Improvisation

Making shelters, stoves and *fun*

Sheet
O.12

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The most important skill we can learn in our everyday lives is *improvisation* – solving immediate problems with what's available around us using our past experience as a guide. The problem with trying to plan and organise is that external circumstances can disrupt your ideally conceived solutions; through improvisation we can move on and work around problems as they arise.

This unit is really all about experimentation, and the value of "playing around" with objects in order to learn the deeper, more technical skills of manipulating objects that have many other applications. As children we learn through play; we fix in our minds the many different ways that the objects around us behave, and how we can manipulate them. In later life we use this stored body of information to carry out all sorts of activities, and also extend this body of experiences with new and more complex forms of interaction that are based upon the basic sets of rules or ideas we learn as children.

The most important thing to understand about improvising solutions is that "failure" is not necessarily a problem; through failure we learn what doesn't work and can then move on to try other options that might, informed by our experience. *The most important issue with regard to failure is not so much to avoid it, but not to repeat it;* so often in life we replicate patterns of activity that often end up in much the same unsatisfactory outcomes. The skill of improvisation is as much about being able to distinguish what options will not work as it is finding options that might.

So often in life we are urged to conform – *to be serious and act like everyone else*. In fact there are times when just going out into the countryside and messing around can be as valuable to developing vital future skills as reading a worthy article or going on a course. Planning your actions is always a good idea, but there are times when you need to act more spontaneously to solve your immediate problems – we need to practice those skills if they are to serve our needs when we most need them.

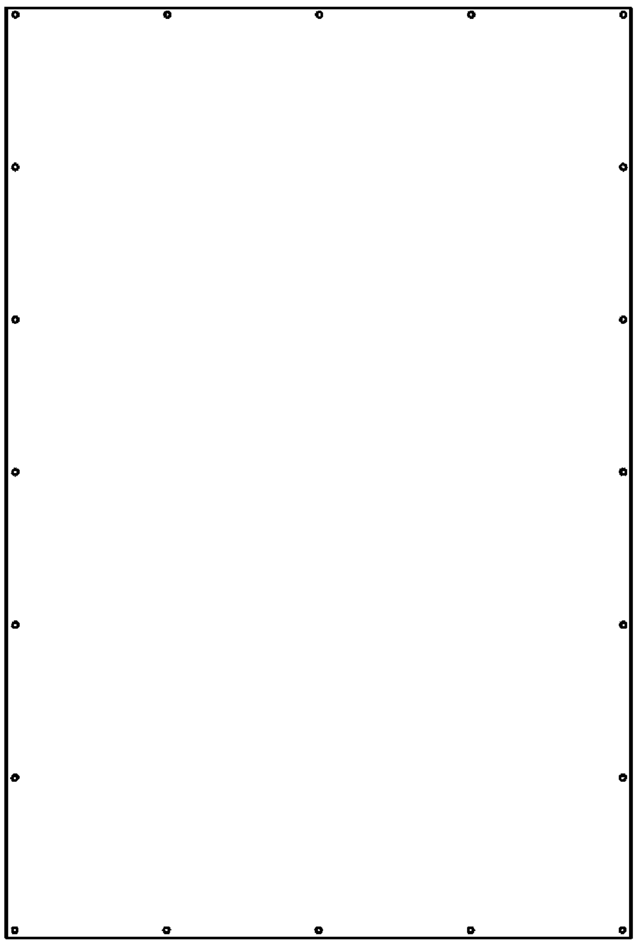
Shelters – *introduction*

Shelters are fun; as kids many of us will have experimented with blankets and household items to make a den, and perhaps carried those ideas outside. The luckiest of people never stop doing this!

Learning how to play around with string and sheets of fabric or plastic can have many applications. Shelters can keep the wet off your head, but also the heat of the sun; they can also keep you warm outside, or, erected indoors, make a little heat go further if your house gets its energy supply cut off[1]. Learning how to make basic shelters with what's available around you can therefore have many vital applications should the world around you not perform according to its usual rules.

To begin, get a sheet of paper. The basis of improvisation is being able to realise a number of ways of manipulating an object in ways that you haven't experienced or practised before. *Rather than get large tarpaulins and ropes it's just as easy to start with a sheet of paper* – which represents your sheet or tarp. Then, by folding and manipulating the sheet of paper you can learn the basic shapes, the limitation and the problems involved in making structures out of a large flat sheet.

For example, consider the diagram below –

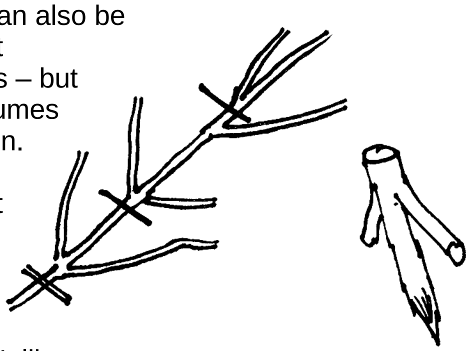


This represents a standard sized plastic groundsheet or tarp that you might buy in DIY or camping shops. They come in many different sizes but the proportions of the sheet are usually about the same – usually about one and a half times as long as they are wide. Along each side you'll often get reinforced eye holes at regular intervals for trying down or suspending the tarp. You could enlarge the above image on a photocopier, or download the [A4-sized PDF sheet][2] from the FRAW site, and start practising making some of the shelters that we'll look at below.

Poles, pegs and ropes

To make shelters stand up you need at least some string, or better still some strong twine or cord. You won't have to worry about cord if you're just playing around folding a piece of paper, which is why doing some real-life practising of your paper folding experiences with real tarps and ropes is still important.

The classic tent has poles – usually made of metal or wood in sections. Most modern tents now have more flexible poles that thread through the fabric of the outer sheet because this holds the tent erect more securely. Some of the ideas that follow require either one or two poles. You can buy poles from camping shops but they can be very expensive. For this reason it's just as easy to experiment with other materials. Bamboo or cut wood poles are OK, but if you're in the countryside you could also look for some long straight 'sticks'; ash, elder and sometimes willow are good sources of poles, but to be strong they need to be still alive, not dead and rotting – remember to exercise some common sense restraint when you harvest your poles.

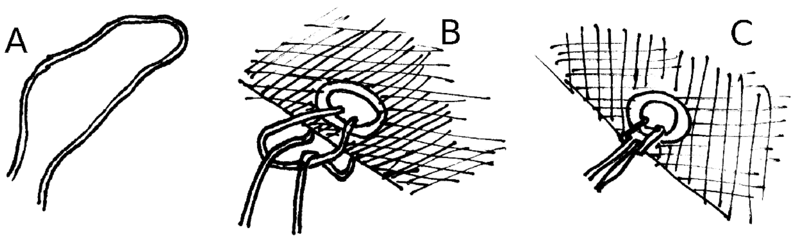


Tent pegs can also be bought in most camping shops – but this again assumes the shop's open. If you've ever stuck for a tent peg then again trees and shrubs offer the simplest source. Unlike poles, if the branch is dead (but not rotting) the wood becomes very hard and so it's ideal for making pegs. Oak and ash are good sources (beech tends to rot quickly, but freshly fallen branches are OK). Simply cut the branch into smaller sections (as shown above) and sharpen the central shaft to a point with a knife or saw. If you carefully lop off the side shoots this will make an ideal 'hook' to hold your cord.

Rope and cord is more of a problem. You can make good string from both nettle stems and willow bark, and by platting a few strings together you can make cord – but it takes time and a lot of effort. Therefore remember this simple rule; always have a ball of strong string or cord in your home or in your rucksack – *it's immensely useful stuff!*

Eyes, knots and lashing a sheet

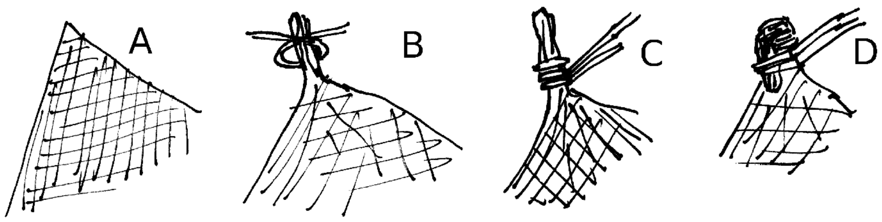
If you make a hole in a plastic or woven sheet of fabric it will tear – the hole is a weakness, and when put under tension the sheet will split or unravel. So when you erect a tarp you need to use it in a way that avoids the need to pierce the sheet.



To solve this problem tarps usually have eye holes that allow you to string-up the sheet without weakening its structure (see top diagram). Rather than tying a knot around the eye-hole – which requires undoing again or cutting the string and wasting it, it's far simpler to make a loop with your string/cord (A). Thread the loop through the eye hole and then pull the 'legs' of the cord through the loop (B). Finally pull it tight and the loop will neatly and firmly grip the eye hole (C). In fact, when lashing a sheet it's easier to use loops of cord rather then single lengths; you just thread the sheet as shown and then hook the other end of the loop over a tent peg, rock, or tie it off on some other large object – *cutting the string or trying further knots isn't necessary!* And as you're using two lengths of cord together rather than one, this option is also much stronger.

There's an obvious problem here – *what if your sheet doesn't have eye holes?* The best option in these cases is to support it with long lengths of cord that you throw the sheet over, rather like a washing line, and then weight the sides of the sheet down with large objects – such as logs, rocks or planks. That way you don't have to physically fix the sheet, but the danger is of course than in rough weather it can blow away – as the sheet bucks around in the wind your weights get thrown off. To solve this the simplest option is to wrap the sheet around your weights rather than just placing the weights on top.

If you have to tie the sheet, perhaps because you don't have much cord to make a line, then you need to gather the corner or side into a long tail (A/B), then you tie your loop of cord around the tail and pull it tight (C). Now of course if the sheet is tugged this will come loose so it's important to fold the tail over on itself and then tie-off the whole thing firmly again (D). This will stop the sheet pulling through the hole. The only problem with the “eyeless” approach is that, because it results in a furrowed sheet at the gathers, it tends to flap around a bit – but better to be a little noisy in the wind rather than tearing into pieces.

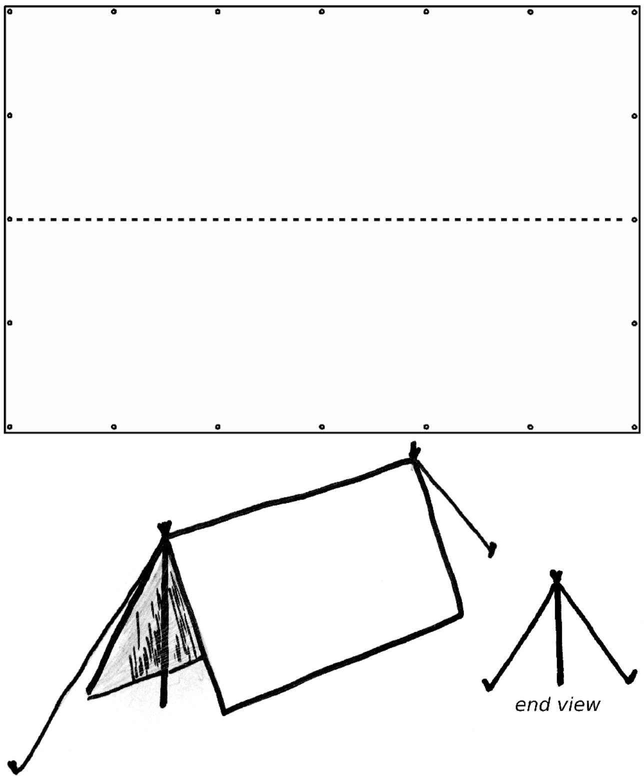


Ridged structures

Ridge tents have a central ridge, either because the sheet is under tension or because it's laid over a cord rather like a washing line. This makes it one of the simplest types of structure to erect.

The classic ridge tent has a ***symmetric ridge*** – both sides are the same length. It requires two poles, and to make sure it doesn't sag you usually need to run a cord along the ridge. With standard ridge tents the sides run to the ground, but if you use long guy ropes from the corner/side, or you support the corners/sides with shorter poles, you can open the sheet out more, leave the sides open and have a shaded/rain-proof space underneath.

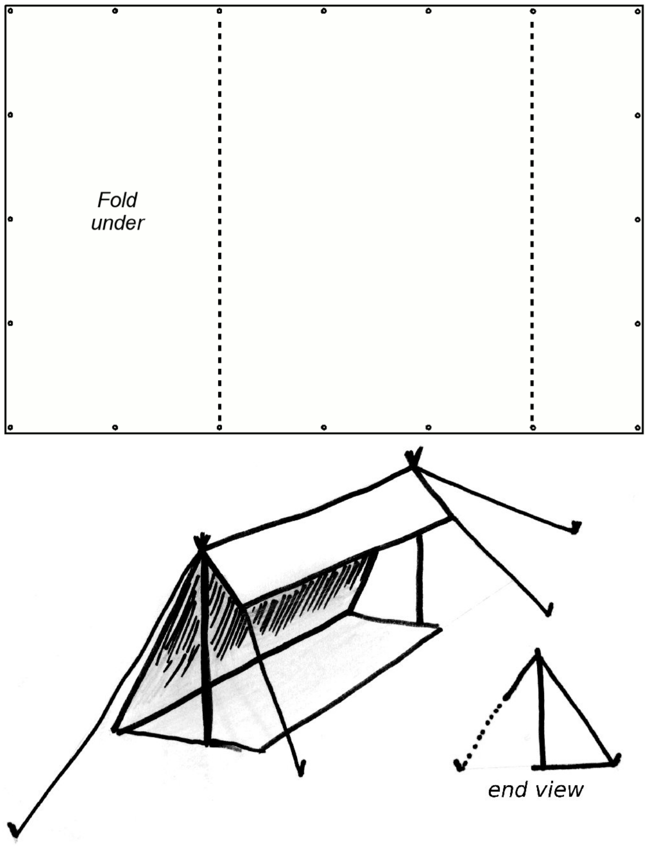
The symmetric ridge[3]



What's often more useful is to string the sheet off-centre – to produce an ***asymmetric ridge***. This is the example used earlier on the *Shelter* (O2) unit for a cook tent. By stringing the sheet off-centre you can provide shelter from the wind and weather from one side, but leave the other side open to allow easy access. If the sheet is big enough you can also fold one end underneath to provide a waterproof surface to sit on. The draw-back to rigging an asymmetrical ridge is that you need a lot more cord to run the guys out on the open side.

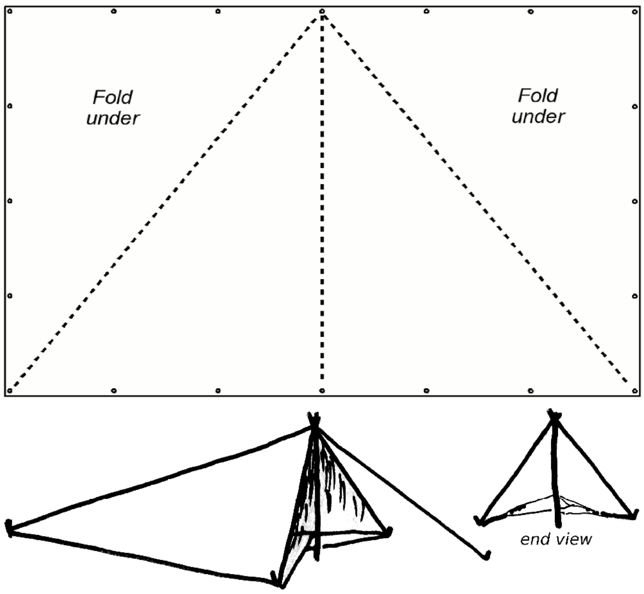
The other problem with both symmetrical and asymmetrical ridge structures is that to get a tight ridge you have to put the cord under a lot of tension. This in turn puts a lot of loading downward onto the poles – and unless you have some very strong poles they can easily buckle and snap. If in doubt, you can reduce the loading on the poles by taking the ends of the ridge cord out at a much shallower angle – but this uses a lot more cord. The trade-off for reducing the load on the poles is also increasing tension on the cord – which might lead that to snap instead.

The asymmetric ridge[4]



Finally there's the ***single-pole ridge*** option.

The single-pole ridge[5]



This is perhaps the best improvised outdoor tent as: It uses the minimum of cord; it's more aerodynamic, and provides more shelter, if you erect the "pointy end" into the wind; by folding the sides underneath you create a large 'groundsheet' area; and you can use a single short pole, easily harvested from a hedge if required. It's also the most air-tight option; by lying length-ways along the tent you can create a micro-climate to provide warmth – with a bivvy bag[6] it's quite a snug option! The 'open' end can also be easily sheltered with another smaller sheet, or just a waterproof jacket stretched out.

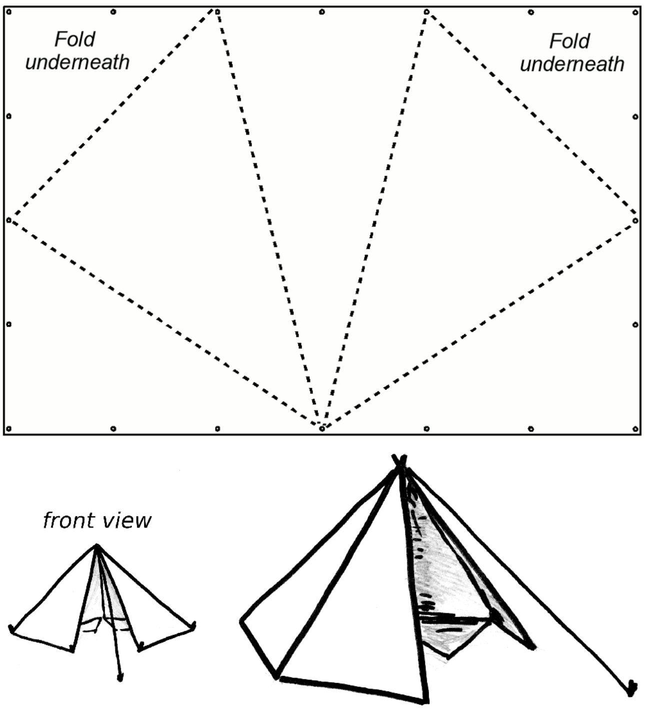
So far we haven't talked much about head room: Let's take the “long” side of the sheet that forms the entrance of the tent as being X. For a symmetrical ridge, where the width of the base is about the same as the length of the sloping side, the height inside from the ground to the ridge will be about $0.86 \times X$. So, if the side of the sheet were five feet (about 1.5 metres) the height inside would be 0.86 × 5' = 4' 4” (or 1.3 metres). For an asymmetrical ridge the height is dependent upon how you rig the sheet, but usually you can get more head room out of the sheet because you're leaving one side open.

The length of the one-pole ridge will depend upon the length of the tarp in that direction – and so if you want to lay inside then you'll need at least your own height plus about 20% to be comfortable. In terms of the height the procedure is the same as above but it's only $0.43 \times X$ – so with a five-foot sided tarp that would make the height 2' 2” (an 8' by 5' tarp is ideal for such a shelter). *This is why the single-pole ridge is more snug – it has a much lower head room!*

Pyramid structures

If you play with the one-pole ridge structure a little what you eventually end up with is something a little more pyramidal in shape. Depending how you fold the sheet the final form will either: have an ***'open' doorway***, that gives a lot of room; or the sides will meet to form a ***'closed' doorway***, but as a result you won't have as much room inside.

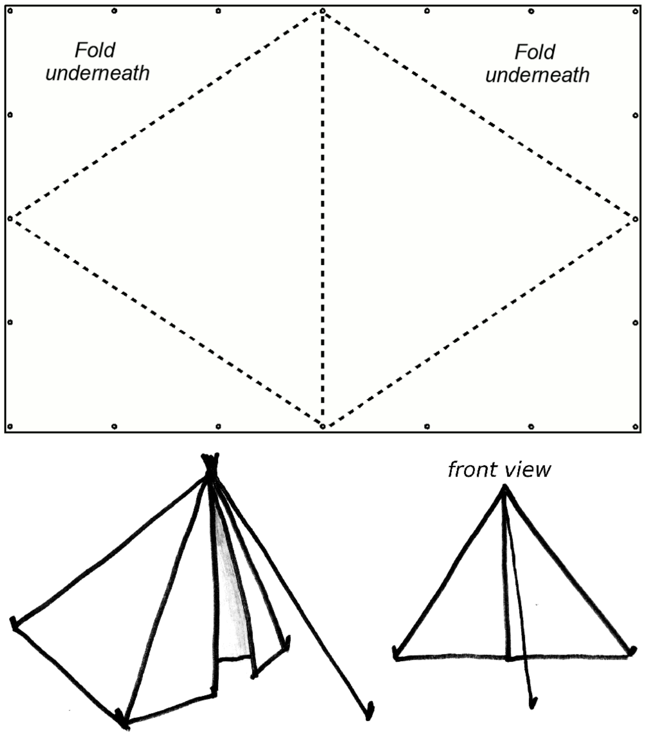
'Open' doorway pyramid tent[7]



The pyramid tents are a little more complex to erect: Even though you don't have to string up a long internal cord to support the ridge, the folding and pegging out of the sheet needs to be more precise or the sides won't meet in the right place; also all the weight is taken by a single eye holes on side of the tarp, so if the tarp isn't very strong that runs the risk of tearing it; the other problem is that the height of the pole has to be just right to fit the tarp – which is all a matter of calculating angles, and so in practice you're better just erecting what you have to have and making the pole fit the space available.

Very roughly the height of the pole is going to be around 0.65 times of the width of your tarp – *but this can change if the dimensions of your sheet differ in any way*. That said, with a 5' width the height of the tent is going to be about 3½'.

'Closed' doorway pyramid tent[8]



If there's a problem with the height then you'll have to make the pole fit – for example you could hammer it into the ground which would not only make it shorter, but it might improve the rigidity of the tent too. However, with both pyramidal options you don't have to use a pole at all. One option would be to tie a cord from the top of the tent to a fixed structure above it, such as a tree branch; another option would be to tie the top of the apex of the pyramid – via a short length of cord – to a hedge, fence or gate.

As noted above the 'open' pyramid has slightly more room inside, and whilst the door is open the fact that the sides close around a little means that it gives a lot more shelter from the weather inside. The big difference with the closed pyramid is that the corners fold under to give a near complete coverage of the floor inside – so it's not so damp to sit/lie inside.

More traditional improvised designs

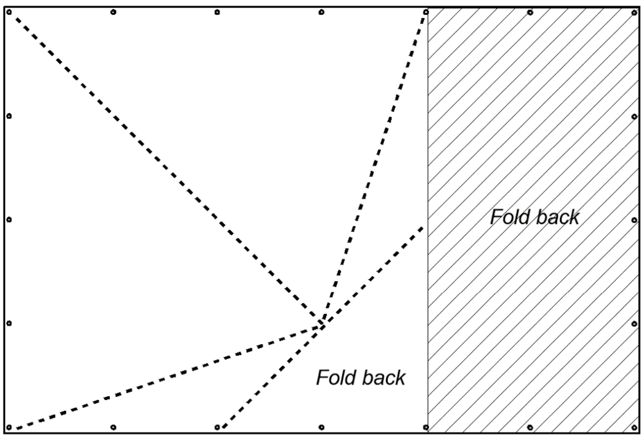
Traditional tent designs have one significant difference – *they are usually based upon square sheets*. That's because they've been improvised from sail cloth which, years ago, normally came in large square sheets.

Very similar to the pyramid design is the “forester's tent” (popular with early logging gangs, and the boy Scouts, in the USA). However it's a real pain to do all the folds and tucks, and so apart from idle curiosity it doesn't have a lot of use.

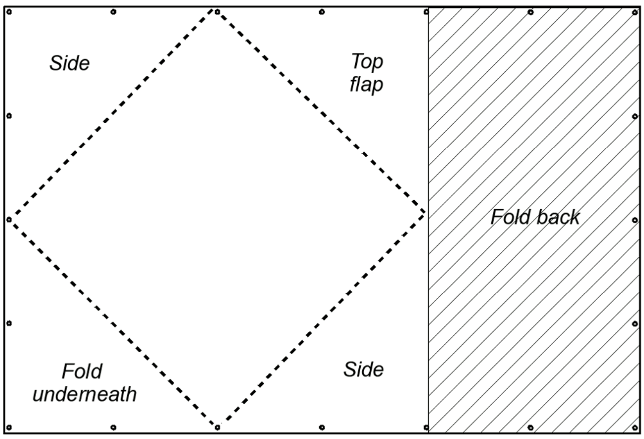
Another, less technical option is the “Baker tent”.

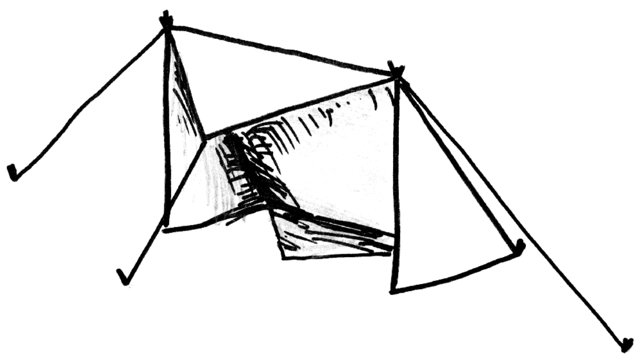
This is another design from the USA, and it was a popular improvised shelter for homeless families during the depression, and later for the work teams building out in the wilderness during the "New Deal" period. Baker tents come in many forms, some with poles along the sides to support the roof. The example below uses just two poles, either side to support the ridge, and a single sheet. It's very quick and easy to erect, and it's an excellent shelter from the heat of summer if you erect the doorway facing north – but in the British climate it's fairly useless in driving rain.

The foresters' tent[9]



The Baker tent[10]





Try them!

These are not the sort of tents that you'd want to do serious backpacking with. They're good improvised shelters on days out, or for cooking under, but with the exception of the one-pole ridge they all have their good and bad points for sleeping in – certainly you'd want to take a bivvy bag to provide more shelter for your sleeping bag. Also, whilst pyramid tents do provide very good shelter from the wind they're a little cramped for sleeping in. Even so, putting together improvised shelters like this is a could be a great activity to do with kids. It is possible to make a more "liveable" static tent with these designs – as is often the case in countries after natural disasters where similar designs are used. What you'd need to do in these cases is "insulate" the tent (as outlined in Unit O2. *Shelter*[11]) using an additional tarp to pack leaves or bracken onto the main shelter (or, at home in emergencies, cushions, curtains or or spare bedding). A proper groundsheet insulated with material underneath is also essential to stay warm.

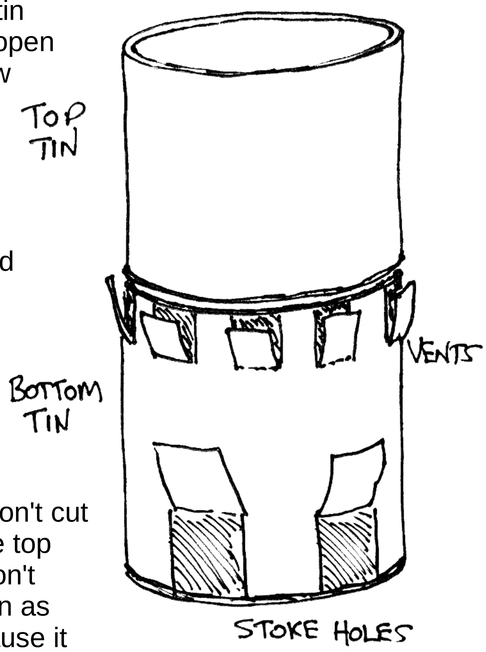
The "Hobo stove"

Shelter is one thing, but what about cooking?

Well here's another fun idea[12] from the days of the Great Depression. You can make a stove out of two old tin cans – standard size cans will do but if you can find something a little larger then that's even better (like the extra-large catering-size tins – try begging a couple from a local restaurant or take-away). ***The most important aspect of this design is that the 'top' tin*** (that you use for heating liquids or food in) ***must be able to stack securely on top of the bottom tin*** (that contains the fire) – otherwise the whole thing risks toppling over.

First of all the top tin just needs it's lid taken off – as will most likely be the case with any food tin. But beware of tins that have a plastic lacquer around the inside as this might burn, and apart from making your food/liquid taste awful these compounds produce toxins when they overheat. **Also beware old paint/chemical tins too** – *for the top tin you must always use a tin that's been designed for food use or you run the risk of poisoning yourself*.

In practice it's probably easier, if you seriously intend to use the stove for cooking, to make the base section from an old tin and then use an ordinary saucepan on the top.



The bottom tin needs the top open too, but to allow the flames to escape a little it's also important to cut slits just below the seam all around the top – usually you can do this with a strong knife or a tin opener, but beware sharp edges! If you don't cut slits around the top then the fire won't "draw" and burn as efficiently because it will be starved of oxygen.

Finally you need to cut one or two large "stoke holes" in the bottom. These perform two purposes: Firstly they let air in to allow the fire to burn; secondly these are the holes that you feed small sticks and twigs into in order to keep the fire burning – in this way you can just keep the fire fuelled without taking the tin off the top. Also, it helps if the stoke holes are on the same side rather than opposite each other. Wood requires heat to burn, and if the holes are opposite the wind will blow the heat away from the base of the fire, but if they are on the same side, and you turn that side towards the wind, the wind will gently blow the fire and make it burn hotter.

The Hobo stove was developed by travellers – "Hobo's" – living rough in the 1930s. When hitching a lift in a train box car having a fire on the wooden floor was obviously not an option. By putting together a couple of tins one person could easily boil water or cook some food without setting the wood floor of the box car on fire; once made it was also a lightweight and simple utensil to carry around.

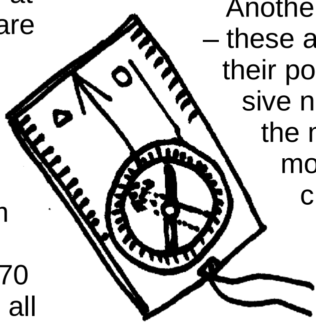
Whilst a seemingly laborious way of making a stove to cook on, the important feature of this stove it that it runs on small stick and twigs – just the sort of rubbish you find lying around after a storm. Also, because the bottom tin concentrates the heat in a small area it's more efficient – an open fire would need a lot more fuel to keep it running by comparison (rather like a rocket stove or storm kettle). For this reason the Hobo stove represents a far more effective way to cook food or heat water if fuel is in short supply. As it's a very small, contained fire it's also something that you could use near (but not inside!) a shelter to keep warm and minimise the risk of setting the tarp on fire. However, for a fixed camp, or for installing in your back garden, a rocket stove[13] would be far more effective for cooking, and far more efficient in its use of fuel.

Telling the time

When you're out walking (be it in the countryside, or even the city) having the precise time shouldn't be necessary. Walks take as long as they take, and so meeting certain time limits should not be a priority. Knowing roughly how long it is until it gets dark, or whether or not you'll get home/to the end of the route before dusk or when you anticipated, is important; but, in order to escape the pressures of the "modern society", doing without a watch, clock, and definitely a mobile phone, is an important aspect of "decoupling" yourself from the imposed pace of the modern world.

This raises the obvious question – *how do you tell what the time is?*

Humans have been using sundials[14] for at least three to five thousand years. These are able to show the time relative to the local sunrise, noon and sunset. The difficulty is that, as you go around the Earth, the sun rises and sets one hour later for each 15° of circumference. As people once travelled slowly this wasn't a problem – the difference in time is about 4 minutes per degree, which at the equator is about 70 miles. With the coming of the railways this all changed; the introduction of railway time[15] meant the whole nation began to move to a single time standard rather than local time. Also, although sundials appear to tell the same time, in relation to a fixed time constant (or the "equation of time"[16]) they run fourteen minutes slow around February and fifteen minutes fast around late October/early November. So, around 125 years ago[17], the world adopted a universal mechanically-demarcated time constant and, paradoxically, our lives have been speeding up ever since!



To know the local solar time all you have to do is measure, using a compass, the angle of the Sun relative to north and divide by fifteen. Stand facing the sun (or, as we'll find later, the moon or star/constellation), turn the compass baseplate to point at the sun (or other star), and then divide that angle by fifteen. For example, when the Sun is at 105° the time is roughly (105° ÷ 15 =) 07.00 (7am).

Then, to get something near to the correct "standard" time you need to consider:

- Is it "Summer Time"[18] (usually this begins in the last Sunday in March and ends on the last Sunday in October) – if so you need to add one hour to convert to local 'daylight saving time';
- Next you need to consider how far east or west you are from your local time constant as each degree east or west represents four minutes less or more – in most cases (unless you're a long way from your local time constant) you can ignore this because it doesn't make a great deal of difference.
- Don't forget that you might be fifteen minutes out around February and October/November, but generally you should ignore this because the measurement of the position of the Sun will be out a little, ***and in any case if you're worrying about fifteen minutes here or there you really need to think about slowing down!***

So, we've solved the problem of measuring time in the day – *what about at night?*

Although the moon changes the time it rises – *it rises an hour or so later each day* – if you're just measuring the time over a single night you can use the position of the moon fairly accurately. Measure the position of the moon at a roughly known time, and then for each fifteen degrees of motion add an hour. Don't forget that before the full moon the moon does not set before dawn, but after the full moon the moon does not rise until after sunset (on the day of the full moon the sun sets almost at the same time as the moon rises).

Another option is to use stars and constellations[19] – these are easier to use than the moon because their position changes very slowly on each successive night rather than changing by an hour like the moon. However, the advantage of using the moon is that it's easier to see through the clouds than the stars. The main difficulty in using the stars is that you need to know a little about them; and need to be able to identify constellations through the year as they change with the seasons. The stars rise and set four minutes later each night, which means that at the same time on the same day of each consecutive month you'll see a slight different set of stars/constellations in the sky.

In the same way as with using the moon, to tell the time with the stars you measure the bearing to a star or constellation at a known time. Then, as the night passes, each 15° of motion represents an hour of time. As the sun sets you're likely to see the brightest stars (some of which are likely to be planets in any case!) first, and so you could measure their positions first. Later in the night, if the star or constellation is about to set, you simply measure the position of another, more easterly one and use that instead.

Most importantly, don't forget that when using the moon or stars you're not measuring the “time”, but *time passing*. How accurate you measurement is depends upon you measuring the position of the moon/stars at a known time, and then adding the apparent motion of the sky to that figure.

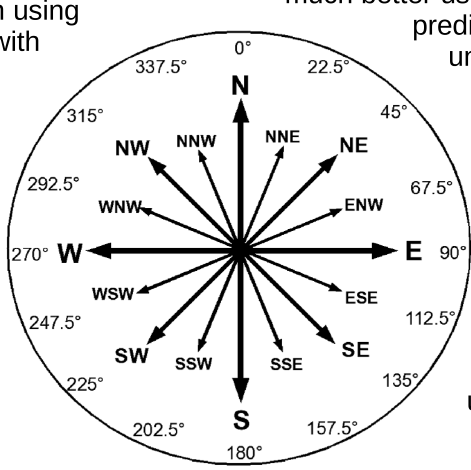
Of course, none of this is going to be precisely accurate, but that's the whole point! If you're worrying about missing minutes then you're going to be missing what's going on around you in the real world. The fixation of modern society with precise time-keeping, and the enforcement of our daily lives by precise time measures, removes the opportunity for us to pause and take moments outside our daily lives when we can look at the world around us.

Telling direction from the time

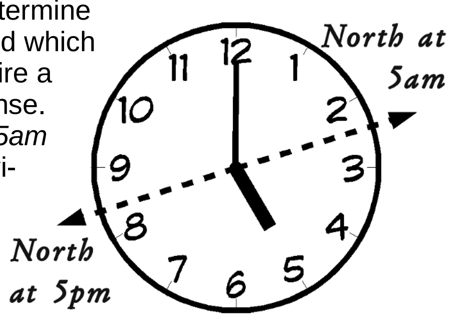
The sun rises in the east and sets in the west doesn't it? No! For a few days a year that's the case, but otherwise it's position depends on how far north or south of the equator you are and what season of the year it is. In late June in the southern half of England the sun rises in the north-east and set in the north-west; in late December it rises in the south east and sets in the south-west; in between these two dates the position slowly moves between the two.

If you have a compass you can tell the time from the position of the sun. The converse is true too – if you know the correct local time, but you don't have a compass, you can tell the direction you're going.

The simplest way to tell direction using the sun is to imaging a clock face with 24 hours in it instead of 12 hours. The hour hand will, no matter what time of year, be pointing towards the sun, and midnight will always point north. By knowing where north is all the time, you can work out your relative direction.



The usual, more practical option is to take a conventional 12-hour clock face and point the hour hand at the sun; the point half way between the hour hand and '12' is the *north-south line*. To determine which is north and which is south will require a little common sense. For example, at *5am* the north will obviously be between the '5' and the '12', but at 5pm it will be in the opposite direction (see diagram).



Manufacturing fun

There's an old Chinese proverb which goes,

Tell Me, I'll Forget;
Show Me, I'll Remember;
Let Me Do It, I'll Understand.

If you want to improvise solutions to problems, then that skill can only really develop out of practical experience – not theoretical study – because it requires understanding. Of course that requires time and effort, and so it helps if you can make these activities fun at the same time. Building shelters and dens with kids is one example; fiddling around with some old tin cans to make a stove is another; telling the time just by glancing at the motion of the sun and stars is probably the most interesting because, with a little application, that's a skill you can practice in your everyday life to perceive both time passing and your direction of movement.

Throughout the units in The Great Outdoors series[20] we stress the practical approach because it's that tactile experience that will allow you to take what you know and improvise solutions: It doesn't matter whether you're making a fireplace in your garden to sit around, and using a gin pole to heat water or cook food on (Unit O3); or whether you're finding water on a hot day by digging a Gypsy Well (Unit O4); or whether you're messing around with some batteries and a PV panel to make a light in your garden shed using a few basic components (Unit O8) – practising these skills at your leisure will allow you to make much better use of them at a later date if, as many predict, we're entering an era of more unpredictable energy supplies (Unit O9).

The ideas in these units, in the context of what society might consider “normal” today, may appear a bit far out; *but they can still be immense fun to play with!* More importantly, if things pan out as many energy and resource experts now predict, as time passes these skills will become more and more useful.