

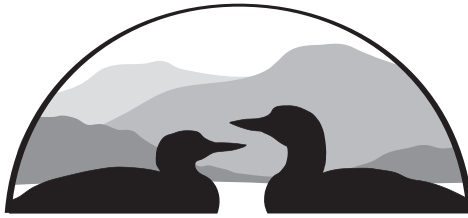
# New Hampshire Bird Records



**Summer 2012**

**Vol. 31, No. 2**

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# **New Hampshire Bird Records**

## **Volume 31, Number 2**

### **Summer 2012**

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# Kestrel Want a Cracker? – More Messing with the Order of Things

by Pam Hunt

It wasn't all that long ago (Summer 2011 issue of *New Hampshire Bird Records* (NHBR): Vol. 30, #2), that I hinted at some major rearrangement of the falcons on the avian evolutionary tree. The exact quote was: "which may be closer to parrots, but that's another story." Indeed it is, and because you may have a little difficulty finding the falcons in this issue of NHBR, the time for that story has come sooner than we thought.

To recap, it was recognized in 2011 that falcons were not actually all that closely related to the more traditional hawks. This evidence came from three independent studies of DNA, including one study that also tried to calibrate DNA changes against the fossil record. In 2012, the Falconiformes was officially moved from after the hawks to a new and exciting neighborhood; next to the passerines along with parrots (which were also moved significantly). Parrots and passerines are now considered to be more closely related to each other than either is to any other group of birds, and the next closest group to these is the falcons (see Figure 1). Taken another way, a Peregrine Falcon is a closer cousin to a Ruby-crowned Kinglet than it is to a Bald Eagle. Sort of humbling, isn't it?

I won't go into all the exciting details about "Mesozoic retrozoons" and "gene jackknifing," (two of the tools used to determine the new relationships) and instead share some thinking about why we might have been so wrong for so long. Hawks and falcons are clearly quite similar, what with their raptorial talons, strongly hooked

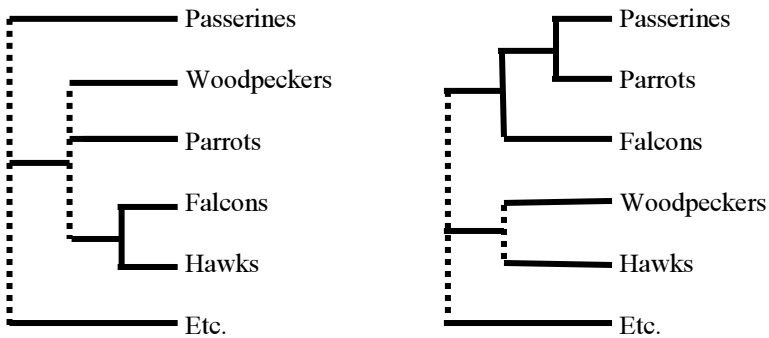


Figure 1. Simplified diagram showing relationships among groups of birds mentioned in this article. The left diagram represents how these groups were classified prior to the recent rearrangement of parrots and falcons, while the right shows the new relationships. Groups connected by shorter lines are considered more closely related than those connected by longer lines. Dashed lines indicate that not all families of birds in a given grouping are shown in the diagram.

beaks, remarkable eyesight, and migratory habits. Except for the migration part, however, these characters are also shared with owls, and it's been a long time since anyone lumped owls with the diurnal birds of prey (obviously there are some pretty significant structural differences involved!). All these predatory adaptations are just that; adaptations among species sharing a very similar lifestyle. Hawks, falcons, and owls are the avian epitome of this trend, but several other groups have evolved parts of the package. Jaegers, for instance, have strongly hooked bills that facilitate a vole-based diet on the breeding grounds, as do shrikes, which now turn out to be close cousins to the falcons anyway. Interestingly, shrikes and falcons are the only birds with something called a "tomial tooth," (see photo) a secondary "tooth" on the upper mandible just in from the hooked tip. The point here is that it's pretty easy to find similarities among birds that may or may not be all that closely related.

This whole "lifestyle dictates morphology" thing is called "convergent evolution," and it explains a lot of what we see in the natural world. Keeping within birds of prey, both harriers and owls have well-developed facial disks that aid in locating prey through hearing, but no one is saying they're close relatives because of this. Just as we wouldn't say that shrikes and falcons are in the same family because of a tomial tooth. Morphology has a way of standing out to visual creatures such as humans, but deep under all the feathers it's the genes that are really running the show. When we take a closer look at those genes, we can sometimes find some pretty interesting stuff! Including the fact that falcons are not really raptors.

There is, of course, no guarantee that this state of affairs is permanent. Not all that long ago, DNA-DNA hybridization (a technique to measure the relatedness of species; see *New Hampshire Bird Records*, Winter 1998-99, Vol. 17, No. 4, p. 36) was all the rage, but some of those analyses have since fallen from grace. The fact that three separate studies using different genes all propose this falcon-parrot-passerine group, however, suggests that it may be a pretty solid relationship. We'll just have to get used to it!



*Peregrine Falcon bill showing the "tomial tooth" on the upper bill. Photo by Norm Smith.*

## Abbreviations Used

BBC	Brookline Bird Club	R.	River
BBS	Breeding Bird Survey	Rd.	Road
CA	Conservation Area	Rt.	Route
CC	Country Club	SF	State Forest
CFT	NH Audubon Chapter Field Trip	SP	State Park
FT	Field Trip	SPNHF	Society for the Protection of NH Forests, Concord
IBA	Important Bird Area	T&M	Thompson & Meserves (Purchase)
L.	Lake	TNC	The Nature Conservancy
LPC	Loon Preservation Committee	WMA	Wildlife Management Area
NA	Natural Area	WMNF	White Mountain National Forest
NHA	New Hampshire Audubon	WS	NHA Wildlife Sanctuary
NHBR	New Hampshire Bird Records	~	approximately
NHRBC	NH Rare Birds Committee	WTP	Wastewater Treatment Plant
NWR	National Wildlife Refuge		
PO	Post Office		

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