

## 18 TROPICAL FOREST EXPEDITIONS

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Tropical rain forests cover less than 6 per cent of the Earth's land mass and are defined by their location (between the Tropic of Cancer  $23^{\circ} 27'$  N and the Tropic of Capricorn  $23^{\circ} 27'$  S) and by their high rainfall. They are therefore hot and humid environments, although upland forests may often be cold enough to require a blanket or lightweight sleeping bag at night. Some forest floors may be under water for much of the year.

This chapter is intended to provide a basic outline of tropical forest logistics for small expeditions. It covers most of the topics relevant to living, travelling and



Figure 18.1 *The use of rivers is a pleasant and traditional means of travel in the jungle*  
(© Corrin Adshead)

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working in the tropical forest environment. Further information, especially in relation to somewhat larger expeditions, is given in the Royal Geographical Society–Institute of British Geographers (RGS–IBG) Expedition Advisory Centre’s *Tropical Forest Expeditions* manual (Chapman et al., 1983 and later editions).

### ACCLIMATISATION

Humans may once have been “tropical animals” but for many this is definitely past tense. Those transported abruptly by aircraft from temperate climes are likely to suffer from fatigue, lethargy, poor sleep and reduced exercise tolerance. They should maintain hydration and exercise little in the first few days, and this limit on activity should be considered when formulating the expedition itinerary. Acclimatisation is assisted by slower transit overland or on a boat but otherwise takes about 8–10 days (slightly longer in children). Not surprisingly, air conditioning delays acclimatisation and is best avoided. In preparation, careful exercise in a hot humid environment, as simulated by exercising in warm clothing indoors for an hour a day for at least a week preceding your visit to a tropical environment will aid acclimatisation, although the benefit is lost within a week if not maintained. Care must be taken to maintain hydration and exercise halted if any signs of heat stress develop.

### CLOTHING AND EQUIPMENT

#### Footwear

Jungle boots, specialized calf-length canvas rubber-soled boots, are the traditional footwear for tropical forest expeditions. They may be obtained at various “ex-army” stores. Those that originate in the US army are leather-based and more substantial than commercial copies. On the other hand, baseball or hockey boots (with eyelets above the soles to let out water) are adequate if you are not planning on trekking too far, and are more easily obtained and cheaper. Try to find the thicker-soled variety with treads, because they give better grip on slippery river beds and are more comfortable on roughly cut tracks. Don’t assume that you can buy them locally, particularly in larger sizes, although in some countries (e.g. Malaysia) they are available. However, it is best to assume that both baseball boots and local purchases won’t last more than 2 months in the field (maybe less, although their lives can be prolonged by drying them whenever possible), and you should have a spare pair, so take as many as you will need. Avoid totally waterproof boots made with “breathable” fabrics because they tend not to dry easily and will certainly become wet inside. The humidity prevents the fabric from “breathing” so you are better off with boots that will allow water in and out easily. The jungle floor can be muddy and wet, so slightly higher-leg boots, with a sewn-in tongue, are preferable.

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Figure 18.2  
*Leeches, although a persistent nuisance, are easily removed using insect repellent. Treat the bite with antiseptic (© Corrin Adshead)*

### Clothing

Wear baggy, lightweight but strong trousers, tucked into socks and boots, and long-sleeved shirts, with plenty of pockets. Underwear, if worn, should be quick drying and should not chafe. Do not take old cast-off clothes; they will not last long. Don't wear obviously military (especially camouflage) clothing, practical though it may be, because this can sometimes be misinterpreted with unfortunate consequences. Socks should be long enough to tuck trousers into for general comfort, but they will not keep out ticks, leeches, etc. If leeches are bad (as they may well be in Asia), it is worth buying "leech socks" locally or making your own. These are over-socks, made from fine-weave cotton, simply styled like a Christmas stocking but with a double seam tightly sewn so that leeches cannot squeeze through. They should come to just under the knee and have a draw cord, which is tightened over the trousers. Leeches that have evaded your defences can be persuaded to leave with a dab of insect repellent, spirit or tobacco soaked in water.

Mosquito (or midge) head-nets, generally designed to be worn over a wide-brimmed hat, can be an enormous asset. Remember that if you are covered up there is less access for insects to bite you. Malaria prevention starts with your clothing. Long sleeves and trousers are far better than shorts and T-shirts.

You should always have at least one set of comfortable clothes for use in camp and

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for sleeping. Never let them get wet: resist the temptation to keep them on instead of climbing into your clammy field gear on a bleak morning.

**Other equipment**

Take sunglasses and sunscreen for long boat rides and open-topped transport journeys.

Simple, suede/cotton gardening gloves will save your hands where you are climbing in forest on rough rock, e.g. in limestone areas, and are useful for trail cutting and rope work. Sweat-rags are useful, and a floppy wide-brim hat keeps the sun off during river journeys – and the bugs, especially ants, from going down your neck while cutting trails. Waterproof clothing is generally more trouble than it is worth in a forest – it is simpler to get wet and then to dry again – but a large waterproof poncho (with eyelets) may save a lot of discomfort during river journeys when it can get very cold if you are wet. A poncho can also be rigged as a temporary shelter if required. Small, folding umbrellas for base camp life are worth a thought too.

Your rucksack should be made of synthetic material, and be comfortable and well balanced (as most modern sacs are). Side pockets can be a hindrance in dense vegetation; if you have them but do not want them, then tape or strap them up to keep them out of the way. If you have a “high” pack that protrudes far above your shoulders, this can also be extremely awkward when ducking under branches and logs.

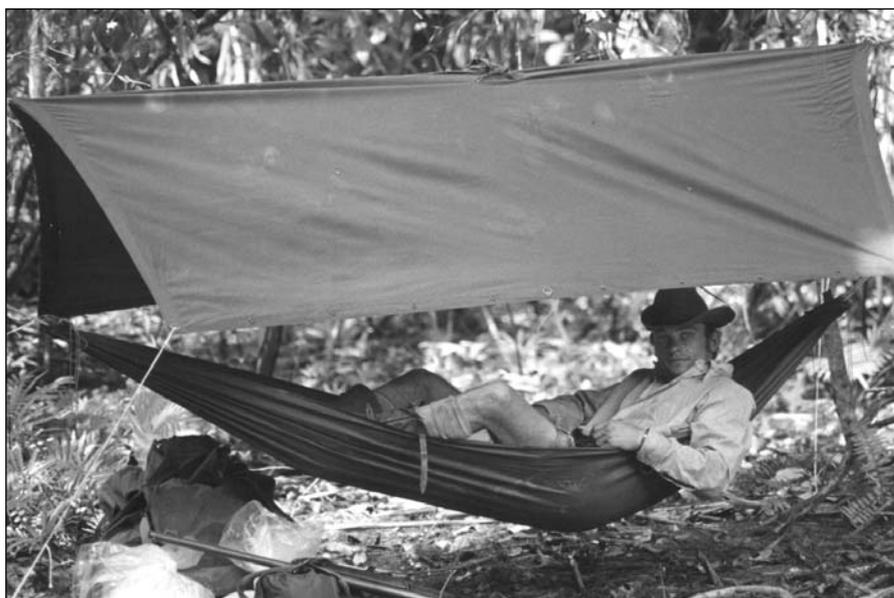


Figure 18.3 *Hammock with flysheet suspended between two trees* (© Rupert Grey)

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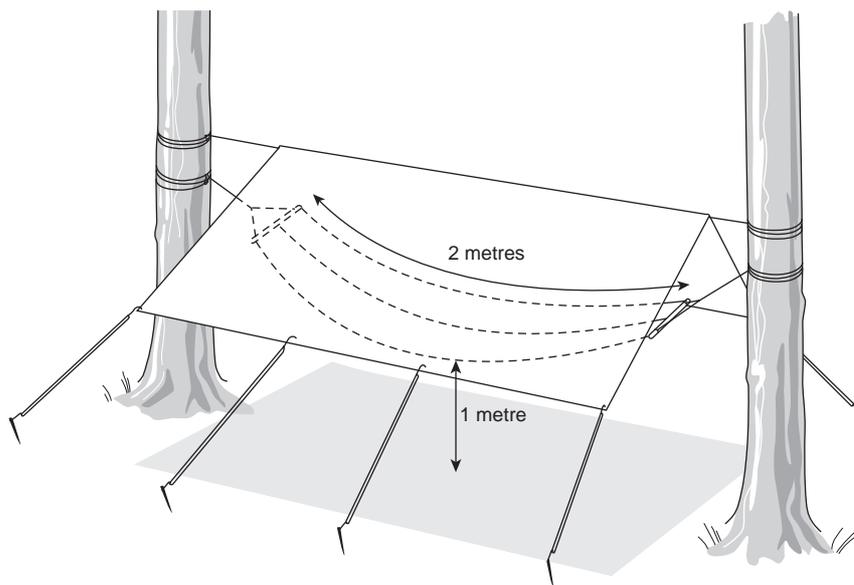


Figure 18.4 *Erecting a hammock and flysheet* (© Bob Hartley)

Attach sleeping mats vertically to the back of the pack. Use waterproof liners, but still pack individual items in polythene bags to prevent them from getting wet. A good selection of self-seal bags is invaluable, and you will probably need many more than you think you are going to.

### Cooking and camping

It should generally be possible to cook over wood fires (even in heavy rain you will find dry wood somewhere, or your guides or trackers will know which wood to cut for immediate burning), but take a bicycle inner tube, candle or some other suitable fire-lighter and, if you're not happy about your ability to make fire, take liquid fuel cookers for back-up. If you are working and living in a nature reserve or national park, you may not be able to cut trees at all. If you are in a large park where a small amount of selected cutting is allowed, remember to take them well away from the path that visitors/tourists use. Cut only standing, dead wood, however. Strip off the wet, outer layers of bark if the wood looks soaked. For igniting, carry lighters as well as matches in a waterproof container. Lighters are prone to becoming damp.

Remember that night tends to fall early in the tropics, so if you have to work, read, etc. after nightfall, as most expeditions must, take paraffin or gas lamps. Butane canisters are virtually universal and can normally be bought in most tropical countries, but gas mantles are often more difficult to come by and are best taken from the

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UK. If the expedition is frequently on the move you may need quite a few! Hammocks are advisable for camping in the jungle – they can be bought locally but it may be better to purchase (and try out) good-quality hammocks before you depart on your expedition. The nylon mesh hammocks available in Britain tend to be too small for comfort but can be useful for suspending supplies. Several companies in Britain now make lightweight, quick-drying hammocks made from cloth. In South-east Asia “camping sleeves” (essentially stretchers) are often used, but this involves cutting poles from the forest. Although this is usually no problem unless camping in an area where tree cutting is prohibited, or if a science programme prevents drastic changes in the forest structure, it is better practice to avoid cutting live, young trees at all.

Mosquito nets are worth taking even if there is no risk of malaria in the area – there may be sufficient insects to interfere with your sleep, and nets can keep out other unwanted bedfellows such as scorpions, centipedes, bats and even snakes. In South America you can buy mosquito nets that are specially designed for use with hammocks. Otherwise tuck in the excess material underneath you. Check the inside of your hammock and net before you go to bed. Experiment with all this exotic sleeping gear in the garden before going out into the field! Treat your mosquito net with permethrin to add to its effectiveness in deterring insects.

It can be surprisingly cold at night, especially in a hammock and in a mountainous area, so take a synthetic sleeping bag or warm blanket. If you are planning to be in one place for any amount of time, the best means of camping is to tie a large plastic tarpaulin over a stout wooden framework, lashed together with rope – or your local guides will use lianas or bark ties. Spend a little time making the camp reasonably comfortable – it’s very easy to rig up basic tables/work benches and seats from sapling poles, rattan or bamboo, and they make life much more pleasant. For lightweight trekking expeditions it would be better to take “bashes” (single shelter sheets for use with hammocks and mosquito nets), though it is not necessary to get a specially made set. Ordinary hammocks and lightweight tarpaulins, the latter suspended with elastic “bungees” or nylon cord, are fine. Ponchos, although versatile, are often short and tend to leak around the hood seams. A heavy downpour in the jungle will make you wish you had invested in a good-sized basha sheet! On this type of expedition, make sure that you leave yourself sufficient time to set up a decent camp before nightfall.

Camp hygiene is important and latrines should be sited so as not to interfere with your domestic water supply or anyone else’s. In a long-stay camp it is necessary to build something substantial, consisting of a seat, shelter and hand-washing facility. If you have a big porter team, remember that they too need these facilities. It is not easy to organise the defecating habits of others, but at least make sure that they are “down river”.

Much of the equipment that you should take with you is of course the same as you

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would take on any other camping trip: compasses, whistles, maps (although these may be of limited use in tropical forests) in plastic map cases, penknives (locking blades if possible – don't include them in your hand luggage on the plane), cigarette lighters, strong nylon cord, insect repellent (and one you know works on your skin – not everybody's body chemistry is the same), waterproof notebooks (e.g. surveyors' notebooks with high wet-strength paper), waterproof watches (on non-rot straps or cords), tin openers, waterproof torches, water bottles, cooking and eating equipment, first-aid kits, etc. Medical supplies should include plenty of fungicidal cream and powder, antimalarials, antihistamine and effective antibiotics (see Chapter 14). Everybody should carry a small, practical survival kit in a belt pouch in case they become separated from their main rucksack. Wear a whistle and a small compass everywhere. It is easy to become disoriented in the jungle.

### **Machetes**

There are very few items of equipment specific to forests, but machetes (or *Parangs* as they are called in Malaysian countries) are one of them. It isn't worth taking them out from Britain – you can obtain them easily when you arrive and you will also avoid problems at border customs points. They are essential in the forest and have a multitude of uses from cutting wood and clearing trails to digging holes. For most general work it is best to get one with a shorter (12-inch/30 cm length) and reasonably heavy blade, and with a sheath. This can be slung over the shoulder on a tape, or worn on a belt. Keep the machete in its sheath when not actually cutting the trail – it is all too easy to fall accidentally on to a razor-sharp machete blade. And it needs to be razor-sharp: take a file or whetstone; the latter may be heavier but it keeps its virtue longer. Attend to the blade every night and do not put the machete on the jungle floor during use, as you will probably lose it.

### **Cameras and film**

You need to be particularly careful to prevent mould from attacking optical lenses (fungus can grow on [and etch] glass) and film. Details of tropical photographic techniques are not provided here, but there are a few primary rules, which will help to prevent disasters. Avoid leaving film in the camera for long periods; process all film as soon as you possibly can. If possible take a camera that is not entirely reliant on electronics, because these can go wrong in the damp. If you are arranging for a runner to take out mail, live plants or animals, post off film to an appropriate processing laboratory at the same time. Keep film, cameras and lenses in sealed containers with desiccant (silica gel with at least a proportion of the colour indicator type) when they are not in use. Dry the silica gel regularly over a fire. Light levels at the forest floor are remarkably low and, although fast film overcomes this problem, it does so at considerable expense of quality. You may be better off using a flash or tripod.

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Consider carefully the nature of your expedition and the specialised equipment that will be required. If you are planning aerial supply drops, for example, you will require marker balloons and probably radios, flares and coloured marker panels. Make sure that the radios and other communication systems, for whatever reason you need them, are suitable for the type of terrain in which you will be. If you are going to need to cross a river, you will require appropriate river crossing equipment and know how to use it safely.

Where you are employing porters to carry equipment and supplies, make sure that you know exactly where everything is (and that it is labelled if necessary), and that items that you may need during the day or at short notice are conveniently located. This may mean explaining to porters where they should be in the group, when trekking. Consider how some items need to be carried and whether you should provide rucksacks or frames for this purpose.

### Food

Take all the food that you will need along with you. Living off the forest is impractical and very time-consuming and, when in national parks or game reserves, illegal or at least morally wrong. When you are close to, and working with, local people, remember that their economy may not be able to support large numbers of extra people. When taking in substantial numbers of porters, take in sufficient extra food for them too, unless you have arranged that they feed themselves. You should only do the latter when you know that there is a source of food readily available or you may encourage illegal hunting. They, and you, may well be able to supplement your diet with fish, but don't count on it. If you are taking food for your porters, make sure that they are happy with it in advance. This applies particularly to the local staple (rice, manioc or whatever). It's a good idea to get one of them to come to the market when you buy it.

Animals will visit your camp. Food should be suspended under cover as anything left on the ground and not in a tin will probably not be there in the morning. A string hammock is handy for this. Support strings can be soaked in insect repellent if you are worried about ants. Even if you are miles from habitation there may be a substantial endemic rodent population which will gnaw through thin metal screw-tops of food jars – and also through thick polythene bottles regardless of their contents (in this case collecting jars should be suspended too). If you are living out of tins, etc., your diet may need topping up with vitamin pills and fresh food whenever it becomes available.

Surprisingly, water can be extremely scarce in certain tropical forest areas during the dry season. Try to find out about this in advance, and plan accordingly. Water filters (modern pump filters or cotton Millbank filter bags) and/or purifiers (iodine will do) should be taken on all expeditions, but these will be particularly appreciated when the only water available is from a nasty pond. Everybody should carry a bottle

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of iodine purifier for personal use. Carry two 1-litre-sized bottles each. Collapsible water bags (Ortlieb) are excellent for treks. At the very least, boil all your water for 5–10 minutes. Use large, plastic jerry-cans for holding adequate supplies of water in the base camp. Administer the appropriate quantity of iodine to the water with a large plastic syringe and identify those containers holding purified water.

**RELATIONSHIPS WITH AND EMPLOYMENT OF LOCAL PEOPLE**

It is essential to establish good relations with local residents both within and around the forest. Make sure that you know which dialects they understand and can communicate in, and have the appropriate interpreters. Even if you have permission to visit the area, remember that the forest may be their spiritual home and therefore respect their ownership. Explain to their leaders (elders) what you are hoping to do in the forest: if you are collecting specimens, make it clear that there is no commercial value and, if appropriate, that when studied the samples will come back to that country. Most local people are nationalistic (even when oppressed by their governments) and feel happier if their plants or animals are being returned to “their” country (even if they will never see them again) than if they go for good.



Figure 18.5 *A good local guide will assist greatly in daily tasks such as fire-lighting, cooking, fishing, choosing routes and campsites (© Corrin Adshead)*

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If local people can be hired (as guides, porters, cooks, clothes washers) it can help their local economy and personal wealth. Try to contact the local “headman” when you reach a village or new area. Make sure that you are using the correct rates and spread the cash as far as you can through the community. Always discuss the rates and get an agreement before loads are picked up. Keep your team cheerful. Be sure that they have adequate equipment and bedding for cool nights. Carry contingency cash in case you need to hire extra guides and porters along the way. In many areas cigarettes are a form of “currency” so consider taking a good supply even if you don’t smoke. However, cash is a healthier alternative.

If you are travelling in populated areas and going from village to village, discuss your destination with the porters. They will know how long it will take and whether it is feasible within the time that you suggest. There is, however, still enormous scope for confusion on this subject, so be warned! Try to avoid questions that can be answered yes or no. When the destination is unknown, or cannot be defined, make sure that you plan to stop by early afternoon. Respect any local taboo as to where you can walk, travel through or stay. It is usually based on superstition or hunting, but to break it can mean that your whole labour force walks out on you.

By collaborating with local people you will learn infinitely more about the environment, and gain infinitely more from the expedition, than if you try to “go it alone”. “Five get lost in the jungle” sounds pretty exciting and romantic, but really it’s an utterly barren and unrewarding experience in comparison.

### TRAVEL

#### By river

Most expeditions use river transport in tropical forests as a rapid means of getting from A to B. This generally entails using local transport facilities, which in many cases means longboats (wood or aluminium) with outboard motors. Inflatables are only really suitable for large rivers, and even then they may not be ideal during the dry season. If your expedition logistics hinge on river travel, make sure that you go there at a time of year when the rivers are navigable with relative ease (i.e. not too much water and not too little).

You should hire experienced local boatmen to take you because they will know the vagaries of their craft and the intricacies of their rivers. Although these people may adopt a somewhat cavalier attitude towards river travel, for the sake of safety there are a number of points that should be observed:

- Wear life jackets (it is not an insult to the boatman), and carry paddles and balers. If possible, use outboards without shear pins in rivers with rapids. If you are providing the motors, it is worth considering using those with long

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Figure 18.6  
*Longboats require careful loading but are a useful means of travel in the jungle (© Corrin Adshead)*

propeller shafts for negotiating shallow stretches of river. A 25 hp motor is enough to get most boats up most passable rapids, but you may need to haul boats by bow and stern ropes (which should be at least 20 m long) in leap-frog fashion past difficult stretches. You may need to portage (carry) and for that reason fuel and equipment should be distributed in manageable loads. For rivers with rapids you should have two boatmen: one in the bow with a pole and a paddle and one at the stern. The motor should be attached to the boat, as should everything else (except you!). For this purpose, ropes, karabiners and a large net are useful. Sensitive and valuable items should be stored in waterproof (floating) plastic containers. Be sure to have enough tools, spare parts, shear pins (if required) and fuel. A fuel funnel can be handy.

- A 25 hp engine can travel for about 3 hours at 15 knots on a 5-gallon tank, but fuel consumption depends very much on the speed of the river and the number of rapids. Descending rapids is more hazardous than ascending, because once you have committed yourself you cannot stop. Don't wear heavy boots when travelling on dangerous rivers, and remember that you may be burned or dazzled by sunlight reflecting off the surface of the water. Do what the boatman tells you to do.

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### On land

It is advisable to travel through the forest using the pre-existing trails cut by local people rather than cut your own. Unless you really are completely out in the sticks, these trails will exist. Travel in single file at the pace of the slowest member of the team. It is easy to over-estimate the speed at which you are travelling in forest, so if this is important you may need to count your paces. On a good trail you may cover 3–5 km/hour, whereas on a bad one you may make only 1–3 km.

River crossings can be extremely dangerous, and the current deceptively strong. There will be plenty of submerged hazards in jungle rivers, such as dead tree trunks. Complete a good reconnaissance of the crossing point. Use a rope if you are wading across anything remotely dubious, and always unfasten your rucksack so that it is slung on one (downstream) shoulder. Cut yourself a stout walking stick for stability; this can also be extremely handy on steep slippery slopes. If you are crossing bridges of felled trees over dangerous water, always use an improvised handrail and make sure that you have a safety plan in case anyone falls in. The crossing of larger rivers requires rather more complex procedures. These involve different rope techniques and require practise by the team and clear briefings before the river crossing is carried out. Make sure in advance that you have the necessary equipment with you if your route is likely to take you to such a river. Ideally you should not try to cross difficult jungle rivers, but alter your route instead. Rainfall can cause flash floods, which arrive without warning, so take pains to choose a campsite well away from the river flood-plain. Check the watermarks on trees near the banks and never camp in a dried-out water source.

If your route involves road or air transport, remember that roads and airstrips in certain regions will be closed for climatic reasons at certain times of the year and jungle helipads become overgrown quickly if not maintained.

### Navigation in the forest

Navigation in tropical forest is not easy. Even on short journeys from a forest camp in virgin forest it is very easy to get disoriented and lost. Mark saplings and trees clearly on both sides by shaving off a length of bark, so you can see the mark when approaching from the other direction. Regularly used routes can be marked with coloured plastic tape. Follow rivers or ridges where possible and check their direction of flow, and compass bearing with the map. Remember that, in tropical forest areas, it is likely that many streams will not appear on your map.

When cutting trails for regular use, make sure that your machete is sharp and that other people are well clear of the area of activity. You will probably be surprised how slowly you cover the ground. It may be necessary to cut in straight compass-controlled lines for demarcating research areas, and these may be used for general travel. It is relatively easy to cut straight lines in lowland alluvial forest and navigation by compass is possible on such occasions. In mountainous areas this may be much more difficult. If

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you need to be particularly accurate with your direction finding, use a “leap-frog” system of the type described by Chapman et al. (1983), and back bearings. Similarly, if your distance measuring is important, compare your pace count with a count made over a known distance on identical terrain. Remember that machetes tend to become magnetized during sharpening and will deflect your compass needle if carried too close.

When travelling by boat on larger rivers, maps can be more easily followed, but remember that rivers can change course and meanders may form anew. In areas where you will be exploring by such rivers, recent aerial photographs, if available, will be the best navigational aid to follow. Consider taking a GPS with you. Although this should not replace your guide or basic navigation skills, it is a handy tool for navigation and many models do work under the thick tree canopy. It is very useful for fixing the location of clearings that could be used for helicopter evacuation from the jungle, and for supply drops, etc.

### Safety

Tropical forests are not the dangerous places people like to make out, but you do need to maintain a modicum of common sense. Carry out introductory training before you depart, covering emergency procedures, camping techniques, navigation, base-camp routine, etc. Find out in advance what potentially dangerous insects and animals exist in the region, and either avoid them altogether or avoid antagonising them. You are very unlikely to be bitten by a snake if you take sensible precautions such as not wandering around in bare feet and not rummaging with your hands in leaf litter. But find out anyway which snakes are venomous, and where the nearest health centre is that maintains a stock of antivenom. Check your clothes and boots for unpleasant animal or insect surprises in the mornings. Avoid malaria, be cautious with rivers, don't camp under very large or dead trees, and don't eat tempting fruits unless you know them to be edible. Avoid wandering off on your own and don't go too wild with your machete!

## FURTHER INFORMATION

### Further reading

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- BCB International Ltd, Clydesmuir Road, Cardiff CF24 2QS. Tel: + 44 2920 433700  
Helium-filled air marker balloons.
- J.E.T Asia: Batam, Indonesia. Website: [www.jet-asia.com](http://www.jet-asia.com)  
Expedition training company in remote tropical locations. Courses cover leadership, safety and jungle survival.
- Liverpool School of Tropical Medicine, Pembroke Place, Liverpool L3 5QA. Tel: +44 151 708 9393, fax: +44 151 708 8733, website: [www.liv.ac.uk/lstm/lstm.html](http://www.liv.ac.uk/lstm/lstm.html)
- London School of Hygiene and Tropical Medicine, Keppel Street, London WC1E 7HT. Tel: +44 20 7636 8636, website: [www.lshtm.ac.uk](http://www.lshtm.ac.uk)
- Nomad Travellers Store, 3-4 Wellington Terrace, Turnpike Lane, London N8 0PX. Tel: +44 20 8889 7014, fax: +44 20 8889 9529, email: [sales@nomadtravel.co.uk](mailto:sales@nomadtravel.co.uk), website: [www.nomadtravel.co.uk](http://www.nomadtravel.co.uk)  
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