



Iced Coffee. At -70°F a cup of boiling water thrown into the air freezes explosively before it can even hit the ground.

COOLING OUR HEELS

Extremely cold easterly winds continue to chill our expedition to a snail's pace. It is now officially one of the coldest Winfly seasons on record with one localized report of -120 °F (-84 °C) with wind chill. We set a September air temperature record low at -49 °F (-45°C).

Everything freezes.

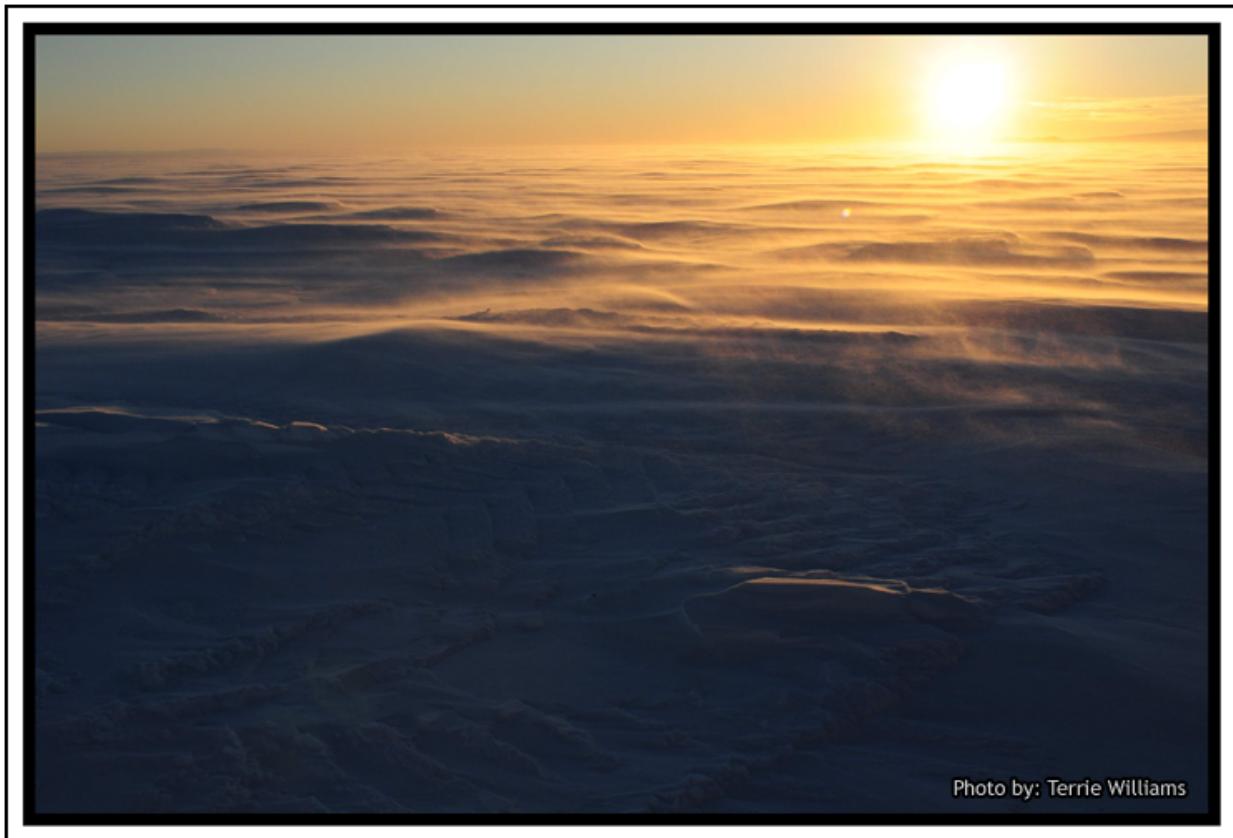
Food freezes.
(This is a real cold cut sandwich.)



Faces freeze.



Even the ocean is frozen solid here.

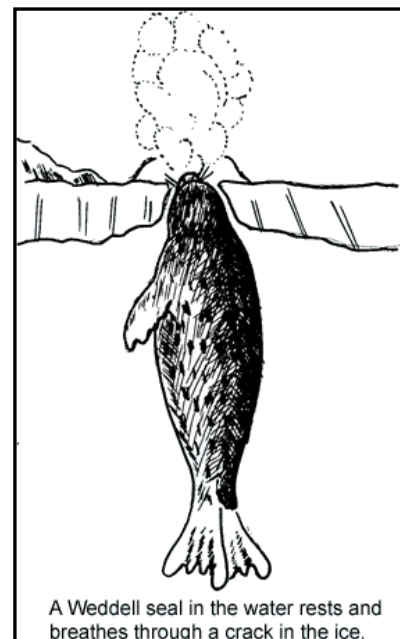


Despite the temperatures we set up camp on the sea ice and spend our days looking for Weddell seals. Traveling on snowmobiles and in a track vehicle called a Piston Bully we search for cracks in the ice where the seals might come up to breathe. It is chilling, frustrating work - like hunting for a frosty pin in a frozen haystack.

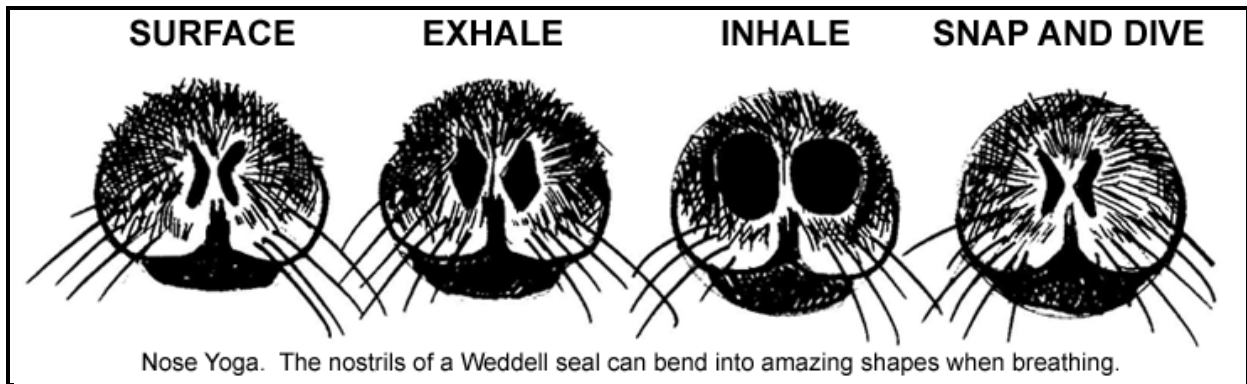
SECRETS OF THE SEAL NOSE

However, the cold also reveals the seals' hiding places beneath the ice. We spot geysers of steam rising out of the sea ice that turn out to be the hot breath of Weddell seals. The icescape around us erupts with steamy funnels from seals resting in the water below. Wedging their leathery noses into cracks the seals are able to catch a quick breath of air and even sleep below the sea ice.

Weddell seals are able to live under the ice in part because the seal's nose is different from your nose and the nose of your dog or cat. Highly muscular nostrils create a two valve system of breathing. First the outer nostril opens into a slit - this allows the animals to quickly exhale. Then an inner part of the nose and nostrils completely flare open, allowing air to rush in.



(Each nostril opening is nearly the size of a quarter in diameter! Most human nostrils can barely flare to the diameter of a dime.) As the animal inhales the nostrils suddenly shut with a "snap".



Such a special valve system is necessary for preventing water from flooding into the nose when the seals dive to great depths as they hunt for fish.

YouTube Video: "Night Chills: Breathing Through the Ice"
<http://www.youtube.com/watch?v=mRmq7OgKto>

Suddenly, in a large hole in the ice, we finally see our first Weddell seal of the expedition. It is so cold that the steam from his breath condenses on his whiskers.



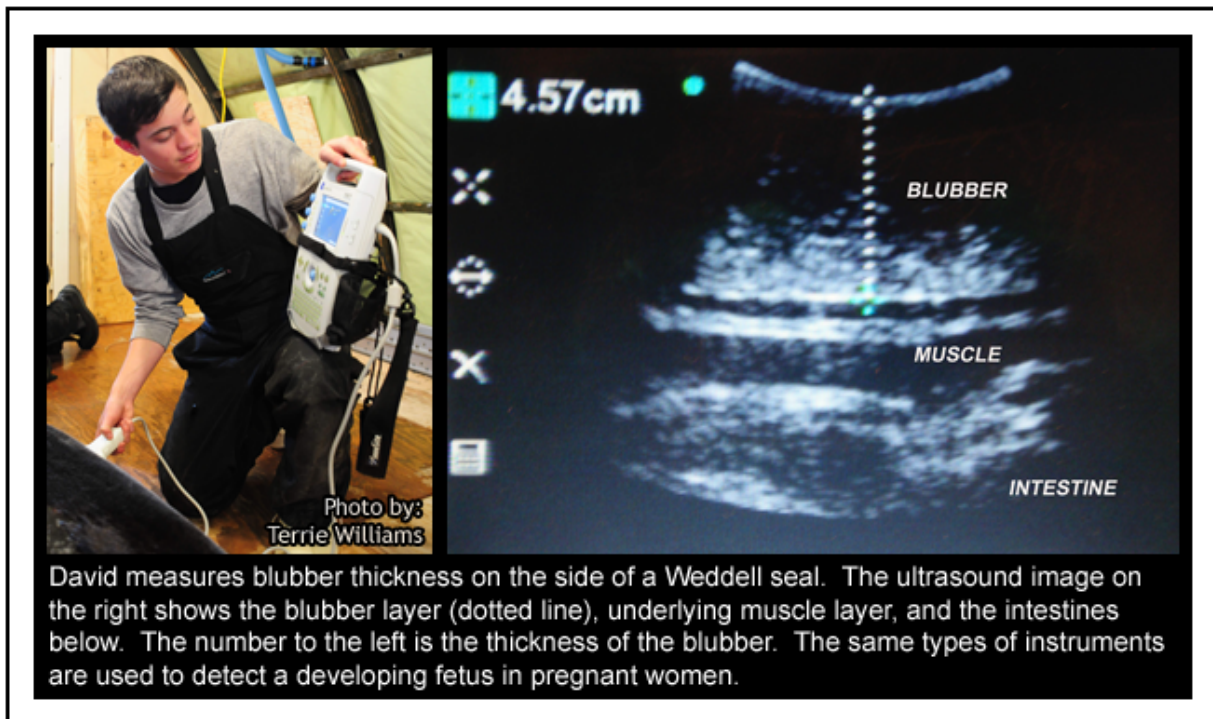
The seal sits in a slush of ice and salt water, which makes us wonder:

HOW DO WEDDELL SEALS KEEP WARM IN FREEZING WATER?

To find the answer to this question we use a portable ultrasound machine to measure the thickness of the fat layer below the skin for each of the seals in our study. This fatty blubber acts like a thermal jacket that keeps the animals warm even in chilly Antarctic waters, much like a surfer's wetsuit.



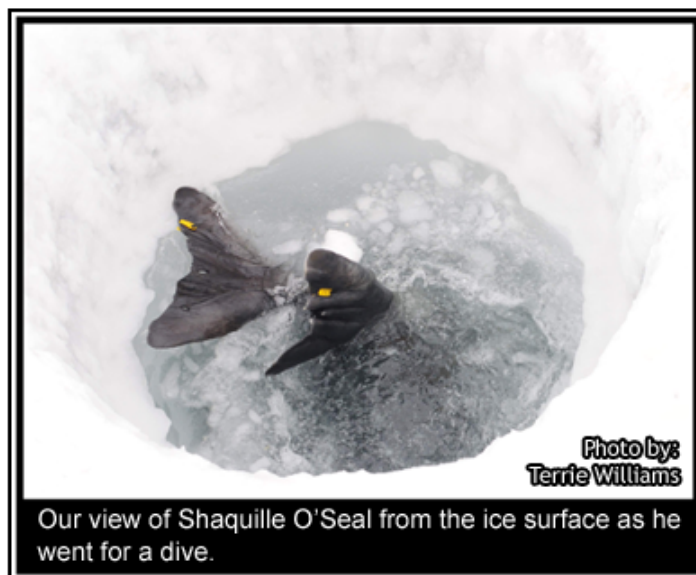
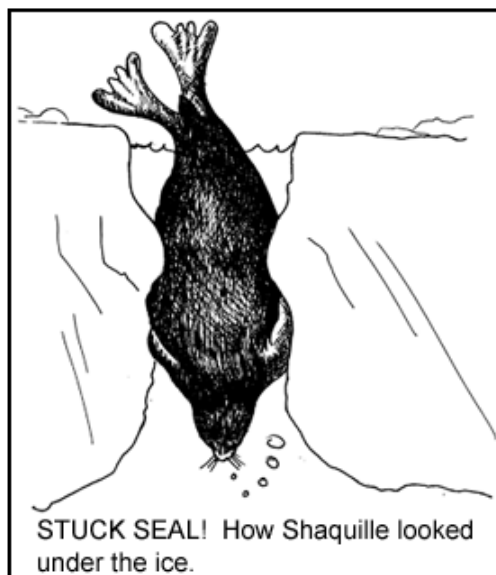
From our measurements we find that the fat layer covering the Weddell seal's body is over 2 inches (5.0 centimeters) thick; that is as thick and fatty as two sticks of butter stacked on top of one another.



CAN A WEDDELL SEAL BE TOO FAT? SHAQUILLE O'SEAL'S NARROW ESCAPE

Over the years our team has found that Weddell seals come in all shapes and sizes - some are petite (at least for a blubbery seal), and others are very large (weighing almost half a ton). One of the largest was Shaquille O'Seal. When Shaquille tried to go for a dive in an ice hole next to our camp he misjudged his girth. After poking his head in the water the seal slid his wide body into the hole. Shaquille dove down and then did something we had never seen before - he started swimming *backwards*.

Suddenly, his flippers were back on the water surface splashing, then submerged, then splashing back on the surface. Shaquille was so large he was having trouble squeezing through the hole. The thick blubber layer around his middle that he needed to keep warm was now wedged in the narrow ice hole.



Fortunately, Shaquille - like most Weddell seals - was an incredibly strong swimmer. In three big thrusts of his enormous flippers he powered down to the bottom of the hole, taking the water with him like a toilet bowl flushing. We knew he had popped through the bottom of the hole when the water shot up back into the hole, nearly soaking our boots.

The next day we saw Shaquille O'Seal sleeping on the ice next to a much larger hole - he guarded that ice hole for the rest of the winter and into the summer season!

Next Week - High Tech Seals