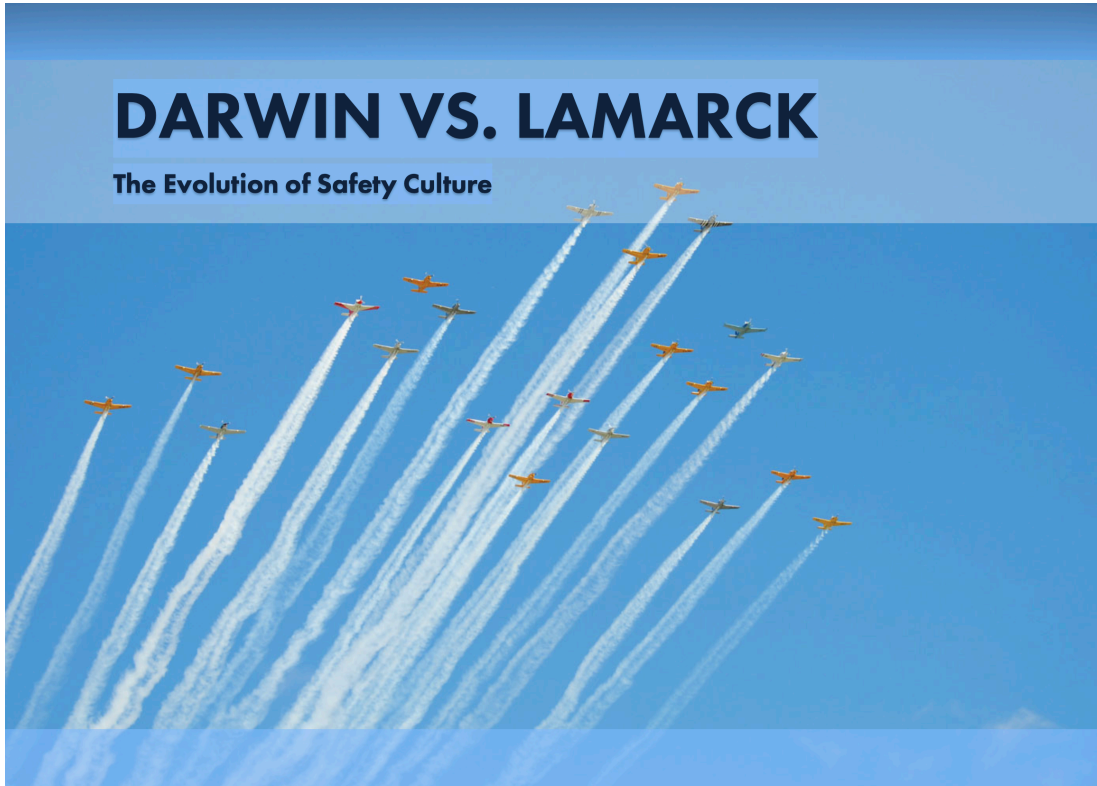# DARWIN VS. LAMARCK

The Evolution of Safety Culture

--by James Williams, FAA Safety Briefing

Most people probably know who Charles Darwin is, but I suspect most have never heard of Jean-Baptiste Lamarck. Allow me to make introductions. Before the Darwinian theory of evolution through natural selection, there was Lamarckian evolution. Part of Lamarck's theory was the idea of use and disuse to explain how species changed over time.

The classic example of this idea is the giraffe's long neck. In Lamarck's world view, the proto-giraffe strained to reach leaves high on the acacia tree that other animals couldn't reach. This repeated strain and stretching would lead to a lengthening of the proto-giraffe's neck. That proto-giraffe would pass that added length on to its offspring. The result, over generations, would be the long neck of modern giraffes.

Supporting this theory, at the time, was the fact that both humans and giraffes have only seven neck vertebrae. In fact, the vast majority of mammals have the same number of neck vertebrae with the notable exception of manatees and sloths. As it turns out, Lamarck was right about the motivation but wrong about the mechanism. Darwin would later posit his theory of natural selection, that change in species occurs through differential success in reproduction. The change is driven by genetic material rather than traits acquired during life. Gregor Mendel would more or less confirm this later with his work on heredity/genetics.

So does that relegate Lamarck to the backwater of a trivia answer you may never use? In fact, his work is worth remembering because it is foundational to a lot of evolutionary thinking. Albeit with the wrong mechanism, Lamarck basically invented the concept of evolution. No one had previously offered a cohesive theory. It seems to me that pilots should remember Lamarck because he was very right about a different kind of evolution, one that's absolutely critical to humans — cultural evolution.

Safety Culture

Cultural evolution, as it turns out, is Lamarckian. Our acquired experience and knowledge can be passed along. The Lamarckian process allows for rapid and, more importantly, directed change. We can actively improve ourselves and our communities. Building a safety culture might seem like a herculean task, but it isn't one you'll be doing by yourself or from scratch. It's also not a process with a definitive end. Like natural evolution, it's a process of continuous change. We can harness that change and drive it to a better outcome. Here are a few ways to do that.

COMMUNITY

Just as a species requires a population, a culture requires a community. You need a community with good diversity because that gives you the widest possible view of an issue. You are leveraging other people's experience and expertise to improve your own. A type club offers an excellent way of finding such a community. A type club, particularly a large/national one, gives you great diversity of experience. But even smaller type clubs can have great benefits.

"Type clubs offer great camaraderie that leads to great safety benefits," explains Kyle Ludwick, the Experimental Aircraft Association's (EAA) Manager of Partnership Development. "People think it's mainly a social thing, but you also learn about your airplane. It's a great place to share best practices, what to do, what not to do, and how to properly own, fly, and maintain your airplane."

If you've never been involved in a type club, go out and attend a fly-in," Ludwick says. "Most type clubs are very welcoming even if you're not a member." He continues, "You're going to learn a ton. These fly-ins have become great training opportunities."

EAA has two new guides that are designed to help smaller type clubs create safety benefits enjoyed by their larger cousins. First is the Type Transition Guide, which aims to create a template for a training guide for aircraft types that don't have one. Next is the How to Start a Type Club Guide. This guide is intended to start a new, or revitalize a dormant, type club based on the best practices derived from the Type Club Coalition, a consortium of nearly 20 agencies and type clubs formed in 2015. The goal is to develop strong communities around as many types as possible. Strong communities can have a tremendous impact on safety.

STRUCTURE

Good cultures need a structure or framework. An interesting place to start is the Aircraft Owners and Pilots Association (AOPA) Air Safety Institute Scalable Safety Framework (SSF). The SSF solves a fundamental challenge of Safety Management Systems (SMS) — scale.

Scalable Safety Framework (SSF)

A practical safety program for general aviation organizations developed by the AOPA Air Safety Institute

SMS is a great tool for driving safety improvement, but smaller operators may perceive it as overkill. The SSF boils SMS down to its core concepts and provides a more flexible solution. It is intended for tailoring to fit your situation rather than to meet regulatory requirements. The core areas are: Safety Commitment, Definition of Roles and Responsibilities, Risk/Hazard Identification, Safety Reporting, and Culture. How you approach these areas will depend on whether you are working in a small group or a large one.

"The major benefit of the SSF is improving GA's safety culture. Allowing pilots and organizations to think through the risks and hazards associated with GA flying brings safety to the forefront of the conversation," explains Robert Geske, Manager of Safety Analysis for the AOPA Air Safety Institute. "The program is designed to have a positive impact on GA's safety culture by: 1) encouraging more safety reporting, and 2) providing flying groups with a scalable framework to create a customized safety reporting system that has a meaningful impact on those that use it, whether they have two pilots, or two hundred." Geske continues, "Getting buy-in from pilots, mechanics, dispatchers, and organization leadership is much easier when they are involved in customizing the program to meet their specific safety goals."

According to Geske, the response has been very positive. "Since its release in March this year, the material has been downloaded more than 200 times," he says. The AOPA Air Safety Institute (ASI) has developed an interactive presentation that guides groups or individuals through the steps necessary to create a functioning safety program. "So far we've heard from several flying groups that the SSF is a valuable tool that fills a previous gap in safety reporting. The SSF PowerPoint presentation, which is included in the downloadable program, can be delivered by an ASI or conducted independently by flying groups."

CODES OF CONDUCT

Codes hold an important place in culture. Professional codes fill the space above the legal minimums of regulations and address an ethical component that regulations might not have addressed or emphasized. Professional codes of conduct are also designed, implemented, and enforced by your peers, who can sometimes be more influential than authorities. Codes can be a form of positive peer pressure to help you up your game in terms of safety. Another great thing about codes is that they can be more flexible than a regulation or rule, which means they can be continuously updated to meet any new challenge. Another benefit is that you don't have to be in a group to use a code of conduct; they're scalable to individual use.

A great place to start in that regard is the Aviators Code Initiative (ACI). The ACI is a nonprofit dedicated to creating and advancing innovative aviation safety tools. The primary focus is on aviation codes of conduct. ACI has codes for a variety of pilot certification levels and aviation professionals including AMTs, flight instructors, UAS pilots, helicopter pilots, light-sport pilots, student pilots, and more. These codes of conduct are flexible and, much like the SSF, intended to be adapted by the person or organization using them.

AVIATION MAINTENANCE TECHNICIANS CODE

AMTMCC
AVIATION MAINTENANCE TECHNICIANS MODEL CODE OF CONDUCT

Tools to advance AMT safety, citizenship and professionalism

AVIATORS CODE

AMCC
AVIATORS MODEL CODE OF CONDUCT

Tools to advance aviation safety and professionalism

FLIGHT INSTRUCTORS CODE

FIMCC
FLIGHT INSTRUCTORS MODEL CODE OF CONDUCT

Tools to advance flight and ground instructor safety and professionalism

FLIGHT SAFETY IN THE DRONE AGE CODE

FLIGHT SAFETY IN THE DRONE AGE

Safety guidance for manned aircraft pilots operating in the presence of drones

GLIDER AVIATORS CODE

Recommended voluntary practices to advance flight safety, airmanship, and the glider community

HELICOPTER PILOTS CODE

HMCC
HELICOPTER PILOTS MODEL CODE OF CONDUCT

Tools to advance helicopter flight safety and professionalism

LIGHT SPORT AVIATORS CODE

Recommended voluntary practices to advance flight safety, airmanship, and the sport aviation community

SEAPLANE PILOTS CODE

Recommended voluntary practices for seaplane pilots to advance flight safety, airmanship and the aviation community

STUDENT PILOTS CODE

STUDENT PILOTS MODEL CODE OF CONDUCT

Recommended voluntary practices for student pilots to advance flight safety, airmanship, and the general aviation community

UAS PILOTS CODE

UAS PILOTS CODE

Tools to advance UAS safety and professionalism

The launching point for this initiative was the Aviator's Model Code of Conduct (AMCC). The AMCC was designed to distill expertise and experience of experts

from across aviation into something that could benefit anyone involved in aviation, hence the efforts to expand to as many subgroups as possible. The AMCC was also designed to be a model, meaning that it is more of a template than a prescription. It is designed to work in concert with concepts like best practices from type clubs and the SSF.

"We still need data on uptake in the operational world, but the level of interest from institutions seems to have increased a lot," explains Bill Rhodes, Ph.D., member of the ACI Permanent Editorial Board. "At the moment, status quo is probably a safe bet for the AMCC, but other areas like UAS are changing with some urgency as the technology is rapidly changing."

"The latest proposals are not so much about conduct, of course, as they are about technology," says Rhodes. As an example, Michael Baum, J.D., M.B.A., Airline Transport-rated pilot, and ACI Permanent Editorial Board Member noted that, "the development of Urban Air Mobility (UAM) merges people and UAS and presents important ethical precepts to which we will continue to respond."

CHANGE IS GOOD

Any theory of evolution is ultimately about change. While we sometimes fear and struggle with change, it can be a powerful benefit in cultural evolution. By combining the wisdom of a strong community with the structure of a system like the SSF, along with the ethos of the AMCC, you have a strong basis for a good safety culture. But that's just a starting point. The key to a robust safety culture is constant evolution.

The examples cited here are one basis, but not the only one. Nature shows us that more than one approach can often converge on a solution to a problem. The important thing is to constantly ask yourself how you build your safety culture, and what you can do to keep its evolution going.

LEARN MORE
- "Kaleidoscope Community," *FAA Safety Briefing* – Sep/Oct 2018
- Type Club Coalition's Type Transition Guide
- Aviator's Code Initiative
- AOPA ASI Scalable Safety Framework

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