

2006 Unconventional Sleep Systems Manifesto

A Comprehensive Primer and Market Analysis of Top Bags, Quilts, and Wearable Systems

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Editor's Note: The weight of the Western Mountaineering Pod 30 is listed incorrectly. The correct weight is 0.48 kg.

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Introduction

Five years ago, few lightweight sleep system products deviated from the design of the conventional mummy bag, with the exception of a few quirky products available from a number of companies serving smaller niche product segments.

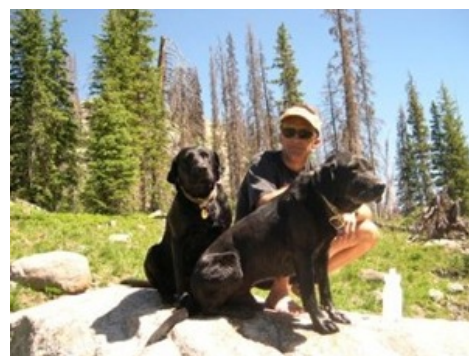
To say that this product category - that of unconventional sleep systems, or "not-mummy" bags - has progressed with the agility of a cheetah would be a gross overstatement, but it's getting better. We have more options to choose from, but cottage industry products still dominate the category. The adoption of unconventional sleep systems in the mass market is halted simply because of limited distribution and lack of understanding by the mass market consumer of how unconventional sleep systems work.

However, prospects for the lightweight hiking community are bright. A variety of designs are available at prices that appeal to those that live out of their trunks and those that live out of their trust funds, and everyone in between.

In this document, we present an introduction and overview to unconventional sleep systems - and the techniques to use them - that comprise one of the most rapidly changing, and difficult-to-categorize product categories. In addition, we provide some scenarios of unconventional sleep systems used by the Backpacking Light staff in various regions of the continental U.S.

In the Review Summary (to be published next week), we summarize the state of the market, including technologies and trends, and analyze the strengths and weaknesses of products available in top bag, quilt, and wearable systems categories.

Sidebar: An Interview with Bill Gamber, President and Founder, Big Agnes



Big Agnes launched an entire product line of top bags in 2000 at Outdoor Retailer Summer Market. Since then, they've remained true to their core design philosophy with the continuing claim of more comfort at less weight.

Ryan Jordan: When did BA launch?

Bill Gamber: We introduced our first Big Agnes sleeping bags and pads at Outdoor Retailer Summer Market in 2000. Thus, 2005 represented our fifth year selling to retailers and consumers. Proving the viability of the original Classic Series bags is the fact that our Lost Ranger and Encampment models, the two originally shown at that first trade show, remain our top selling down and synthetic bags respectively.

RJ: Why did you build your entire product line around the top bag concept? What were you gambling on? No other US manufacturer, cottage or otherwise, had done this before. Little risky, don't ya think?

BG: Big Agnes was founded on the premise that there had to be a better way to design sleeping bags so that you could sleep comfortably in the backcountry without rolling off your pad and that an integrated system could be built without any weight or packed size penalties. The resulting design proves to be both light and small when compared to any comparably sized bag in a given temperature range.

We viewed the entry into the outdoor products market as less of a risk and more of a way to create a category - integrated bag and pad - within the camping equipment segment that made good sense to the average consumer without bordering on the quirky or requiring special components. With our system you can use any pad on the market that fits the size dimensions of the sleeve on a given bag model. Big Agnes' slogan is "Mother of Comfort!" and we feel that first and foremost consumers want to be comfortable and our products help them do so.

RJ: Is the product line growing? Because you are stealing market share? Who are you stealing it from?

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An Overview of Unconventional Sleep Systems

Mummification of the Sleeping Bag Market

Mummy bags are generally considered the darling child of a backpacker's sleep system. Crawling into a mummy bag packed with high fill down and drawing a perfectly contoured hood around your face on a cool night is considered by some to be a religious experience. If you haven't experienced this, then you should try crawling into a Western Mountaineering Puma or Valandré Shocking Blue on a zero degree winter night.

It's hard to break free from the mummy's grip. Mummies are the cornerstone category of nearly every sleeping bag manufacturer's product line. Top bags, quilts, wearable bags, and other unconventional sleep systems, the focus of this article, haven't exactly gone mainstream. In addition, nearly every type of unconventional sleep system sacrifices some comfort for its weight reduction (draft control being the primary comfort sacrifice). Squeezing maximum performance out of these bags requires skill, knowledge of the system's limitations, and quite a lot of practice and fine tuning in real world conditions.

More disappointing than the lack of choices in mummy bag designs is the lack of meaningful innovation in sleeping bag technology in the past ten years. In spite of lighter fabrics, sew-free stitching, laminated insulations, so-called "900" fill power down, more ergonomic footboxes, neatly sculpted hoods, and synthetics with increasing loft:weight ratios, the evolution of sleeping bag design innovation in the mummy crypt has pretty much slowed to a pace that is almost imperceptible from decay. Mummy bags of 2006 are not particularly warmer or lighter than those of 2000, although there are more ultralight options.

Manufacturers claim otherwise, of course, but how about a reality check: mummy bags are mummy bags and there is very little differentiation in the market today among high end down bags. Marmot, North Face, Western Mountaineering, Valandré, and Feathered Friends all make minimalist, high-fill down mummy bags that pretty much offer similar performance at similar weights.

The last time I bought a mummy bag, I chose it based on color.

Mummy bags, ironically, are appropriately named. Innovation in this market is all but dead.

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Cowboy Nap: The Simple Act of Sleeping

Sometimes, I wished I'd grown up in Jim Bridger's time. The act of untying a wool blanket from my horse and huddling up next to a fire at night is my romantic vision of enjoying the Wild West backcountry. However, I'm glad to live in the present day when it comes to reducing pack weight: long gone are the days of heavy wool blanket bedrolls.

But many of today's innovative sleep systems are more reminiscent of a cowboy's bedroll than we care to admit. Sometimes, innovation comes full circle: simplicity worked the first time, perhaps it will work again, with upgraded materials and designs?

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Analysis of Traditional Sleep Systems

A cross-sectional transect of the traditional sleep system reveals several layers (Figure 1). Those layers, from the ground up, are typically:

1. Waterproof ground sheet, bivy sack floor, or tent floor
2. Insulating sleeping pad
3. Breathable outer shell fabric from the sleeping bag's bottom layer
4. Compressed insulation in the sleeping bag's bottom layer
5. Breathable inner lining fabric from the sleeping bag's bottom layer
6. A dozing backpacker (including her clothing)
7. Breathable inner lining fabric from the sleeping bag's upper layer
8. Uncompressed insulation in the sleeping bag's upper layer
9. Breathable outer shell fabric from the sleeping bag's upper layer
10. Waterproof ceiling of a tarp, bivy sack, or tent.

[Click image to Enlarge](#)

Who are your major competitors?

BG: Starting with a line comprised of just a handful of semi-rectangular sleeping bag models and pads, we've expanded into four series of bags including mummy shaped, oversized and water-resistant bags, grown our pad line to five series including our popular air chamber pads (Air Core, Insulated Air Core and now Dual Core) and offered a range of backpacking tents. Each of these steps was taken carefully and with an eye on filling what we viewed as gaps in the product assortment available to outdoor users at the time. Consumers want to be comfortable sleeping in the backcountry and we view it as our job to provide them with products that meet this goal without breaking the bank. Icing on the cake of our growth is the fact that we've received several awards for value and design including an Editor's Choice Award from Backpacker for our Insulated Air Core pads - which utilize PrimaLoft™ insulation - and a Best Buy awards from Backpacker for our Seedhouse 3 tent.

Our line has grown simply because demand for our products has grown. Big Agnes is unique in that we offer a product line with something for everyone; from thru-hikers who want to lighten their load with a single person tent to canoe campers looking for a comfortable pad to bow hunters who need a large bag but want it to be light. We're working hard building awareness and distribution for our products across this spectrum of outdoor users. We've proven that there's room in the category for another brand with top-notch products and customer service and we consider anyone else who offers sleeping bags, pads and tents as our competition.

RJ: What do you do to educate potential customers about the concept?

BG: All of our marketing collateral includes a simple cut-away diagram of our bag and pad sleeve to drive home the point that we're relying on the sleeping pad to provide bottom insulation and moving that insulation to the top two-thirds of the bag.

RJ: Now there are more top bag manufacturers: Western Mountaineering, Sierra Designs, Nunatak, a few cottage brands. What are you going to do to innovate in this area to remain competitive? I mean, really innovate. Not just make incremental improvements to fabric and design.

BG: Big Agnes is on the forefront of sleeping bag innovation right now and we don't plan on slowing down anytime soon. While each bag design starts with our unique integrated bag/pad design we've moved far beyond simple fill and fabric changes. For starters, our synthetic bags are designed using patented construction techniques that increase heat retention, reduce weight and packed size and remain competitively priced. Our Shield Series is targeted towards the technically minded consumer looking to stay dry as these bags use a patented waterproof exterior construction. Our early adoption of these patented construction techniques has resulted in a tremendous amount of editorial coverage and consumer interest. While we constantly seek changes and upgrades that will yield a better product for the consumer, it always helps to drive sales when you can create some hype around it to help prove its value.

Post Interview Comments by RJ: The popularity of Big Agnes and their continued growth over the years emphasizes the fact that mainstream backcountry users continue to adopt the concept of alternative sleep systems, but maybe perhaps, for reasons that are very different from early adopters of innovation and ultralight hikers. Companies like Big Agnes are selling more comfort: Bigger bags, integrated systems, and plush pads. Having used Big Agnes bags for car camping, it's hard to argue the point. There is something to be said about kicking up your knees in a huge bag on a three-inch thick mattress. And, to know that you could take this kind of comfort into the backcountry with you for half the weight of an equivalent system one might buy at a big box store is certainly appealing if you're concerned more about counting sheep than counting ounces. Thus, I think the major innovation of Big Agnes has been its marketing success, rather than patented construction details: they

have been able to communicate the top bag concept effectively, where it hits home to the mass market (selling comfort).

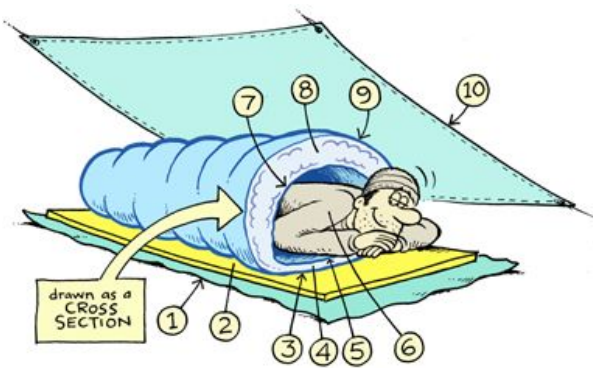


FIGURE 1. Cross-sectional transect of a traditional sleep and shelter system illustrating the ten most common layers from bottom to top (see text for numerical reference to each layer).

Wow! Ten layers of material - and this doesn't even address the individual layers of clothing, the additional layers used by those who use both a tent and a ground sheet, or the additional layer found in a typical double-walled tent!

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Evolution of the Unconventional Sleep System

It is layers #3-5 (in the case of top bags and quilts) and layer #6 (layers in the case of wearable sleep systems), however that are under attack from some manufacturers of unconventional sleep systems.

Top bags replace these layers with a single layer of fabric (Figure 2b), under the premise that the compressed insulation that comprises the lower part of a sleeping bag does not contribute much (at least on a performance:weight basis) relative to the performance:weight contribution from a single layer of fabric - or, in the case of quilts - relative to the performance:weight contribution of no layers at all.

Thus, for a quilt-based sleep system (Figure 2c), it is assumed that the 10 layers of material outlined above can be suitably replaced by only 7 layers (8 layers in the case of top bags) with no appreciable loss of performance. The key presumption (hope?) here is that appreciable equates to negligible. A great majority of the rest of this document is devoted to addressing the validity of that presumption! What is lost in a top bag or quilt system is draft control.

Those who have had the opportunity to use mummy bags, top bags, and quilts will (usually) admit that a layer of insulation sandwiched between two layers of fabric (layers 3-5 above) provides a meaningful amount of draft control and insulating ability at the location where the sides of the bag meet the sleeping pad, especially at colder (near or below freezing) temperatures. Effectively, this insulation forms a seal against cold spots.

Users of top bags, and to a greater extent, users of quilts, mitigate (but do not necessarily solve) this draft control problem in two ways. The first and most obvious is to include insulating clothing (such as a down or synthetic fill jacket) as part of the sleep system. Such clothing provides a barrier to convective heat loss and can overcome the influence of a "leaky" sleep system in mild conditions.

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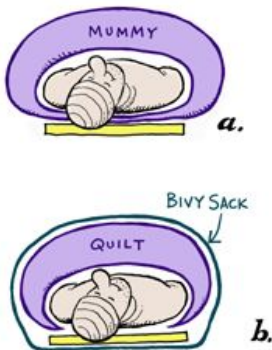


FIGURE 3. Cross-sectional transects of a mummy (a) vs. a quilt/bivy system (b).

The second solution is one employed primarily by tarp campers in cooler and more inclement (and particularly, windy) conditions: use of a breathable bivy sack (Figure 3b). The combination of an insulated jacket, quilt, bivy sack, and tarp is a lightweight and versatile sleep system option that provides wind and weather resistance for most three-season camping.

Certainly, the weight of an ultralight breathable bivy sack, which adds an additional 4-8 ounces to the sleep system, could be spent on additional fill in a warmer sleeping bag, and/or the draft control of a well-designed mummy bag. However, considering that draft control is most important when camping under an open shelter (e.g., tarp), then a top bag or quilt is usually a lighter option for the tent camper with no meaningful loss of performance in mild (three-season) conditions. For the tarp camper, spending the weight savings on a breathable bivy sack, rather than a more robust sleeping bag, brings some flexibility to the sleep system, including added wind resistance, spindrift and rain spray protection, and ground cover.

It is certainly debatable whether or not the weight gain of a bivy sack is warranted over some combination of an ultralight ground cloth, additional sleeping bag insulating fill, or additional design features (like those for draft control that are found in a mummy bag).

The use of top bags and quilts in winter (and especially, subzero) conditions is a much sketchier proposition.

Layering a three-season quilt with winter insulating clothing (e.g., winter-grade down or synthetic fill parka and pants) inside a bivy sack is a versatile and warm solution down to zero degrees that is undoubtedly lighter than the same clothing, bivy sack, and a winter worthy mummy bag. Few top bags or quilts are suitable for subzero conditions; consequently, layering a quilt inside a roomy top bag, or layering two quilts, is an option we have experimented with and find to be quite suitable for subzero winter conditions - if insulated winter clothing and a bivy sack, snow shelter, or tent is used for primary protection from the wind.

In the case of wearable sleep systems, where the sleeping bag replaces an insulating parka and/or pants, the goal is simplicity: reducing the number of system components (Figure 4). Wearable systems typically are not "ultralight" in the same category as an ultralight quilt and top; in fact, the weight-saving benefits of a wearable sleep system may best be realized when a single bag can replace a sleeping bag, parka, and insulated pants as part of a hiker's cold weather kit.

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FIGURE 2. Cross-sectional transect showing individual layers of a mummy bag (a), top bag (b), and quilt (c).

And What About the Weight?

The million dollar question:

Are unconventional sleep systems really lighter than conventional mummy bags? Specifically, do unconventional sleep systems truly meet the promise of their manufacturers that their performance:weight ratio exceeds that of traditional mummy bags?

Consumers generally expect that manufacturer-assigned sleeping bag temperature ratings are reasonably accurate. While the temperature rating is a useful metric for comparing bags within a given manufacturer's product line, different manufacturers rate their bags differently, and thus, the temperature rating should not be used to compare products from different manufacturers.

Another useful comparison metric is single layer loft: that amount of insulation that remains uncompressed while lying over the slumbering hiker.

And, an even more useful measure of performance that would be of particular interest to the hiker paying close attention to weight, is the loft:weight ratio of a sleeping bag.

The loft:weight ratio is particularly revealing because it identifies the tendency of a design to focus more on features and sizing and less on raw insulating efficiency. In particular, it is expected that this metric would highlight the differences between mummy bags, top bags, and quilts. However, as Table 1 shows, the loft:weight ratios between mummy bag designs (e.g., Western Mountaineering UltraLite, 9.6 cm/kg) are similar to quilts (e.g., Nunatak USA Arc Special, 10.6 cm/kg) and top bags (Western Mountaineering Pod 30, 10.0 cm/kg). This is not necessarily an indication that quilts and top bags don't have weight advantages, but that quilts and top bags may have not yet matured to the point of achieving designs that are as efficient or clean as they could be.



FIGURE 4. Cross-sectional transects of a mummy bag + parka (a) vs. a wearable sleep system (b).

TABLE 1: COMPARISON OF LOFT:WEIGHT RATIOS OF VARIOUS MUMMY, TOP BAGS, AND QUILTS

Bag	Type	Loft ⁵	Weight ⁶	Loft/Weight
UltraLite ¹	Mummy	7.6 cm	0.79 kg	9.6 cm/kg
Alpinist ⁴	Mummy	5.7 cm	0.57 kg	10.0 cm/kg
Vireo ²	Hoodless Mummy Bag	5.7 cm	0.48 kg	11.9 cm/kg
Pod 30 ¹	Hooded Top Bag	7.6 cm	0.76 kg	10.0 cm/kg
Elite Top ³	Hoodless Top Bag	6.4 cm	0.45 kg	14.2 cm/kg
Arc Special ⁴	Hoodless Quilt	5.1 cm	0.48 kg	10.6 cm/kg
Raku ⁴	Wearable Mummy	6.4 cm	0.91 kg	7.0 cm/kg

Notes:

1. By Western Mountaineering.
2. By Feathered Friends.
3. By Rab Carrington (UK).
4. By Nunatak USA.
5. Loft measured is upper layer loft averaged over the chest-to-knees area of the bag.
6. Weights and loft measurements were made directly on new bags that had been fully lofted for 24 hours.

It is also worth comparing a mummy and top bag design from one manufacturer (Western Mountaineering) and a mummy and quilt design from another manufacturer (Nunatak) so more direct comparisons of loft:weight ratio can be made.

Western Mountaineering manufactures both the UltraLite (a mummy bag) and the Pod 30 (a top bag). Loft:weight ratios have been calculated for these very similar bags (each has 3.0 inches of upper layer loft) to be 9.6 cm/kg and 10.0 cm/kg, a difference of only 4%. Nunatak manufactures the Alpinist (a mummy bag with a more minimalist design than the UltraLite) and the Arc Special (a quilt), both of which have measured lofts of about 2.0 to 2.25 inches of upper layer loft. Loft:weight ratios for these bags have been calculated as 10.0 cm/kg and 10.6 cm/kg, a difference of only 6%.

It seems that unconventional sleep systems, then, may not provide the earth-shattering weight savings benefits over similarly lofted mummy bags that we originally expected or yearned for a few years ago. And due to their draft control limitations, they certainly are not as effective at insulating as a mummy bag, right? And so, if we need bivy sacks or more fill to achieve a given temperature rating (in order to compensate for draftiness, for example), are we really saving any weight?

Performance Advantages of Quilt-Bivy Systems

Let's first consider the combinations of two shelter types (tent vs. tarp) and two sleeping bag types (mummy vs. quilt) in inclement weather conditions.

For the sake of brevity, we'll assume that a sleeping bag with approximately 2.0 inches (5.1 cm) of upper layer loft will be sufficient to keep a hypothetical hiker comfortable in still air under the stars on a typical 32 °F night in the mountains.

The lightest solo tent on the market that affords complete protection from wind and rain is something along the lines of a Six Moon Designs Lunar Solo e (24 ounces). Add to this, a well-designed ultralight mummy bag with 2.0 inches of upper layer loft (e.g., Marmot Hydrogen, 21 ounces) and you have a bag-shelter system that weighs 45 ounces and will keep you warm at 32 °F.

Can the mummy bag be replaced by a quilt having only 2.0 inches of loft without loss of performance of the system? If it can be assumed that the tent protects the hiker from wind and rain, then the answer is most certainly yes. A quilt that meets these specifications is the Nunatak Arc Ghost, weighing only 16 ounces (based on manufacturer temperature ratings - interviews with actual Ghost users, and a product review of the Ghost at BackpackingLight.com, indicate that this temperature rating may be optimistic). If the hiker wears a hat to bed (and it would be assumed that his mummy bag would not replace his warm hat), then the hiker has saved about 5 ounces of system weight with no appreciable loss of performance.

Our hypothesis, then, is that:

Unconventional sleep systems are lighter than traditional mummy bags - at least if you're sleeping in a tent capable of fully protecting you from inclement conditions, including wind.

But what if you are sleeping under a tarp? And what if the weather is something worse than mild? Even only "breezy" conditions (with winds < 5 mph) are known to cripple the performance of a sleeping bag. A stiff wind blowing through a tarp on a freezing night can render a bag rated only to freezing quite chilly indeed.

If our hypothetical hiker above replaced his solo tent with an airy tarp, the equation certainly changes. A quilt is simply no match for a mummy bag when the wind is blowing. And that's why we often pair the quilt with a breathable bivy sack (which adds 4 to 8 ounces of weight to the system, but is offset by 2-3 ounces saved over an ultralight ground cloth that is not needed with the bivy sack; thus, the net weight added back to the system is in the 2 to 6 ounce range by using a bivy sack). And so, it appears that adding a bivy sack offsets the 5 ounce weight savings of choosing a quilt (Arc Ghost) over a mummy bag (Hydrogen).

Thus, for this scenario, we must ask the following question:

Do unconventional sleep systems really save weight over traditional mummy bags if you are tarp camping in inclement conditions?

However - and this is extremely important to realize - experience has taught us that the combination of an ultralight bivy sack with a quilt is more versatile than a mummy bag and ground cloth for its ability to keep you warmer and drier in inclement weather under a tarp. The bivy sack provides some buffering capacity against convective heat loss by minimizing air currents circulating around the surface of the sleeping bag, it protects the bag from moisture caused by spindrift and rain spray, and it provides a sealed hood area for rebreathing warm air (the process of inhaling cold air and expelling air warmed by your body causes significant heat loss).

Because of the benefits of a breathable bivy sack with a tarp as a shelter system, it seems more advantageous for the mummy bag user to consider adding a bivy sack to their kit (and switching to a lighter weight quilt) than for the quilt user to trade in their bivy and quilt for a heavier weight mummy bag.

And thus, we propose a revised hypothesis as follows:

Unconventional sleep systems (and in particular, quilt-bivy systems) do save weight over the mummy bag-bivy and mummy bag only systems required to keep you similarly warm if you are tarp camping in inclement conditions.

Keep in mind that we are discussing quilt systems relative to mummy systems. Top bags generally lie somewhere in the middle of the weight scale between mummy bags and quilts, and the choice between a mummy bag and a top bag - or between a top bag and quilt - are noticeably smaller than between a mummy bag and a quilt.

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Performance Advantages of Wearable Bag Systems

And what of wearable systems? Do they offer a weight advantage over their bag-clothing counterparts?

Let's consider, as our wearable model, the Nunatak Raku. The system offers 2.5 inches of single layer loft in a 32 ounce package and is assumed to provide comfort down to 20 °F as per the manufacturer's suggested temperature rating. Now, we must ask the question: what is the lightest possible quilt-clothing system that can be used to replace the Raku? For simplicity, we'll choose a down-insulated clothing system (parka and pants) in combination with a quilt system that provides a similar thickness of single layer loft. Nunatak's own Kobuk Parka and Pants (1.0 of single layer loft) weigh about 28 ounces total. Adding Nunatak's Arc Edge blanket (1.0 inches of single layer loft) and down balaclava brings the system weight up to 41 ounces, and we've not even met the loft equivalent of the Raku, especially in the head area. This weight differential increases further if the user elects thicker clothing and makes up the difference with a thinner bag.

Consequently, we are left to assume that:

A wearable system, as well, has the potential to save a significant amount of weight over separate clothing and sleep systems, even if we opt for the lightest possible sleeping bag style available - the quilt!

Of course, all of these comparisons make a very important assumption: that the systems being compared use similar weight fabrics, similar fill types, and similar sizes. The analysis becomes far more complicated when mixing and matching products using different construction types and materials from different manufacturers.

In addition, all of this talk about the context of a system in variable weather conditions can pose quite a quandary for the beginning lightweight hiker, who may not only have very little experience with stormy weather, but may be downright intimidated by it!

However, if we were prodded to generalize about the potential application of top bags and quilts five years ago, we might have discouraged their widespread adoption as a core piece of a three-season lightweight backpacking kit for all users. However, a lot has changed in five years: more products, more user experience, more available education, and more backpackers converting to "lightweight" have increased the rate of adoption of these systems. Today, virtually anyone can learn to use an unconventional sleep system effectively in three-season conditions, and those with three-season experience are having less difficulty extending them to winter conditions than they did five years ago.

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Unconventional Sleep System Designs

A handful of companies have been quietly manufacturing three primary types of unconventional sleep systems in recent years: bags with no bottom insulation ("top bags"), bags with a partially or fully-unsewn circumference ("quilts"), and hybrid bags designed to be worn as clothing ("wearable bags").

Top bags are designed on the premise that while in a sleeping bag, the weight of your body compresses the bottom insulation and renders it ineffective at trapping air and keeping you warm. Weight is saved by eliminating the additional layer of fabric on the bottom required to contain bottom insulation, bottom baffles, and of course, the bottom insulation itself.

Sidebar: Insulation Distribution in a Sleeping Bag

Most down sleeping bag manufacturers (including Western Mountaineering, Feathered Friends, and Marmot) distribute down unevenly in a sleeping bag. A commonly acceptable ratio of loft distribution between the top and bottom layers is 3:2 (i.e., 60% of a bag's total loft is in the top layer, and 40% is in the bottom layer).

Not everyone agrees with this philosophy.

Quilts are exactly that: two layers of sheet fabric sandwiching the sleeping bag insulation. A quilt is simply draped over you while sleeping, not unlike the comforter on your bed at home. Like top bags, quilts are designed on the premise that little or no insulation (from a sleeping bag) is needed below you while sleeping. Some manufacturers hybridize the designs of a comforter and a sleeping bag by offering sewn footboxes and/or straps to secure the quilt around your body/sleeping pad, but the fact remains: it's still just a quilt, which has significant draft control limitations. Weight is saved in a quilt system by reducing the girth of the bag (requiring less fabric and insulation), eliminating the hood, and combining it with other clothing to remain warm. Quilts are a particularly unique deviation from conventional mummy, top bag, and wearable bag designs because they have no fixed girth. Consequently, you can combine any number of insulating clothing articles to dial in your desired comfort range.

Wearable bags typically offer closable hems for arms and legs/trunk so the bag can be worn in camp. Weight is saved in a wearable bag system by encouraging you to leave some insulating clothing at home, or at least, reduce the weight of the insulating clothing that you'd normally take if your sleep system were not built around a wearable bag.

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Mummy Bags

Mummy bags still win hands down as the most efficient standalone bag design (by providing maximum draft control for resistance to heat loss in colder and windier conditions).

Fitted properly to minimize dead air space within the bag and compression of shoulders and torso insulation when the bag is zipped and hood is cinched, a mummy bag will keep you warmer for the weight than any other design. Drafts are kept at bay by the small face opening, you can roll around to your heart's content without sucking cold air onto your backside, and the insulation drapes around your sides and seals the bottom of the bag. Hooded mummy bags control drafts, and that's why they work well for so many people.

However, a mummy bag sized for efficiency reinforces the experience of mummification for the modern hiker: the constrained girth of a mummy bag prevents much movement within the bag. You can't pull a knee up, and lying on your side usually compresses the insulation in the shoulders and back. So, hikers are tempted to fit themselves into bags that offer more interior girth, for more comfort. The result is a loss in efficiency due to more interior volume that your body needs to keep warm. Knowing that you are carrying more bag than you really need to stay warm at a given temperature might be a maddening conclusion for the ultralight hiker! The advantage of using a mummy bag with some extra room is that for cold nights, you can layer some insulating clothing without compressing the bag's insulation.

The problem of lying on your side in a mummy bag (causing compression of the insulation, as described above) can be partially solved by rolling with the bag. However, most manufacturers distribute less down in the bottom layer of their bags, so after some time of sleeping on your side, your back may begin to feel cool. Learning to roll inside the bag is a useful skill. Unfortunately, because a mummy bag's hood is not articulated, rolling inside means that you breathe into the side of the hood.

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Top Bags

Top bags don't really solve any of the key problems associated with mummy bags, and actually exacerbate some of them. Girth is still constrained, side sleeping is even more of a problem (because the insulative seal at the ground-body interface is broken), and some overall insulation efficiency is sacrificed due to the loss of heat occurring where the bottom, uninsulated portion of the bag meets the outside air near your sides.

Top bags generally suffer from another unique anomaly: many of them have "straps" or "sleeves" built in to accommodate a sleeping pad. The positive result of this design is that you never roll off your sleeping pad and it improves the seal at the interface between the insulated sides of a bag and the insulation of the sleeping pad.

Of course, top bag makers have been successful at convincing backpackers that rolling off your pad is a very serious problem and the only way to solve this is with an integrated pad-bag system. Ironically, as we'll discuss further below, anybody can easily train themselves to roll inside the bag. And, once you learn this trick, you never really go back. This is important because having a bag fixed to the pad means that unless your body is a little wider than the pad (most folks aren't - sleeping pads are intended to be wider than the body for comfort!), the sides of the bag won't drape gracefully to follow the contours of your body. In some bags, the "top" part of the bag doesn't have enough girth, and you feel "squeezed" between your pad and severely compressed insulation of the bag's top. To combat this, other top bags have too much "top" width, leaving substantial gaps at your sides which results in a loss of efficiency.

In concept, top bags work well enough to consider them as lighter alternatives to conventional mummy bags. In practice, a top bag-fixed pad system fits precious few of the population perfectly. Some folks that are annoyed by this lack of fit simply use the top bag independent of the pad, and sleep on top of their pad rather than sliding the pad into the bag or fixing the bag to the pad with straps. Not the ideal solution.

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Quilts

Quilts, on the other hand, address some of these problems. The girth of a quilt is essentially removed from the equation, which means your sleep system remains independent of your clothing system, and you can combine the two for optimal warmth without worrying about compressing any insulation. Some quilts offer adjustable straps to secure the quilt around your sides in cooler temperatures, which helps control drafts.

For the side sleeper, quilts are a dream-come-true: they do not restrict movement, and it's easier to learn to roll under a quilt than inside a sleeping bag.

Quilts, however, are not without their disadvantages:

Quilts do not have a built in hood. This isn't a problem for warm temperatures, where you can simply wear a beanie hat at night, but in cooler temperatures (near or below freezing), lack of a hood and draft collar at the neck of the quilt requires you to pair it with the hood of an insulated jacket, or a separate insulated hood or balaclava. For most folks, lack of a hood is a minor inconvenience at best, and in reality, a huge benefit. No hood, or rather, using a hat or hood independent of the bag, means that the hood remains articulated with the bag and side sleepers don't have to breathe into the hoods of their bags.

In addition, quilts are more prone to drafts than either mummy or top bags. Not only do quilts have no insulation on the bottom, they have no fabric (unlike top bags) to seal in heat and control drafts. Consequently, users do need to train themselves in the art of draft control in order to push the limits of quilts in cold conditions.

GoLite President, Demetri Coupounas, says this:

Each of GoLite's sleeping bags, including the Feather and Feather-Light, come with the same insulation loft on the bottom as on the top. 50/50 insulation distribution is neither better nor worse than other ratios - it just depends on the user and the use. 50/50 is best for the user who turns several times during the night and tends to take her/his bag with them in turning onto either side, as opposed to just turning within the bag. The colder it is, the more important it is for this type of sleeper to have full insulation on the "bottom" of the bag since this is often not on the bottom in use. Someone who sleeps on their back reliably all night long would be fine with far less bag insulation on the bottom, and of course, someone who turns only now and then might want less than 50/50 but not necessarily much less.

My take is this: learning to sleep on your back, and/or learning to turn inside a bag without "taking" the bag with you, is a learned skill. It takes practice. But even skilled users know the effects of waking up from backside draftiness in the middle of the night. At some point, you have to realize that such limitations are "ok" and must be accepted if you are going to reduce weight by carrying a sleeping bag with uneven loft distribution, or in the most extreme cases, a sleeping "quilt" with no insulation at all on the bottom. - Ryan Jordan

Many quilt users combine a quilt with an ultralight, breathable bivy sack to extend their range. Use of such a bivy sack provides not only draft protection, but also additional warmth that is best realized in a breeze while sleeping in a tarp or airy tent, when all types of sleeping bags suffer. Recognition of the fact that users of the quilt-bivy system have pushed their limits to remarkably cold conditions certainly makes one wonder if the combination doesn't offer a higher warmth:weight ratio than a mummy bag of the same weight as the combination of quilt and bivy.

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Wearable Bags

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FIGURE 5. The wearable bag can be donned while cooking, lounging around camp, or adjusting the guylines on your tarp in the middle of the night, thus saving weight by replacing insulating clothing.

Wearable bags offer an interesting alternative to conventional sleep systems. Because they are designed to be worn (Figure 5), the transition from hanging around camp in the evening to going to sleep at night and the transition from waking up in the morning to performing daylight's first camp chores is nearly seamless. Having used a wearable bag (Feathered Friends Rock Wren) extensively in a mountaineering context in combination with a waterproof bivy sack, I find them to be among the most comfortable alpine sleep systems available. A wearable bag is appealing for some lightweight hikers who enjoy sitting around camp stargazing, midnight strolling, or night photography where cool evening temperatures would otherwise drive them into their sleeping bags.

Wearable bags do have some disadvantages.

Because of the weight of the extra accoutrements and materials required to convert the bag to a wearable garment, the design tends to have a lower warmth:weight ratio than an equivalent weight mummy bag (cf. Table 1). However, if you consider that the bag may very well replace an insulated jacket and pants, the net weight savings could be significant. Of course, a wearable bag is not practical, or usually accessible, to keep you warm at a rest break on the trail during the day, which makes it inappropriate for winter, when a parka is usually donned at a rest break. In addition, because a wearable bag is your only source of core warmth, it's not a practical solution for staying warm when you have to be mobile in inclement conditions (you are less likely to want to expose your sleeping bag to the elements than your parka). Finally, some may find a wearable bag inconvenient for performing camp tasks that require more mobility or limb articulation than what a wearable bag might provide. Such activities include setting up a tarp, building a campfire, or hanging a bear bag.

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Techniques for Maximizing the Benefits of an Unconventional Sleep System

As is the case with most techniques for shaving weight from your kit, sacrificing weight with an unconventional sleep system also requires some useful skills and a bit of practice. These are not necessarily "advanced" techniques per se, in the realm of say, splinting a broken femur with a trekking pole and an ice axe, but techniques that nonetheless need to be learned in order to maximize the performance of your sleeping gear.

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Insulation Control

The most important usability difference between a mummy bag and a quilt or top bag is that you can't expect to roll over with your quilt or top bag and not feel a cold spot (in a top bag) or outright draft (in a quilt) on your backside in short order. Consequently, when shifting sleeping positions at night, you must learn to roll within the bag, and not with the bag.

This is not a hard skill to learn, and seems to be learned primarily by the habit of subconscious repetition rather than dedicated practice or a purposeful change in conscious effort. It's a habit that is easier to develop in a bag that is integrated with a sleeping pad via a sleeve or strap arrangement, simply because it's easier to roll off a pad than have a pad roll over on top of you.

Often, in the midst of favorable REM slumber, in spite of your best efforts (subconscious or otherwise!), the center of mass of the insulation will have shifted to one side or the other. The typical symptom of such an occurrence when lying on your back is that one arm will be exceptionally warm while the other will fall on the scale between tepid and rather goose-bumpy.

The solution to the problem is simple, but not always obvious, and again requires a learned skill that comes with repetitive habit development: simply lift your backside off the ground (not an easy task for those with back problems) while spreading your arms to the side until tension is developed in the bag. Then, while still hovering off the ground, use your arms to roll the bag back on center. The whole process takes only a few seconds but is such an obvious solution that some folks don't realize the simplicity of it. With experience, the most agile backpackers can accomplish this re-centering task from virtually any sleeping position - yoga training may help. Of course, this whole rigmarole is usually unnecessary when your bag integrates with a pad via straps or a pad sleeve.

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Draft Control

Maintaining the location of your insulation, including your bag and your pad, is the first step to effective draft control - the biggest limitation of top bags and quilts. In colder conditions, however, more substantial draft control measures must be employed. A variety of more advanced tactics can be employed to control drafts that may sneak in through the neck opening of a hoodless bag or through the bottom of a quilt. These tactics include the use of down or synthetic fill insulating clothing, a bivy sack, and an insulating balaclava.

The most basic of those tactics is to combine your bag with insulating clothing, and most effectively, with a down or synthetic fill jacket. Such protection for the torso provides excellent buffering capacity against minor drafts and can dramatically boost the temperature rating of your bag. Of course, the same strategy can be employed with a mummy bag, but the advantage of a quilt and its variable-girth nature (especially if the quilt has adjustable straps between its sides to control the girth somewhat) is that the girth can be expanded to accommodate your insulating clothing without compressing either the clothing or the sleeping bag.

The second primary tactic commonly employed is that of encasing your top bag or quilt in a bivy sack, of which highly breathable (non-waterproof) models are available for tarp and desert camping for a weight penalty of less than half a pound. A bivy sack provides some additional insulation resulting from the additional dead air space it entraps in the sleeping system, but more importantly, it provides a barrier to wind and, especially when drawn closed, an excellent buffer to drafts resulting from the exchange of warm air inside the system with cool air from the outside environment.

The third key tactic is that of pairing your hoodless bag (whether a quilt or top bag) with a hat or balaclava (Figure 6). The important

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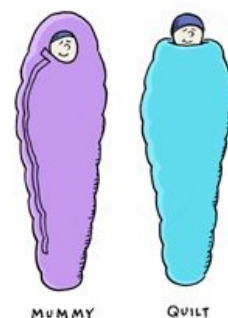


FIGURE 6. A hat or

design feature of the balaclava that you should consider for draft protection is not necessarily its insulating capacity, but its length: you must be able to draw the neck cord of your bag snug around your balaclava-cape-covered neck in order to maintain an effective seal against cold air entry into your quilt.

balaclava is an integral part of the sleep system that is built around any hoodless mummy, top bag, or quilt.

Combining a lofty down or synthetic fill balaclava, hooded parka, insulating pants, and a bivy sack with a very light top bag or quilt can provide adequate protection from the elements in any season where Arctic winter conditions are not expected.

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FIGURE 7. Draft tunnels in a mummy (a) vs. top bag (b) vs. quilt (c). Exacerbation of draft tunnels in a top bag while side sleeping (d). The more cross sectional area of the sleep system that is occupied by a draft tunnel (black), the more difficult it is to retain heat in the system.

At this point, it is worth introducing the concept of draft tunnels. Visualize a draft tunnel as a pocket of space inside your sleeping bag that is unoccupied by either your body or your clothing (Figure 7). These open pockets are undesirable at colder temperatures, because they provide space for convective air movement in the sleeping bag, subject to drafts resulting from the intake of cold air from outside the sleep system (hence their nickname, "draft tunnels").

In a utopian mummy bag, these open pockets disappear because the bag perfectly drapes around the contours of your body to result in their displacement by the conforming materials of the bag itself (Figure 7a). Draft tunnels are best avoided by selecting a bag with an interior girth that perfectly matches that of your body, plus any insulating clothing you are wearing. (This highlights the beneficial feature of a variable girth quilt and its ability to adapt to various clothing combinations.)

Of course, backpacking gear tends to be non-utopian in function, and top bags in particular are a quite distanced from the utopian sleep system that is free from draft tunnels. The top bags that are most vulnerable to draft tunnels are those by which some mechanism of fixing the sleeping pad location relative to the bag is provided through a sleeve or straps. As a result, the sides of the bag tend to veer downward to form a relatively perpendicular angle with the sleeping pad, rather than conforming nicely around the body's lower side (Figure 7b). A similar result occurs when a pad is secured by straps underneath a quilt. A negative byproduct of this design is that if the bag is sized correctly to the user's desirable girth (based on body size and clothing worn), the inability of the bag to contour around the body results in excessive compression of the fill over the top of the user: a horrible consequence, since it is this insulation that must serve to keep the user warm!

In a quilt or top bag where the pad has been disengaged from the bag and the girth properly sized, the insulation is allowed to conform underneath the lower side of the body, and the formation of draft tunnels is minimized (Figure 7c).

It should further be noted that side sleeping exacerbates the formation of draft tunnels because the bag cross section takes a more triangular, and less oval shape (Figure 7d). Again, this problem is minimized for side sleepers who disengage their bags from their pads.

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Pad Control

Another challenge with top bags or quilts is that of staying atop your sleeping pad and not rolling off. Pad straps and sleeves are available on some products to solve this problem (Figure 8), but for one reason or another (and we've articulated those reasons herein), you may not

want to use them. Staying on your pad is not unique to unconventional sleep systems, and the art (and mysticism) of doing so won't necessarily be articulated here. However, quilt users can rejoice: they have direct access to the pad directly beneath them and generally find that it's far easier to stay on the pad than with any other type of sleep system. Those that use torso-sized pads are at a particular advantage because the pad requires so little effort to position properly.

Many users blame an under-insulated sleeping bag for a cold night's sleep, when in reality their sleeping pad may be inadequate. Top bag and quilt users who pair these ultralight bags with kidney-sized pads made from bubble wrap are the biggest culprits, but most of us experience this at some time or another when pushing the limits of these sleep systems. Sleeping on wet ground at temperatures near or below freezing, or on snow at any temperature, will seriously test the integrity of the sleeping pad: these surfaces are extremely good conductors of heat and require more insulation. In theory at least, a thick torso-sized pad should keep your body core warmer than a thinner three-quarter or full-length pad. For winter use on snow, one effective compromise is a thin (1/4" to 3/8") three-quarter length closed cell foam pad (use your backpack and its padding to insulate your feet) combined with a thicker torso sized pad (either self-inflating or closed cell foam).

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Mind Control

And what if your ultralight sleep system, of which you've invested countless hours (days?) designing, testing, and using on trips, suddenly meets its match on a trip in a far and remote wilderness? In other words, what happens when the temperature simply falls to a point that is far lower than what your sleep system can handle?

If staying put is your only option and you must do what you can to ride out the night, then there are a few tricks.

Learn to meditate, be still, and stay on your back to conserve heat. When the temperature dives to that point that's 10 degrees colder than what you expected, be still, especially in a quilt: every bit of movement causes warm air in your sleep system to be exchanged with cool air from the outside.

Glen Van Peski, Alan Dixon, and I did this on a fall trip to Wyoming's Wind River Range. Our sleep systems were designed for temperatures near freezing. On our final night, we were trapped by a winter storm that drove everyone else out of the mountains. Through several inches of snow and temperatures down to 14 °F, we meditated our way through a 15 hour "night" in ultralight top bags and quilts sheltered by ponchos and small tarps. Morning came, and we were no worse for wear, endeared to beautiful blue skies and views of the Cirque of the Towers that were nothing less than stunning. We were glad we stayed.

In addition to meditation, a suite of techniques are available to compensate for an underinsulated bag, including going to bed with a hot water bottle, performing isometric exercises that stimulate blood flow in major arteries, and eating high-fat foods prior to or during the night to stimulate your body's metabolism.

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Applications of Unconventional Sleep Systems

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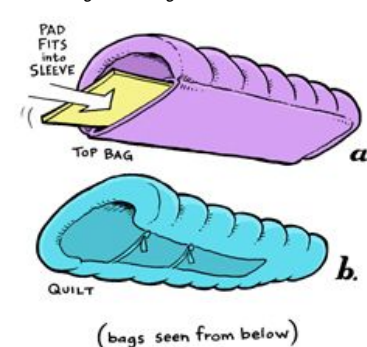


FIGURE 8. The use of sleeves (a, as in top bags) or straps (b, as in quilts) can be used to prevent the sleeper from rolling off her pad at night.

When the rubber meets the road, what choices does our staff make? Do we actually use this quirky stuff? Do we think it offers weight and convenience benefits that render conventional mummy systems dead?

Those questions are not easily answered (or rather, they are not easily answered when planning every trip). However, neither have we promised you a heavenly night's sleep by encouraging you to sell your mummy stock. We've actually used these systems, often to their points of miserable failure. But that's how we learn their limits and we encourage you to do the same.

What follows is a summary of sleep system choices (along with insulating clothing; note that hiking clothing, raingear, and other miscellaneous clothing is not included in these lists) from the Backpacking Light staff that reflect different personal tastes, geographical locales, and climactic conditions. We hope that it will give you some insights that complement the foundation principles and market overview we've presented earlier in the article.

Mid-Atlantic Appalachians, Fall

"Mid-Atlantic Appalachia in November brings near-freezing temperatures, high humidity, and cold rain. The Blue Ridge is rocky with few flat places to camp outside of trail shelters. Since I hike dawn to dusk and sometimes a few hours into the night, I don't want to fuss with finding a flat ground site and staking out a tarp or other ground basis shelter. A Hennessy Hammock provides shelter and allows me the flexibility to camp when I want to stop, not when I find a suitable campsite. The Jacks 'R' Better No Sniveller down quilt is more hammock friendly than my zipperless top bag. I can also wear it around camp on cool mornings and evenings." - Alan Dixon

Alan's Gear:

- Cocoon Pullover (9 oz)
- Micro-fleece Polypropylene Balaclava (1 oz)
- Jacks 'R' Better No Sniveller Down Quilt (20 oz)
- Hennessy Adventure Racer Hammock (15 oz)
- Gossamer Gear NightLight + ¾ Length ThinLight pad (7 oz)

High Sierras, Late Summer

"Joy of the High Sierras: rain is rare! Temperatures in the late summer commonly drop into the twenties and breezes are common, with low humidity. A perfect environment for down insulation. I use a first-generation Rab Elite top bag that has been custom-modified by Nunatak USA and includes a fabric bottom, additional down overfill, and additional side baffling to improve heat retention at the bag-pad interface. The overfill in this 2.75-inch loft bag and the mild, dry climate allow me to leave the bivy sack at home. A down vest and down balaclava round out this system." - Alan Dixon

Alan's Gear:

- Bozeman Mountain Works Stealth 1 Lite Tarp (7.5 oz)
- Western Mountaineering Vest (5 oz)
- Nunatak Down Balaclava (4 oz)
- Custom Modified Rab Top Bag (20 oz)
- Bozeman Mountain Works TorsoLite Pad (10 oz)

Northern Rockies, Winter Alpine Climb

"My belay jacket may be exposed to the elements but it's (usually) cold and dry enough not to worry too much about down getting wet from external moisture. Thus, my bag is an Expedition Arc Alpinist with plenty of interior girth for layering and loft of 3.5 inches. For climbs or backcountry treks longer than two nights, however, I may opt for a synthetic quilt to use as an overbag and/or a synthetic parka, in order to combat the inevitable accumulation of condensation in down gear on long winter trips. A non waterproof bivy sack is fine if temperatures are below 15 degrees at night and wind is expected to be mild. Otherwise, for stormy and/or possibly warmer conditions, I prefer the Integral Designs eVENT Bivy Sack (18 ounces). I choose the TorsoLite pad for its compact nature and comfort for long winter nights, paired with a very thin foam pad for additional insulation." - Ryan Jordan

Ryan's Gear:

- Rab Endurance Neutrino Down Jacket with Hood (22 oz)
- Bozeman Mountain Works Cocoon Pants (7 oz)
- Expedition Arc Alpinist Bag (22 oz)
- Integral Designs eVENT Bivy Sack (18 oz)
- Bozeman Mountain Works TorsoLite Pad (10 oz)
- 1/4 inch foam 3/4 length Pad (4 oz)

Southwest Desert, Sub-UltraLight

"With lows never getting below 40 °F, traveling the southwest desert with a sub-5-pound base pack weight is enjoyable and comfortable. No rain and warm temperatures mean that truly ultralight sleeping systems can be used: a MontBell U.L. Down Inner Jacket and a Jacks 'R Better Shenandoah Summer Quilt combined with a simple, breathable bivy sack. For warmer months, I can even leave the insulated down jacket at home. In colder months, I'll replace the U.L. Down Inner with a Bozeman Mountain Works Cocoon Pullover and combine it with a Jacks 'R Better No Sniveller quilt." - Carol Crooker

Carol's Gear:

- MontBell U.L. Down Inner Jacket (7 oz)
- Turtle Fur Fleece Beanie Hat (1 oz)
- Jacks 'R' Better Shenandoah Universal Blanket (14 oz)
- Bozeman Mountain Works Vapr Bivy (6 oz)
- Bozeman Mountain Works TorsoLite Pad (10 oz)

Southwest High Country, Three-Season

"Although the Arizonan deserts aren't suitable for hammocks, the high country has plenty of trees and I take advantage of them by sleeping in a hammock. If temperatures are warmer, I use a Jacks 'R' Better Weather Shield bottom (with a Gossamer Gear ThinLight foam pad if needed). If it's colder, I move up to a Bozeman Mountain Works Cocoon pullover and the Jacks 'R' Better No Sniveller quilt (2.25 - 2.5 inches of loft)." - Carol Crooker

Carol's Gear:

- MontBell U.L. Thermawrap Inner Jacket (5 oz)
- Turtle Fur Fleece Beanie Hat (1 oz)
- Speer Top Blanket (15 oz)
- Hennessey Adventure Racer Hammock (16 oz)
- Jacks 'R' Better Shenandoah Universal Blanket (14 oz)

Southern Rockies, Summer

"I typically camp at high altitude (11,500 to 12,500') on my off-trail ramblings, where weather conditions are quite variable. A good campsite is not hard to find in the alpine zone, but I need to be prepared for a range of possible conditions. Temperatures can drop down to freezing in lower places, so I am careful to pick a good microclimate. Nighttime convectional breezes are also common, which carry heat away when I sleep exposed, so I try to find some scrubby trees or rocks to break the wind some. My preferred sleeping system is a poncho/tarp, a thin plastic groundsheet, a thin foam pad, and a GoLite Feather-Lite zipperless/hoodless sleeping bag rated at 40 degrees. I frequently carry a water repellent bag cover for insurance against wind-blown rain." - Will Rietveld

Will's Gear:

- Mountain Laurel Designs Silnylon Pro Poncho Tarp (10 oz)
- Bozeman Mountain Works Cocoon Pullover (9 oz)
- The North Face Windstopper Fleece Bomber Hat (2 oz)
- DuoFold Microfleece Pants (6 oz)
- GoLite Feather-Lite Bag (20 oz)
- Homemade Breathable Sleeping Bag Cover (7 oz)
- Gossamer Gear NightLight Pad (4 oz)

Washington Cascades, Fall

"Temperatures in the Washington Cascades remain moderate into the fall, rarely dipping below freezing. Precipitation is a given (!) so keeping down gear dry and blending down with synthetic insulations is a good strategy. The ground is often wet, and rain blows sideways often, so a bivy sack can be a Godsend. I use a Bozeman Mountain Works Spin Poncho in conjunction with a Bozeman Mountain Works Vapr Bivy Sack. I combine a Nunatak Arc Ghost with a Bozeman Mountain Works Cocoon pullover and SmartWool long johns. To keep my head warm I use a kit-made "Ray Way" style bomber hat, and add a full coverage stretch fleece balaclava when the temperatures dive." - Doug Johnson

Doug's Gear:

- Bozeman Mountain Works Cocoon Pullover (9 oz)
- Ray Way Insulated Bomber Hat (1 oz)
- Nunatak Arc Ghost Bag (15 oz)
- Bozeman Mountain Works Vapr Bivy (7 oz)
- Gossamer Gear NightLight Pad (4 oz)

Brooks Range, Alaska, Early Summer

"Like the Cascades, the Brooks Range is cold and wet, especially in June. An ever present near-freezing mist and rain can cloud the north slope and render down insulation virtually useless in a matter of a few days. Since there are no town stops or opportunities for drying your bag, synthetic insulation (comprised of the Polarguard Delta-insulated Cocoon systems below) is key, and forms the cornerstone of both the clothing and sleep system. Full synthetic insulating clothing, combined with a thinner synthetic insulating sleeping quilt, are far easier to separate and dry out than the equivalent weight in a thicker mummy bag." - Ryan Jordan

Ryan's Gear:^{*}

- Bozeman Mountain Works Cocoon Pullover (9 oz)
- Bozeman Mountain Works Cocoon Pants (7 oz)
- Bozeman Mountain Works Cocoon Balaclava (prototype, 2 oz)
- Bozeman Mountain Works Cocoon Quilt (prototype, 18 oz)
- Bozeman Mountain Works Nano Bivy (3.5 oz)
- Gossamer Gear NightLight Pad (Trimmed to 3 oz)

^{*}Taken from Ryan's actual gear list for a 600 mile unsupported Arctic expedition across the north slope of the Brooks Range in June, 2006.

Montana Beartooths, Fastpacking

"On marathon day hikes and long overnights in the Montana Beartooths, I have a singular goal: maximum mileage and minimum gear. As such, I sleep little, hike a lot at night, and enjoy the freedom of a tiny daypack while covering up to 70 miles or more - often off trail - in the course of 48 hours. Minimizing kit weight requires a change in mentality here. I sleep during the heat of the day and move in the chill of the night. I still need shelter from rain, but I want it to be simple (a bivy sack) and I always combine inclement weather naps with sheltered locations (in caves, under overhanging cliffs, or in dense forests). This is the kit I used to hike the more remote western state high points without establishing camps: Granite (MT), Gannett (WY), Rainier (WA), and Kings (UT). The coldest conditions I've ever encountered with this gear list was descending from Froze-to-Death plateau in falling snow after an ascent of Granite Peak, the Montana high point. The key to staying warm: not relying on the gear. I had to keep moving! But, I was able to catch a few zz's the evening before the climb by napping for a few hours in the afternoon sun at 9,000 feet!" - Ryan Jordan

Ryan's Gear:

- Bozeman Mountain Works Cocoon Pullover (9 oz)
- Bozeman Mountain Works Cocoon Pants (7 oz)
- PossumDown Beanie Hat (2 oz)
- Ortovox Bivvy-Poncho (raingear & shelter, 12 oz)
- 16" x 30" x 3/8" closed cell foam bivy pad (2.5 oz)

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Acknowledgements

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