



OUT THERE

## PROFESSOR COLD

LAURENCE IRVING'S  
WINTRY WORK  
by Michael Engelhard

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**WE KNOW NOTHING ABOUT** Laurence Irving's cold tolerance. Given his Arctic quests and long Fairbanks residence, this student of chill responses certainly gained some. His peers called the Boston-born Harvard and Stanford man "Larry," believing that "Noah's Ark would have been an appropriate location in the space-time continuum" for him because of the menagerie he had handled.

His eager mind grappled beach fleas and ducks; starfish respiration; trout embryo development; seal, porpoise, and manatee blood circulation; and mammal adaptations, including those of humans. But he tempered exacting curiosity with doses of compassion, for instance helping the daughter of a Jewish scientist with whom he'd worked overseas to flee Hitler's Germany.

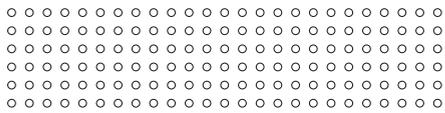
Two years to the day after Hiroshima, Irving entered a drab Barrow Quonset hut. His prior career and the war—the second in which he'd served—had amply prepared him to head Alaska's Naval Arctic Research Laboratory. Irving's earlier efforts had shown that diving

beavers shunt oxygen from muscles to the brain, avoiding asphyxia of that crucial organ. As a major and chief of the Physiological Test Section at the air force's Eglin Field in Florida, he'd gauged thermal properties of military clothing (such as "walk-around sleeping bags" worn as coats), oxygen support for high-altitude flights, and carbon monoxide hazards inside aircraft and winter shelters, like the stove fumes that had almost killed Admiral Richard E. Byrd in an Antarctic weather station.

**Above:** Simon Paneak and Laurence Irving take the temperature of a caribou near Anaktuvuk Pass. **Right:** A willow ptarmigan foot with insulating "snowshoe" feathering.



IRVING EMPLOYED  
NATIVE CONSULTANTS  
IN BARROW AND,  
LURED BY THE  
VALLEY'S REPUTATION  
AS A MIGRATORY-BIRD  
CORRIDOR, AT  
ANAKTUVUK PASS.



The Barrow experiments proved that Arctic warm-blooded creatures owe their vigor not only to fat and fur insulation but also to flexible inner thermostats in the form of fine-tuned metabolisms. Arctic foxes and huskies sleep at temperatures as low as  $-30^{\circ}$  to  $-40^{\circ}\text{C}$  without increasing their heat output. They shiver at  $-70^{\circ}$  to  $-80^{\circ}\text{C}$ , thereby producing energy to maintain a normal core temperature. Smaller animals, conversely, start shaking well above freezing. The team—comprising Irving's Swedish colleague and future son-in-law Per Scholander—found that cooler extremities curtail heat loss. How, they'd wondered, do birds avoid freezing their naked legs? Glaucous gulls' webbed feet, it turned out, get just enough blood flow to prevent frostbite. Similarly, diving fur seals' furless flippers stay colder than their bodies; accounting for roughly one third of an adult's skin surface, they thus shed less warmth. Irving's high-latitude probing of coldblooded animals, lichens, and vascular plants as well stressed cryobiology, the ability of organisms to withstand freezing.

Considering *Homo sapiens* as merely another mammal and therefore fair game, Irving learned that local Inupiat immersing their hands in ice water surpassed Caucasian control groups. This is true for commercial fishermen too, hence acquired,

not genetic. Furthermore, Native test subjects exposed to moderate cold with scant bedding slept rather comfortably, shivering less. However, far better than any physical traits, their culture's ancestral technology—sod houses, fur clothing, seal-oil lamps, etc.—and savvy regarding their homelands shielded them.

The North Slope transplants under Irving soon realized that besides being hardy, the Inupiat were astute naturalists. They volunteered facts gleaned “during a lifetime and in seasons and weather when most scientists remain indoors,” so “thanks to their careful observations, accurate knowledge of country, and ability to travel, our studies proceeded rapidly.” Inupiat hospitality throughout “greatly eased the burden of working in remote regions.” Irving employed Native consultants in Barrow and, lured by the valley's reputation as a migratory-bird corridor, at Anaktuvuk Pass. The grit of tiny black-capped chickadees wintering in the Brooks Range surprised even him. He enlisted Simon Paneak, an able “instructor of scholars,” to investigate ptarmigan distribution. Their bond bloomed into a friendship of more than 25 years, with Paneak co-authoring papers and Irving eulogizing the

**Right:** Northern fur seal in “jug handle” position, a thermo-regulating behavior.



hunter-historian in an obituary.

Appointed the first director of the University of Alaska Fairbanks Institute of Arctic Biology in 1962, Irving broadened his grasp on how life's flame defies climate extremes. Wild Norway rats rummaging midwinter at the town's refuse dumps were tougher, metabolically more efficient, than their pampered albino lab-cousins—once again, a result of acclimatization. Human bodies in the Interior likewise adjusted to mind-numbing temperatures. Two students of a religious community who embraced simplicity and walked about lightly clothed, lightly shod, felt less pain near 0°C than students always bundling up. Even at -5°C, their digits didn't hurt as badly upon rewarming as did fingers and toes routinely ensconced in mitts and vacuum-layered, army-surplus "bunny" boots.

Fairbanksians remember Irving for his holistic approach to biology.

Beholding all facets of Arctic survival, he was never content with just the details of individual species' physiological mechanisms. "I do not know what use the results may have," he downplayed the insights of five fruitful decades, "but I have a feeling that, like art, science is as valuable, as it provides pleasurable interest." A devoted mentor, the winter

tsar kept a toe in academic waters until his death at age 84, in 1979. ❄️

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*During his first Fairbanks winter, the author blistered his Adam's apple biking from his cabin to campus. He then realized that a metal zipper slider is a perfect cold conductor.*