge on the other. If you count an almost-right forecast as correct for one, it's also correct for the other. Remember, too, that if there's enough precipitation to verify a rain or snow forecast, it's also enough to miss a "no precipitation" forecast.

Compare your forecasts with the almanac or other forecasts for several months. If the other forecasts are consistently more accurate than yours, it's a measure of the skill of the other forecasters. If the other forecasts aren't more accurate than yours, the forecasters' guesses, or luck, are no better than yours. And, by our definition, they have no more skill than yours.

Temperature: Just a word on forecasting temperature. You can also make long-range forecasts for temperature. The problem of verifying a temperature forecast is in knowing what the forecaster or almanac means. What is a warm, cold or hot day in relation to normal? That is, how many degrees above normal is a "hot" day. Unless you know this you can't verify such a forecast. You also must understand the terms you use in your own forecasts. If you want to make a temperature forecast, remember that ordinarily several warm days or cold days occur in a row. Consider this in your forecast.



The "dangers" of hedging are illustrated by this example. If the forecast that you're checking — your own or another one — predicted rain on the days that are circled, the days that are underlined show how meaningless hedging can become if you're willing to count the "hedged" days correct, too.