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The features marked with a star (\*) are based entirely on material taken straight from standard research (and other Official and Therefore Always Correct) literature. Many of the other articles are genuine, too, but we don't know which ones.

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**The Improbable Research podcast is back!**

[https://www.improbable.com/  
category/the-weekly-improbable-research-podcast/](https://www.improbable.com/category/the-weekly-improbable-research-podcast/)

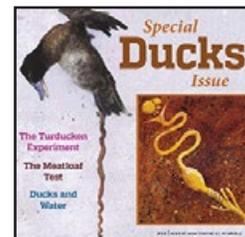
### Where There's More

There's always new improbable — it's not what you expect! — stuff on the **Improbable Research blog** at [IMPROBABLE.COM](https://www.improbable.com)



### On the Front Cover

Artist's rendition of two photographs from the study "Elaborate Vaginas and Long Phalli: Post-copulatory Sexual Selection in Birds." (See page 26) Artwork by Nan Swift.



### Some Coming Events



The Covid-19 pandemic has introduced excitingly boundless uncertainty as to whether, when, where, and how various public activities will happen in the near future. In 2021 some will happen teledistantly.



See [IMPROBABLE.COM](https://www.improbable.com) for details of these and other events:



#### August 14, 2021

Readercon, Boston, MA USA [online]

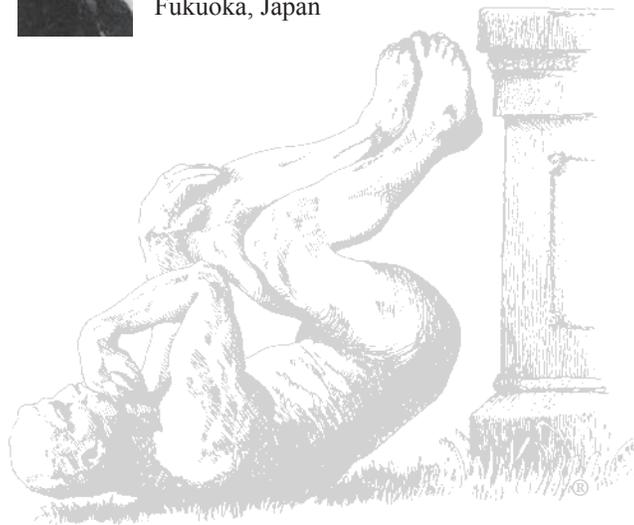
#### September 9, 2021

The 31<sup>st</sup> First Annual Ig Nobel Prize Ceremony and Webcast



#### September 10-November 3, 2021

Ig Nobel Museum Exhibition, Fukuoka, Japan



# URANIUM FOR DUCKS

by Marc Abrahams, *Improbable Research* staff

Depleted uranium should, perhaps, be the ammunition of choice for duck hunters. That's the conclusion of the study:

“Response of American Black Ducks to Dietary Uranium: A Proposed Substitute for Lead Shot,” Susan D. Haseltine and Louis Sileo, *Journal of Wildlife Management*, vol. 47, no. 4, October 1983, pp. 1124-1129. (Thanks to Ewald Schnug and Silvia Haneklaus for bringing this to our attention.)

The study's authors were based at the U.S. Fish and Wildlife Service's Patuxent Wildlife Research Center in Laurel, Maryland.

## A Hit with Ducks

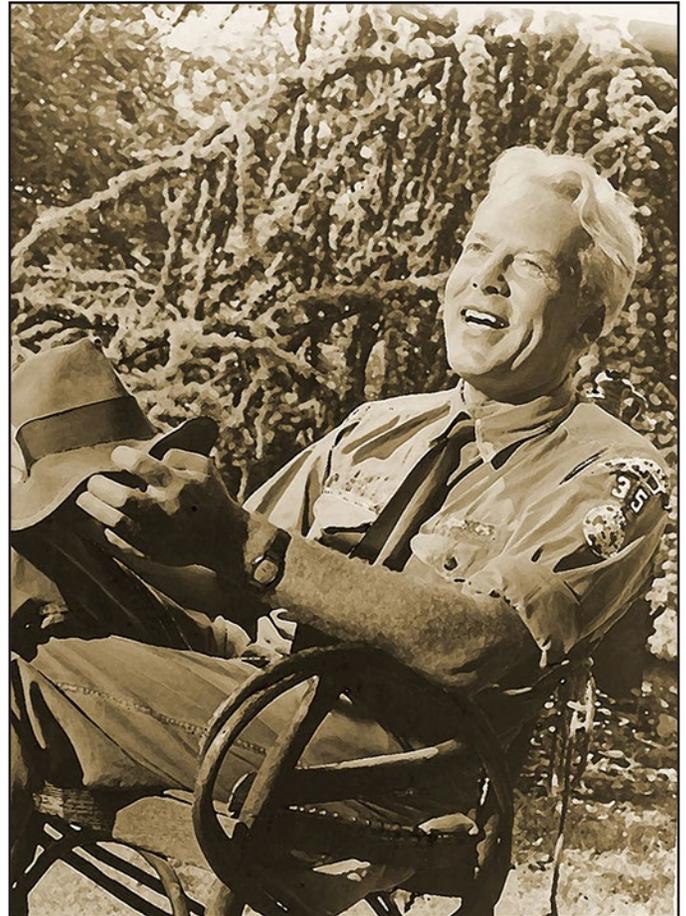
Lead shot is dangerous for ducks, especially if it hits them.

When it doesn't hit a duck (or hit another hunter, as sometimes happens), the shot falls into the wetlands. The lead leaches into the muck, slowly poisoning whichever ducks have managed to avoid being shot.

In many hunting areas, lead shot is verboten. At the time of the study, steel was being touted as the best alternative to lead. But Haseltine and Sileo pointed out some drawbacks. They wrote:

Steel shot shells are more expensive than lead shot shells when purchased in a retail outlet; they cannot be used in all guns and have not been well received by some hunters who question their performance on ducks and geese.

Haseltine and Sileo credit the idea—substituting uranium for steel—to metallurgist Dr. Carl A. Zapffe of Baltimore, Maryland. Zapffe was no slouch about steel; as witness his 1948 study “Evaluation of Pickling Inhibitors from the Standpoint of Hydrogen Embrittlement: Acid Pickling of Stainless Steel.” Dr. Zapffe also wrote a book disputing Einstein's Theory of Special Relativity, but that is a separate matter.



*Metallurgist Carl A. Zapffe, who the study's authors say came up with the idea. Drawing by Nan Swift.*

## RESPONSE OF AMERICAN BLACK DUCKS TO DIETARY URANIUM: A PROPOSED SUBSTITUTE FOR LEAD SHOT

SUSAN D. HASELTINE and LOUIS SILEO, U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD 20708.

Lead (Pb) shot has been associated with mortality in waterfowl (Trainer and Hunt 1965, Anderson 1975, Stout and Cornwell 1976) and other avian species (Benson et al. 1974, Kaiser et al. 1980, Pattee et al.

1981). Bellrose (1959) indicated that between 2 and 3% of waterfowl populations may be lost yearly to lead poisoning. Incidence of lead shot in waterfowl and estimates of mortality from lead poisoning have decreased slightly (Trost 1980) or not at all (Longcore et al. 1982) in local areas since 1976, when the U.S. Fish and Wild-

*continued* >

# URANIUM FOR DUCKS [CONTINUED]

## Attractiveness

Haseltine and Sileo listed what they call the “attractive characteristics” of depleted uranium as a raw material for making birdshot:

In its pure form, it is denser than lead and, in alloys, might be made to produce shot patterns and velocities attractive to hunters and within the effective range for waterfowl. Depleted uranium can be alloyed with many other metals and its softness and corrosiveness can be altered over a wide range.

But nothing is perfect:

Negative aspects for potential uranium shot include pyrophoricity [proneness to spontaneously burst into flames] problems with pure depleted uranium, which can be altered by alloying, and the expense of separating depleted uranium from other nuclear waste products.

Their main argument was that uranium may not be very poisonous even to a duck that, of its own accord, swallows some in pellet form. That is what Haseltine and Sileo sought to verify.

## Eating

They fed forty ducks a diet of commercial duck mash salted with powdered depleted uranium. None of the ducks died of it, or got sick, or even lost weight. Moreover, the researchers reported, the ducks “were in fair to excellent flesh” when slaughtered.

And so they enthused that “further examination of this metal as a substitute for lead in shot is justified.”

However, no one has yet followed up on this in a big way for hunting anything other than people.



*Louis Saleo, co-author of the study. Drawing by Nan Swift.*