



ICE COLD

Think you've had a cold winter? How about travelling solo for months at -40c? Welcome to the world of Gary Rolfe, Arctic Explorer.

Gary is making a name for himself having established the vital ingredients to succeed and survive, single-handed in the most hostile wilderness locations on the planet. Here he offers a unique insight into his methods and innovative gear that help protect him and his dogs. Unashamedly extreme concepts from the colder edge.

His secret is his no compromise attitude. Everything from the dogs, nutrition, gear, training and clothing are all scrutinised in minute detail for improvement. The gear is kept simple and it must perform under incredible stresses. And it has a tough life. For one month of any journey with ten huskies he starts with a ten-foot sled carrying a 1000lb payload that includes 620lbs of dog food, reliable communication gear, fuel, medical and veterinary kits. The dog food is also fit for human consumption. This makes up his world. So tuck up nice and warm, and get ready for a closer look at the nightmare scenario of living way below zero for months on end...

WAKE UP CALL

The day starts with me brushing frozen breath from tent inner walls, roof and sleeping bag on to the shelter's floor. Here it remains frozen. From the night before my stove and lantern rest full of Coleman white gas (naphtha) on a firm level base of thin

wooden ply. The generator's fuel rod and two fuel pans wait there with curled dollops of petroleum paste. I use white gas since it has the lowest flash point of all reliable stove fuels, and in extreme cold the only other serious stove fuel challengers are aviation fuels. Jet A produces more BTU's (British Thermal Units) per minute meaning less to carry, but it's a pig to light. Jet B (kerosene and white gas mix) isn't much better. Whilst AV 100 is the easiest to ignite. But the overriding factor against using big BTU aviation fuels is their fumes, these severely sting eyes if burnt in the confines of a tent. There's also P50, an Arctic fuel that is basically domestic heating oil. But like Jet A it's difficult to get going

(MAIN) Pingo and Hansel, lead dogs on the Beaufort Sea. **(INSET)** Gary on the Mackenzie River, Northwest Territories, travelling by moonlight at -45c - now that's cold. All credit: Gary Rolfe.

and really isn't much better than kerosene anyway, soots like crazy and stinks. So, all in all white gas weighs less than aviation fuel, emits the least fumes, is easy to start, won't clog up stove parts and is stable.

BREKKIE IN BED

I've a waterproof container that, for one month holds 310 oversized matches and emery boards. With gloves on I sprinkle out and select one match, praying it's not a dud. Most standard lighters aren't much good at forty below zero, they're hard to operate and the fuel doesn't have a low enough flash point. An alternative is using a Zippo lighter - the large flint wheel is easy to strike and it works with white gas. Don't try this in less than extreme cold though, it won't explode but above 15c will become too hot to handle.

Once my stove is primed with 30 plunges, I light the paste. It spits and crackles. The trick is to warm those critical metal parts that carry gas vapour to its ignition point. This is always dangerous, inadequate warming can lead to a pooling of fuel. Turning the stove knob I watch the little flames uncoil then flick up from the burner pan. Then there it is, heat. Lit white gas vapour roars, hectic, strong. My tent warms and this feels all so very, very precious.

Water is essential for all times on a journey. It's hard just staying warm out here, and to avoid a hypothermic state requires immense physical output, with a corresponding huge intake of oxygen. The end result is that every day 3/4 litre of water is required purely to humidify the inhaled freezing air. Dehydration and hypothermia are linked in a vicious dance. Before breaking camp I fill four one-litre steel flasks with boiling water to last the day. These flasks are only ever used for water, and will last for two days and nights at -30°C, smaller sizes simply freeze solid. The cups are wrapped with cloth backed duct tape to prevent them freezing to my mouth.

I eat breakfast with a plastic spoon - again, this won't freeze to mouth tissue. My diet is based on complex carbohydrates, delivering instant and constant long lasting energy in a ratio of 60% carbohydrate, 25% protein and 15% fat. On expeditions I ingest around 5,200 calories daily, the equivalent calorific expenditure to running a marathon a day. This is supplied via specially developed sports nutrition powders of fructose and protein sprinkled over pasta or oats with dried fruit. The whole idea is to provide instant and long-lasting quality energy to maintain critical body weight and replenish tired muscles before, during and after exercise. Weight for weight my food per day will weigh 950g, slightly less than one of the dog's daily rations. All pasta and rice is pre-ground before packing, it cooks quicker and is lighter on the stomach.

Why don't I eat more fat? Well unlike the dogs I can't metabolise and mobilise it fast enough to serve as an efficient energy source during intense exercise in violently cold conditions. And equally ill-evolved, I can't produce Vitamin C, so make do with a

concoction of minerals, vitamins and amino acids. For major bodily functions I aim into a bag and perform inside the tent. Double lined re-sealable bags from the previous day's food are used, and in a minute or so their contents freeze solid.

DRESSED FOR WORK

It's now that I get toggled up. Once on the move there's no messing with clothing, once it's on, it stays on. Zips under the arms of every layer and side vents help regulate body heat. Undergoing huge bouts of exercise over many hours, it's paramount to evaluate the layering system for wicking away sweat from my skin. Allowing sweat to freeze on my body is not only unpleasant, but a potential killer. Rab's Vapour Rise first layer system has become a critical part of my kit in recent years.

Then it's onto more specialist kit. Cycling shorts with a chamois leather crotch give added protection in the nether region, whilst ski goggles with a felt nose protect

from the wind. When it's cold enough to turn spit into ice cubes I wear two fleece gaiters around my face. The first is close fitting, the second big enough to fit over the first creating a warm wedge pocket between the two. My body benefits from breathing in this slightly warmer air. A fur-trimmed parka hood ruff is a sound investment to stave off a frostbitten face, and there are a few choices out there. It may seem strange in the days of modern man-made fabrics, but sometimes nature knows best. The most spectacular affair uses the very best tundra wolf, wolverine and beaver furs, and is prized. Sewn together this creates what the Inuit call an 'amowak'.

For my eyes I wear disposable contact lenses, glasses would just freeze to my face. A week's supply are kept thawed next to my body, the rest lie frozen on the sled. On shifting sea ice they're worn for extended periods - the thought of being woken by ice breaking up under camp and scrambling blindly out of water gives me the creeps.

(TOP) December 6th, sun setting for the last time behind boreal larch in the Mackenzie Delta, North West Territories.

(BOTTOM) Moving over the frozen Beaufort Sea.





Piper shaking off a blanket of snow before being harnessed for a days travelling.

"Huskies love the cold. This is their domain, here they are purveyors of excellent efficiency."

The last job I do inside the tent is to smear my face with Bag Balm. This antiseptic ointment protects potentially vulnerable frostbite areas from splitting. Importantly it contains no water and doesn't freeze to body parts. As well as protecting it encourages fast healing, anything else is nothing more than a cosmetic.

TOOLS OF THE JOB

Some days I greet the world by throwing a cup of boiling water into the air, watching it explode into a bursting cloud of minute spangled ice crystals. In the morning sun it falls like glitter. Then camp is broken and the sled packed. All food and gear is packed in large duffle bags, and paint markers boldly identify the stuff sacks that contain a sled kit, ski kit, ammunition, dog kit, cook bag, spares bag, dog food, medical and veterinary kits. IT delicacies such as my laptop and Iridium sat phone go inside a single Neoprene-coated nylon dry bag and into a Pelican protective case.

My tent and sleeping bag system are all zipped into my bivi bag. I've used seriously good tunnel and freestanding tents in the Arctic but still customize them. A decent drying loft is installed and awning cord hoops sewn along the frame for tensioning poles from the inside. A tent fly snow flap is another job, once complete, this looks like a hovercraft skirt. I also tape all pole sections bar the middle one with cloth backed duct tape, the tape doesn't become brittle.

Tent fires are the ultimate nightmare. Flameproof material is not cheap but it's a serious addition to the loft area. I've a small Chubb fire blanket as back up. If you purchase one, make sure it'll put out the fuel you intend using, not just a regular chip pan fire. Alongside fire the other tent concern is ventilation. All stove fuels produce carbon monoxide, a potential killer. Fail to recognise the importance of an inlet for fresh air and outlet for stove emission fumes, and nausea will quickly graduate into headaches, poisoning, blindness and death.

I travel alone with the dogs and if we fall through while moving over river or sea ice, our immediate future depends on the stove kit. This is kept at hand in a dry bag with the water flasks, day food, a bowl, my only spare clothing, and spare matches waterproofed with edible tallow candle wax. The bag also contains basic parts of my medical and veterinary kits. You don't have to be in the Arctic to appreciate packing a kit aimed at getting your dog back to safety. It doesn't weigh much and could save its life.

On top of my bivi there's space for other gear needed throughout the day. Bear paw pattern snowshoes with built-in crampons, a solar panel, rifle and a snow shovel with a steel face are all arranged and bungeed down. A .30-06 calibre rifle filled with 150g bullets, no scope just open sights, is kept in a lightweight sleeve. A felt cover with lanyard covers the barrel end - in polar bear country a plugged barrel is bad news.

A gear rail at the stern of my sled keeps ice screws, karabiners for tent guys, snow saw, an axe and wire snips tidy. Also handy is a knife (with a split ring threaded through a hole through the blade for easy opening with gloves). All tool handles are sprayed fluorescent red for easy location in snow, smaller items sprayed completely.

For an independent and renewable power source a Unisolar MBC-262 solar panel is combined with a rechargeable sealed lead acid 12V Gel Cell deep cycle battery. Even at forty below zero the amorphous silicon alloy panel remains flexible, and its customised cable and junction box don't become brittle. To absorb solar energy the panel is secured over the sled, and while on the move, requires only the cable terminal tabs to be attached to the battery and it begins to charge. It's worth noting that the heaviest rechargeable batteries are the most effective owing to their quality lead content. Head-torches, a spare GPS and emergency strobe lights are chosen to all be compatible with rechargeable AA nickel metal hydride batteries.

Before we move off I harness up the dogs in their usual frenzy of excitement. I ski alongside the sled on wax-less wood core skis with free-heel mukluk bindings, the only way to generate enough body heat to stave off hypothermia. At best the sled runners skim effortlessly full lick over stretched flat pans of sheer ice; the dogs happy and pulling in unison, with their nimble feet going nineteen-to-the-dozen. I watch the dogs, concentrating on their footings, harnesses and expressions to check their mood.

FINDING YOUR WAY

GPS's have made polar navigation easier, and using them with gloves on narrows the selection to those with decent sized buttons. A regular compass is a dead loss in the high Arctic. Alcohol freezes in the compass housing giving sluggish readings. But if the sun's out shadows can be used. At noon local time anywhere on the planet your shadow will point true north. Since the sun moves 15° west every hour, I aim that angle off my shadow and gradually alter the degree increments as time passes. For instance at 11am local time the shadow is cast 15° west of true north and at 1pm, 15° east of true north. Northern bush pilots sometimes use the same method from shadows cast by wizened boreal larch, ice pressure ridges, or even a polar bear.

COLD SNAPS

Expedition camera work is never easy, and in the Arctic it calls for ingenuity. At forty below cameras are operating on the very threshold of their ability and film becomes brittle, shattering if the frame advance isn't even. This can never be achieved with a manual unit, and all the cameras are set to slowest frame advance (silent advance). By not shooting the extra frame at the end of the roll the chances of keeping precious film intact increases. Silent advance also avoids static electricity caused by the felt on the film gate, in extreme cold this can cause a vertical line through the film. Don't exhale into your camera while changing film either, it'll freeze, causing ice crystals to form and scratch film.

The only filter I use is a circular polarizer to remove unwanted reflections and saturate colour. Lens caps have oversized tabs for use with gloves on and quick release plates are on all bodies. All the camera gear has adhesive moleskin wrapped around constantly handled areas. I aim to shoot eight rolls of slide film every month, one every four days. Film stock ranges from 50 to 400 ISO and nothing is ever done without gloves, even changing films. It saves calories and prevents cold injuries.

ON THE GO

I believe in routine, and the dogs appreciate this too. We travel for fifty-five minutes then rest for five. The dogs nuzzle one another, content, they take the weight off their feet, lie down and curl with their backs to a wind that sometimes looks to massacre with its insane cold. On calm days weighty



".the constant grating and grinding of the ice repeatedly lets off without order or warning, tension splitting crescendos. Then that echo underneath. Fading, freezing, lost in the deep, that lurking black.."

At camp on the Mackenzie River in 24 hour darkness.

snowflakes fall like goose down. The flakes bump and cover us white. I snack on complex energy Powerbars, the dogs tuck into high calorie ground chicken nuggets.

HOME TIME

Unless a storm dictates otherwise I halt the dogs after eight hours travel. This is a dangerous time, a polar bear can appear with little warning. Polar bears will actively stalk and kill a human for food, weighing in at nearly half a tonne with claws longer than your fingers. On the move I look out for their kills and watch for downwind attacks. A female with cubs is extra bad news. Fresh droppings look like human faeces with bone and fur, and glistening scarlet clods of sea ice indicate a seal blowhole has been visited. Unsuspecting surfacing seals are bludgeoned with no remorse, and their pups aren't left orphaned for long. There are no prisoners taken out here - seeing blood on sea ice always makes my arse tighten.

Now stopped, ready to make camp, my surveillance for polar bears is aided by the dogs extra sensory world. Their superior sense of smell and ability to select movement in poor light helps buy me reaction time. Pingo is a crafty rascal; he's also a demon fighter, and when making camp he shadows me like a bodyguard. Smart, nimble and tough he is perfectly suited to stall a bear nearly eighteen times bigger than himself.

I begin to dig pits a metre deep for each dog then cut and shape snow blocks for building a low windbreak. My movements become dead slow. Alone it always seems to take so very long, that one last big push to set up camp. Crushing exhaustion has to be staved off with fierce concentration. "Just let me get this done", I plead. The spindrift, wind and endless barrage of driven ice crystals hurtle over the ocean's crust. Not used to momentarily losing pace it hits the windbreak. Up it goes, frozen a million times, traversing an endless distance to god knows where.

SETTLING DOWN

The dogs settle and I get the tent up. It's then I disconnect the freshly charged battery from the solar panel and bundle it into

the dry bag before bringing it inside the tent. Still fully clothed, I begin to organise the tent interior. Some things can be improvised on the Arctic Ocean but a stove can't. In extreme cold it sustains my life. Daily it repeatedly melts 90 litres of snow then boils 12 litres of water to hydrate the dogs and myself. I'm sharp to lift and replace stove pan lids quickly to prevent condensation. It takes four hours to melt enough water, but the process reminds me that I will be warm again.

Then I strip off my clothing and air it from the loft. Everything is systematically dried. No matter how it feels, it will contain moisture - a potential killer. At that most defenceless of moments and listening to the din outside, I'm reminded of where we're camped. The constant grating and grinding of the ice repeatedly lets off without order or warning, tension splitting crescendos. Then that echo underneath. Fading, freezing, lost in the deep, that lurking black. The sound makes me wince.

When on a rest day or sitting out a storm, the laptop comes out. I create a snug nest in the loft for the IT gear still in its dry bag. Condensation forms instantly on the bag's exterior, and it takes six hours for the equipment to thaw before booting up. I have to be patient, water forming on the defrosting equipment would cause irreversible damage. When satisfied, the battery is checked and its direct current converted through a lightweight inverter to power the laptop. This setup also enables direct recharging of the sat phone and video camera batteries. Once up and running, at 24,000 bps, emails are relatively quick to send. I keep a diary and maintain tables of technical performance and research analysis on the tolerance capabilities of gear and materials. Canine and human research data investigating the physiological and psychological affects of temperature extremes is also collated.

Every hour new live maps of weather and ice conditions can be picked up off satellite-linked websites. From these maps I determine if there's open water ahead. Polar bears follow open water in order to hunt and though they aren't territorial they do

protect critical space around themselves. This space varies in size and from animal to animal, and if anything invades a bears space it'll try to eliminate it. At pre-arranged times I also phone to update base with essential progress info. From these conversations I write specific details on my tent walls. This gives me a sense of progress when often very little else matters.

I soak the dogs' feed inside an insulated Coleman 'cooler'. Feeding the dogs at night is usually seriously ugly with the wind pummeling at a ballistic breath taking velocity. Here I try to stand, only to be bought to my knees. Ticker tape ice splinters remorselessly swirl and swerve this way and that, blowing from all angles. Whistling wind shrills and blasts millions and millions of glittered flaying shards through the beam of my head-torch. Adapted cables lead from the unit on my head to a battery pack kept warm inside my clothing. Ice debris fragments collide with me head-on like a sledgehammer. Near misses glance and flick. My body gets punched, jabbed and dented at an almighty pace before I fall into Piper's 'nest'. He lifts shedding snow like a giant casting shackles aside. Unruffled he feeds well with a slathering tongue dribbling. Like the others once fed Piper is hardly ever bothered by what else is going on and easily settles.

At home I work to get stronger, maintain endurance and recover as quickly as possible, all without getting injured. Training at 4am is hell, but it produces discipline for situations when I need to channel my fear into sharp effective decision-making. Tiredness reaches a scale of intense difficulty out here. At forty-five or even fifty below it all simply gets to a point where I just get on with it, never letting the dogs down. This disciplined edge enables me to perform at the best of my ability and fulfil theirs. Huskies love the cold. This is their domain, and here they are purveyors of excellent efficiency.

When training the dogs I expose them to anything they might experience on a journey. Not only do they need to experience these conditions, routines and situations but must experience them while trusting

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(TOP) Dawson and Kavik resting at the
mouth of the Mackenzie River.
(RIGHT) Crazy sea ice formations – pat-
terns copied by the Inuit in their art work.

me. By the end of their first season puppies will have experienced bears, moose, thundering ice, water and a bottomless supply of love and attention. With time the bonding, loyalty and trust follow.

Once I've fed the dogs and myself, I brush my teeth. I don't know what they put into Crest toothpaste but it never freezes. To date the longest I've gone without washing on an expedition is four months. This was during my longest spell in the Arctic. I didn't step on carpet or see grass for 18 months. Personal hygiene amounted to dusting myself with medicated zinc oxide powder. I didn't rot and the dogs didn't complain of any smell so everyone was pleased I guess.

I use American made Wiggy's sleeping bag systems; since they don't retain moisture. One bag is comfortable at forty below and zipped into an oversized lighter bag rated for twenty below. I then combine three closed cell sleeping mats. Two go under the sleeping bags inside my bivi, the other one laid directly under the bivi. Currently I'm experimenting and working with Beacons Products from Merthyr Tydfil to increase insulation properties made from a combined 4mm VA30 and 11mm LD15 Plastazote mat. The mats weigh just 320g.



DARK DREAMS

The cold has petrified me. In 2002, tent bound on the Arctic Ocean I sensed something huge lived out there. Its presence reigned with supreme power. After feeding the dogs one night I scribbled on the tent:

"I'm aware my body might be found. At the time of writing I'm sane and ask that you deal with my remains. Either lay me on the ice, toss me into open water or feed me to my dogs. Please post the letters and diary to my parents. Thank you"

I turn out the stove and lantern then wait for them to cool before filling the pair full with Coleman white gas ready for the morning. Only when this attention to detail is complete do the thoughts of sleep become real. ||

MORE INFORMATION

Gary's site:	www.garyrolfe.com
Rugged laptops:	www.panasonic.co.uk
Flexible solar panels:	www.uni-solar.com
Contact lenses:	www.cibavision.com
Wiggy's sleeping bags:	giles@sls-group.com
Snowshoes:	www.tubbsnowshoes.com
Down clothing:	www.rab.uk.com
Stoves and lanterns:	www.coleman-eur.com
Veterinary packs:	www.padi-paws.co.uk
Nutrition supplements:	www.powerbar-europe.com
Hard to find fabrics:	www.justmakeit.com
Dry bags & hydration:	www.outdoordesigns.co.uk



Next issue: Gary will cover bears, firearms, safety considerations, and transport of dangerous goods. Summit will also be publishing updates from Gary's next expedition, fresh from the Arctic Ocean.