## Caching, Bird Memory and Us

If you watch your feeders now and see a White-breasted Nuthatch coming for sunflower seeds, you may notice that this upside-down artist will return frequently. What a greedy little bird! If you can continue to watch where the nuthatch goes with the seed, you may spot it hiding a sunflower seed under the bark of a nearby tree. Nuthatches will wedge seeds in the crevices of rough-barked trees for future use or will put seeds in crevices temporarily in order to smack them open with their substantial beaks. Alzheimer's and Parkinson's diseases. These stem cells were found after the ability to remember song was erased in Zebra Finches and then regrew.

The corvid family of birds, the crows and jays and ravens, are very adept at caching food and have pretty amazing memories. Ornithologists have studied some of these species intensely. All three genera have representatives in Newton: we see Blue Jays, American Crows and Northern Ravens.

The storing of food for future use, known as "caching," is a behavior pattern of quite a few birds. Our local Whitebreasted Nuthatches and Black-capped Chickadees are two local species that do this.

After storing the food, the bird in question has to remember where to return later to look for the stash. In fact, researchers have found that Black-capped Chickadees grow new neurons in the hippocampus area of their brains each fall



Black-capped Chickadee

Blue Jay pairs will stash food and keep it secret from other Blue Jays, chasing them off when necessary. This behavior is more common when food is difficult to find. When there are a lot of feeders around, there is no need for caching. American Crows have similar behaviors, and both Blue Jays and American Crows are silent when they are busy caching food. They don't want to attract attention to their food cupboards.

and winter. This part of bird brains, as well as our brains, is the area where memory functions are located. Presumably the chickadees are increasing memory functions to help find and remember food sources, including their own caches. This research is of interest to us as it was long thought that we could not grow new brain cells.

An Argentinian biologist, Fernando Nottebohm, has worked with canaries and with both wild and captive Black-capped Chickadees. The wild chickadees experienced more brain cell growth than the captive birds. They have more need of spatial memory in the winter to locate food sources. Nottebohm's research has spurred research on human diseases, including Huntington's disease.

The neuronal growth in the canaries was in a different part of the brain: the HVC, the high vocal center. This area of the brain is related to the learning of complex new songs. Thus, birds also grow new neurons as they approach the season of breeding and the singing of their often-complicated songs. One can imagine the amount of new vocal learning in our local young mockingbirds or catbirds.

More research by Nottebohm's group--and at Boston Children's Hospital--has uncovered neuronal stem cells in humans that could help with memory problems such as An ornithologist at the University of Washington, John Marzluff, has shown that not only can crows remember individual human faces, but they can pass along this information socially to the next generation. He had folks wear two different types of masks and go among crows. One sort of masked person trapped the crows. Five years later, the crows remembered the trapping masks and also had taught this to their relatives and offspring. All of these crows got agitated and mobbed the people wearing the trapping masks.

The most amazing memory feats documented in American corvids are those of the Clark's Nutcracker, an audacious and bright jay-like bird of the West. They cache thousands of pine seeds over the summer and depend on remembering where they stored the food in order to make it through the winter. They remember many of the caches and seem to use a system of local landmarks to find the stores.

Northern Ravens may be the most intelligent birds that appear in Newton. The University of Vermont biologist, Bernd Heinrich, has written two fascinating books about ravens, "Mind of the Raven" and "Ravens in Winter." The ravens that have been seen in Newton, so far, have been seen in the spring and summer, when there would be little need for caching.



Waltham, West Roxbury and Wellesley College are the raven nest sites that are closest to Newton. As I write this article in December, I am hearing a Northern Raven croak along the Cochituate Aqueduct, west of Cold Spring Park. During cold winters in Maine and Alaska, the ravens will follow wolves and human hunters, planning to be the first scavengers at the kill. After eating for the present, they then often cache chunks of meat for the future.

> Another bird that caches is the Northern

Shrike. This small. gray bird turns up in

the winter. It feeds

on insects and small

birds and mammals.

Shrikes have curved

(which can be seen

in the accompanying

beaks like hawks

Nahanton Park during



Northern Shrike

photograph) but are not closely related to hawks. Shrikes are more closely related to the vireos, which look more like our wood warblers. According to recent research reported in Science Magazine, they may have evolved from a distant dinosaur relative that they have in common with the predatory birds we call raptors. Most birds lost the predatory beak, but not the little shrikes. During the winter, a shrike will store extra food by

lodging it in the crotch of a tree or hanging it on a thorn. They return later to finish eating the stored food.

Another behavior that is similar to caching is found in

the Yellow-bellied Sapsucker, which is in the woodpecker family. They drive holes through the bark of tree, to the living layer of cambium cells. The resulting ooze of sap attracts insects to the sweet fluid flow. The sapsuckers then return to dine on the insects Yellow-bellied Sapsuckers are hard to



Yellow-bellied Sapsucker

come across during our winters: most of them are south of Newton for the winter. The photo shows a male Yellowbellied Sapsucker on a tree that is replete with old sapsucker holes. Some of the holes appear to have been enlarged to get at the insects around them. Both males and females are quite striking birds to see, but it is the males that have the brilliant red throats.. They all have the large beak shown in the picture.

→ Pete Gilmore

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**Cedar Waxwing** Photo by Pete Gilmore

