A Fallout of Horned Grebes during a Snowstorm

by **Steven B. Feldstein**

On the afternoon of Sunday April 2, 1995, my wife and I went birding to Toftrees Pond, a small 2.5 acre pond at the north end of State College. Throughout the morning, the skies remained overcast, there were brief periods of light snow flurries, and the temperatures stayed a few degrees above zero Celsius. During our drive to Toftrees Pond, the weather deteriorated and we encountered snow showers.

Upon reaching the pond at 2:30pm, we were immediately impressed with the number of Horned Grebes (*Podiceps auritus*) present. There were about 250 Horned Grebes scattered throughout this tiny pond. The plumages of these birds were highly variable, with some individuals apparently in full alternate plumage, others in basic plumage, and most birds in various stages of molt. With regard to behavior, some individuals were actively diving, but most were simply resting on the surface of the water. As I would typically encounter 1 or 2 Horned Grebes on this pond, I was truly amazed to see so many Horned Grebes present. Furthermore, although I have sometimes seen perhaps 50 Horned Grebes in a full day of birding, this has always been at large bodies of water, with the birds being scattered over many square kilometers. I have never encountered so many Horned Grebes at one time on such a small body of water.

In addition to this large flock of Horned Grebes, we also found 1 Tundra Swan (*Cygnus columbianus*), 10 Wood Duck (*Aix sponsa*), 4 Green-winged Teal (*Anas crecca*), 2 Blue-winged Teal (*Anas discors*), 1 Canvasback (*Aythya valisineria*), 1 Ring-necked Duck (*Aythya collaris*), 30 Bufflehead (*Bucephala albeola*), 1 Ruddy Duck (*Oxyura jamaicensis*), and 6 Bonaparte's Gull (*Larus philadelphia*). Several of these species are rare on this pond.

On the following day, I talked to several State College birders. One birder had visited Toftrees Pond several hours after our visit. Essentially all the ducks and gulls were still present, but the number of Horned Grebes had declined to 15 individuals. On the other hand, I have no information about the number of Horned Grebes prior to our visit of Toftrees Pond. Nevertheless, although I can't confirm that the Horned Grebes arrived on the pond at the beginning of the snowstorm, it is still very likely that this fallout of Horned Grebes was induced by the snow showers.

Being an atmospheric scientist, although not a weather forecaster, I was quite interested in examining the role that the weather could have played in this fallout of Horned Grebes. Therefore, I obtained a complete set of weather maps from the Meteorology Department at The Pennsylvania State University. The most striking maps are the radar echoes (see Fig. 1), illustrated for 12:35pm EDT (1635Z), 2:35pm EDT (1835Z), and 3:35pm EDT (1935Z) (a map for 1:35pm EDT was not available). In this figure, the shading denotes regions of precipitation, and the symbols have the following meaning: NA is not available, OM out for maintenance, and NE no echo, i.e., no precipitation. Thus, it can be seen that at 2 hours prior to our arrival at Toftrees Pond the precipitation was confined to the southern and western boundaries of Pennsylvania. Then, at about the time of our arrival to the pond, which was after the Horned Grebe fallout occurred, the area of precipitation expanded to cover most of the western and central parts of the state. However, this more extensive period of precipitation was brief, as by 3:35pm EDT most of Pennsylvania was free of precipitation. Thus, the radar maps verified that the Horned Grebe fallout coincided with a short period of

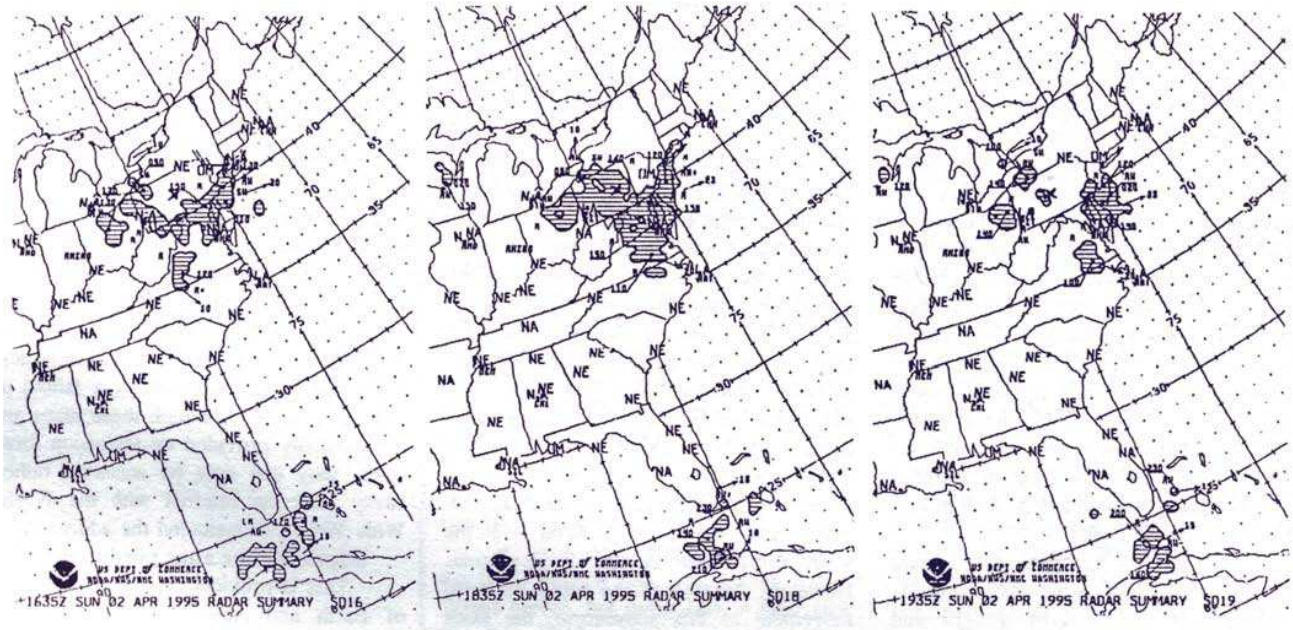

Fig. 1. Radar maps at 1635Z, 1835Z, and 1935Z. The symbol X denotes the location of State College.

snow showers.

In order to further understand this fallout of Horned Grebes, it is beneficial to examine the atmospheric circulation at a distance of several kilometers above the ground. This is because, to a large extent, the weather at the ground is determined by the wind and temperature fields at a distance between 5 and 10 kilometers above sea level. When examining the wind and temperature fields at these levels, for reasons not to be discussed here (see Holton 1992), it is convenient to examine quantities on surfaces of constant pressure, rather than constant height. For our particular purpose, we examine the 12Z (8:00am EDT) 500mb height and temperature analysis (see Fig. 2). (Millibars, typically expressed as mb, are the units of pressure most often used by meteorologists. As an example, mean sea level pressure is approximately 1013mb.) This map is available twice daily. The solid contours, multiplied by 10, indicate the height above sea level of the 500mb pressure surface, and the dashed contours illustrate temperature in degrees Celsius on this pressure surface. As an example for the height field, the number 540 just off the coast of New Jersey indicates that the 500mb pressure surface is 5400 meters above sea level at that location. The wind field, although shown with vectors, can also be inferred from this map, as the wind is approximately proportional to the gradient of the height field. In addition, in Fig. 2, I have drawn surface cold fronts (thick solid lines with shaded triangles), surface warm fronts (thick solid lines with shaded semicircles), and surface trough lines (long dashed lines). Most birders are aware of cold and warm fronts, but they are probably not familiar with surface troughs. Briefly, surface troughs are weak disturbances at the surface, show some temperature contrast as with a front, and are often associated with precipitation. Furthermore, although not shown, features such as those illustrated in Fig. 2 all propagate in an eastward direction.

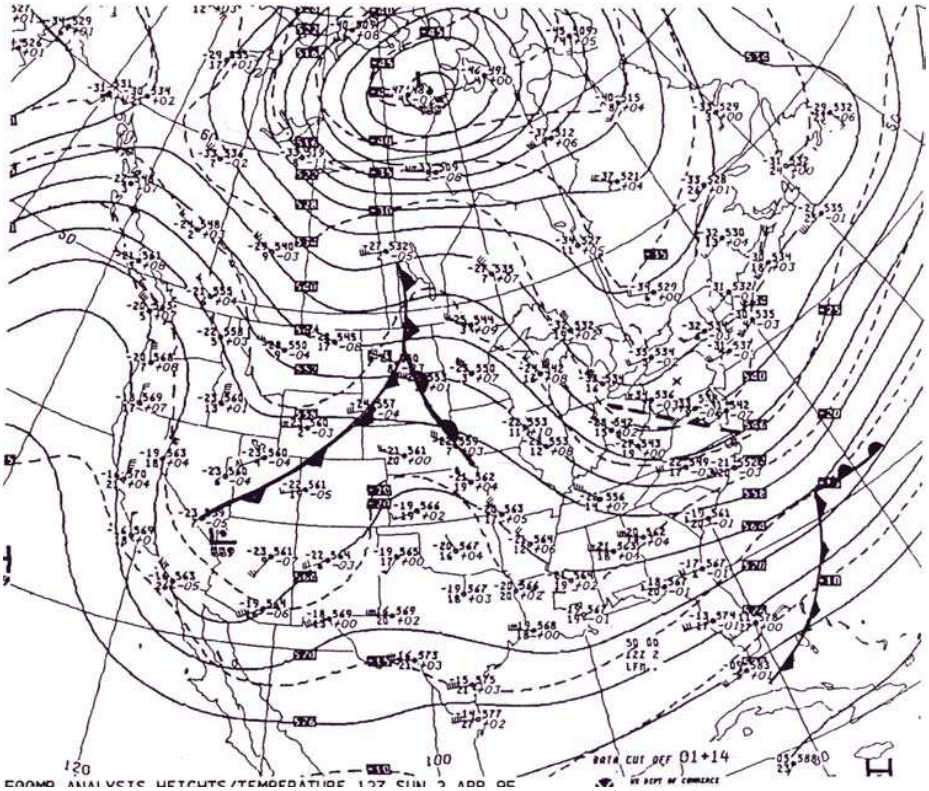

Fig. 2. The 500mb analysis of height and temperature. The surface warm and cold fronts together with the surface trough are also shown. See text for a description of frontal and trough symbols. The symbol X denotes the location of State College.

Typically, the 500mb height contours are organized into wave-type patterns, consisting of well defined troughs and ridges. Furthermore, surface fronts and troughs, and the associated precipitation, are usually located to the east of the 500mb height troughs. All of these properties can be clearly seen in Fig. 2. With regard to the weather in Pennsylvania, and the Horned Grebe fallout, there is a 500mb "short wave" trough present over Lake Erie, and a surface trough is located to the southeast. (Recall that the time of this map corresponds to 8:00am EDT. The 500mb trough must have passed over central Pennsylvania several hours later) An important characteristic of 500mb height waves is that those waves with a shorter wavelength propagate eastward more rapidly. Thus, the 500mb "short wave" over Pennsylvania, together with the surface trough, are expected to quickly propagate across the state. This was indeed found to be the case. Returning to the fallout of Horned Grebes, this suggests that the migrating Horned Grebes were driven down as they encountered snow showers associated with the short wave over central Pennsylvania. However, because of the rapid eastward movement of this snowstorm, the skies quickly cleared, allowing for most of the Horned Grebes to resume their northward migration after just a brief rest on Toftrees Pond.

Many birders often choose to go birding by watching for the forecasted passage of warm or cold fronts. However, this fallout of Horned Grebes, and other species, serves as an example that fallouts can occur when strong warm or cold fronts are not present. In this example, the fallout coincided with the passage of a short wave and a surface trough. These short waves in the 500mb height field are often well forecasted. Thus, birders should also keep in mind that the passage of short waves (maps at levels other than 500mb, such as 300mb or 700mb, show similar characteristics) often can be accompanied by a fallout of migrating birds. Although these maps are not normally provided on television forecasts, they can now be accessed rather easily over the Internet with the World Wide Web. I recommend the address:

http://thunder.atms.purdue.edu/

This is provided by the Department of Earth and Atmospheric Sciences at Purdue University. One can see both current observations and forecast maps, and lots of other interesting information about the weather such as radar maps and satellite photographs, long range forecasts, warnings, etc.

There is an easy to follow menu.

For example, if one wanted to see the forecast maps, one would first click "Forecast Model Data", and then select "NGM Model Forecast", followed by the time of the forecast and the map of interest, such as the 500mb height map described in my article. As another example, if one wanted to see a radar map, click "Best of WXP" Images" followed by clicking "Radar Data Plots". One can then see the location and intensity of the precipitation. Also of interest to birders are the current observations. To obtain these, just click on "Current Data Observations" and follow the menu. This is where one can see present surface highs and low, fronts, etc.

Another useful address is from the University of Illinois. The WWW address is **http://www.atmos.uiuc.edu/**, but I find the Purdue University information quite easy to use.

Acknowledgments:

I would like to thank Harry Henderson for his beneficial discussion on the weather maps.

References:

Holton, J.R. 1992: *An Introduction to Dynamic Meteorology*. Academic Press, 511 pp.

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The Veteran and the Neophyte

by **Allen Schweinsberg**

When introduced to the hobby of birding, were we not initially amazed at the ease with which the experts made snap identifications of birds that barely reached our binoculars before they disappeared? Many, perhaps most, readers of *Pennsylvania Birds* have acquired a fair amount of field experience and are now considered by others to be one of those experts. With some modesty, you will admit that your mind mysteriously, effortlessly, and instantly, processes a huge amount of information (season, range, habitat, behavior, prior occurrence, and the barest of glimpses) to produce quick pronouncements — "Song Sparrow," "Hermit Thrush," "Orchard Oriole" that baffles the beginners at your side.

So, join a veteran, a neophyte (12 years old), and assorted other birders on a "big day." It is early afternoon on 13 May in Union County, Pa. All are tired, having been up since 3 a.m., but spirits are high.

Minutes earlier, they ticked off Swainson's Thrush, White-crowned Sparrow, and Red-headed Woodpecker and as a bonus had good looks at a mink swimming with nesting material. They are trudging back to the two automobiles, now in sight, and are not especially quiet or vigilant. The habitat is not particularly distinguished — a creek on one side of the path, a field containing last year's corn stubble on the other side. The neophyte and the veteran lead the way.

The neophyte: "Look Allen, a Sedge Wren!"

The veteran: (spoken softly so as not to rebuke the impulsive outburst of a 12-year old), "No Joe, it's just a House Wren." -- the veteran's mind having instantly processed season, range, habitat, behavior, prior occurrence, and the barest of glimpses.

But it is a Sedge Wren. It is a Sedge Wren! It stands its ground dumbly, grasping a pair of last year's goldenrod stalks. It is fully visible in sunlight, ten feet away.

The veteran: "Uh ..., uh ... , let's see ... , striped crown, striped back, lots of rich brown coloring under the tail ... ."

By now seven birders are staring at the bird. Several had seen furtive Sedge Wrens before, but never one in their face like this. Field guides are produced. Pictures are shared. Text is read aloud. Amid the commotion the wren doesn't budge.

Then someone exclaims, "a hawk!" Distracted from the wren, eyes look overhead, and the veteran proclaims it to be a Cooper's Hawk (he gets this one right). The hawk is flying high but suddenly plunges down, down, and swoops, barely missing a robin a few feet from the ground. The birders cheer at the spectacle. "Wow!" "Whew!" What does this do to the wren? It moves only a few feet. It is not going to be shortchanged of its fifteen minutes of fame. After several more minutes the wren departs, as do the sated birders.

Now what are we to make of this episode? What went wrong with the veteran's mental computer, and how could the neophyte be so quick and so correct?

First consider the veteran. Let's not be too harsh on him. He has already paid a price (considerable embarrassment) for violating one of the principle maxims of field leadership — never miscall a bird unless it is flying directly away from you. Was he lazy? careless? tired? Probably all of these, but perhaps something else contributed to the error. His mental computer had considered range, habitat, prior occurrence, etc. It virtually eliminated all possibility of a Sedge Wren. This was a county with no prior record of the bird, a county without two sedges to rub together. The veteran was not at all prepared to find a Sedge Wren; he was handicapped by his experience.

And what of the young neophyte (Joe Gyekis — remember the name). He was prepared. [Remember those days when you pored over every page of your first field guide and stared at every illustration. You had no mental computer then; instead you had to study and learn fieldmarks. Remember fieldmarks?] No one told Joe he couldn't see a Sedge Wren; when he did see one, he nailed it.

Perhaps we can generalize. Is it not the case that revolutionary insights and discoveries are often made by the young — by the thirty-year old scientist, not the sixty-year old scientist? Veterans are indeed limited by experience. They know the enterprise is difficult, that a cure will not be found in this decade, that the current theories are sound. The young are less limited. They expect more. They try harder. They are rewarded proportionately.

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