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It's Raining Cats and Dogs ... and Fish and Frogs ... and Birds

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Periodically, the news brings us really weird stories. The story of thousands of red-winged blackbirds dead on the ground in Arkansas on New Year's Day 2011 is a recent example. The reactions to this story provide a good illustration of some of the key aspects of the nature of science, which make science such a powerful tool for understanding the world around us.

I don't live in Arkansas, so my exposure to the story was through radio news and commentary. A discussion on the "On Point" radio show (<http://www.onpointradio.org/2011/01/bird-death-future>) provided a clear distinction between the way scientists and non-scientists approach such an event.

While callers to the show brought up a variety of "I heard/read it was" ideas, the science experts on the show consistently couched the event in terms of testable questions using available and obtainable evidence. Early in the exploration of a weird event such as this, almost anything might be possible. The essential skill that scientists bring to such a situation is the ability and habit of mind to immediately turn wild speculation into testable questions, and to identify the evidence that would allow that question to be answered. The following table summarizes some of the potential explanations, along with evidence for and against.

Possible Cause	Evidence For	Evidence Against
Poison		<ul style="list-style-type: none">• Broken bones• No food in digestive tract (i.e., no recent ingestion of poison)• No chemicals in bodies
Fireworks startling birds into flight	<ul style="list-style-type: none">• Trauma on leading edges of birds (heads, broken beaks, front edge of wings)• Radar shows many	<ul style="list-style-type: none">• Why not every time there are fireworks?

	birds rising into sky after loud fireworks blast	
Radar		<ul style="list-style-type: none"> • Weather radar commonly detects birds and is constantly used
Atmospheric disturbance/Lightning	<ul style="list-style-type: none"> • Birds fly in the atmosphere 	<ul style="list-style-type: none"> • Radar shows a quiet night
Inner ear rupture	<ul style="list-style-type: none"> • Possible result from fireworks 	<ul style="list-style-type: none"> • No evidence in bodies
Supernatural cause	Not testable; science cannot address. Other explanations offer explanation without invoking this.	
BP oil spill-related		<ul style="list-style-type: none"> • No chemicals found in bodies • No birds dead in roosting area • Blunt trauma to leading edges of birds
Nerve gas leak		<ul style="list-style-type: none"> • No chemicals found in bodies • No birds dead in roosting area • Blunt trauma leading to edges of birds

Additional testing was done on bird bodies during the month of January, and nearly a month after the event a final report was released (see for example: http://www.msnbc.msn.com/id/41283576/ns/technology_and_science-science/). This report, of course, received far less attention than the initial sensational event. But it confirms the evidence discussed by the scientists in early January: all evidence fits the hypothesis that the birds (about 1.6 million in this flock) were startled awake in the middle of the night by loud New Year's fireworks, and about 5,000 to 6,000 died as a result of blunt force trauma due to collisions with mailboxes, vehicles, houses, etc, while flying about in a panic in the dark. This type of event does not happen at other times, because such large flocks occur only in winter, and only in a few parts of the country.

This case illustrates the practical use of science as a tool to understand new situations and answer new questions that may arise in the course of life. Though none of the scientists involved learned about exactly this scenario as part of their education, their science education nevertheless gave them the tools they needed to find an explanation. The importance of expertise is also highlighted here: scientists who study these birds already had some important knowledge about the species and their habits that was helpful in sorting through the evidence (i.e., that red-winged blackbirds gather in huge flocks in winter near agricultural areas that offer food sources, that they sleep at night in large roosts, and general ideas about how birds fly in huge flocks without (usually) colliding with anything.)