

## Geese Veeing And Seeing

The iconic V shape provides form and function for Canada's bird

Almost anywhere in Canada, if you look up in spring and fall, you'll see migrating geese. Most often, they will be flying in V formation. But why that pattern? Is it just because a G would be more difficult to spell? Possibly, but bird studies and aerodynamic principles suggest that there are at least two good reasons for that flight formation.

The first reason is that the V formation (called a skein) can save energy for all participants except the lead goose. To fly, a goose, like any bird, extends and flaps its wings. Wing flapping pushes against the air and provides the bird's forward motion. On the downstroke, the feather vanes push the air, while on the upstroke the primary flight feathers twist slightly to allow air to pass through. To provide lift, the wings and feathers are shaped like an airfoil, that is, thicker at

the leading edge and more curved on the top than underneath. Air, having to move more quickly over the upper, curved surface, has lower pressure than the air passing underneath the wing and this pressure imbalance allows the bird to lift off.

As the goose's wing moves the air, it creates vertical rotating patterns at the wing tips called vortices. If the next bird in line can locate itself behind the wing tip of the bird in front, just where the air is rotating up, it gets a free boost and saves 10 to 15 per cent of the energy it would otherwise spend. This benefit from wingtip vortices is then passed along in two diverging lines of flying geese, creating the V pattern.

There can be some compounding, so that the energy saving can be as much as 65 per cent thanks to flying in a skein versus flying alone. Interestingly, this

benefit seems to apply only to big birds like geese, and as such migrating flocks of songbirds do not take the V shape.

Studies of geese skein patterns found that some of the birds are not positioned to take maximum advantage of the vortices from the birds in front. A theory is that they compromise some of the boost in order get into a position to better see and to communicate to all other birds in the group. This means that there is an optimum shape to the V that allows each bird to gain most of the lift from the vortices, but also see all of the others in the group clearly.

However, in the studies, these two reasons don't seem to account for every position taken by birds in the skein, so there may be a third reason why migrating geese fly in V formation that we don't yet know.

— Brian Harris



RYAN VINCE