

Expedition Notes

valuable guidance on the practicalities of expedition touring.

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Your expedition is your own. You have your own plans and preferences. This note is not intended to be prescriptive, but to give you some idea of the problems you might face and some possible solutions. I aim to address the equipment needs of the cyclist who wishes to travel remote and difficult roads well away from "civilisation", but within the range what can still reasonably be described as "touring".

The difficulties that this note is intended to address include:

- Unpaved roads for extended distances (100s or 1000s of km)
- Carrying a heavy load, for example, full camping equipment and clothes for a wide range of temperatures, several days' food and a couple of days' water
- No modern cycle shops for extended periods
- An extended tour — months rather than weeks

These are the kind of difficulties that routinely need to be met in touring on roads, or what passes for roads, in many of the remoter undeveloped areas of the world, particularly those with more challenging terrain. But you can also go looking for something similar in Canada, Australia or Iceland, for example.

"Touring" by my definition means travelling where a loaded bicycle can mostly be ridden. I do not discuss the needs of those who wish to jump rocks or wallow in loose sand. Conversely, if you mostly stick to tarmac, or stay within reach of modern cycle shops, then much of this note need not concern you.

The author's experience includes, among other rough tours, an 11,000km tour in the southern and central Andes in 1997/8. This note was compiled in 1999.

General Considerations

The most important issue to address in expedition cycle design are:

- **Load carrying.** Several days food, a couple of days water, camping equipment, cooking equipment, tools, spare parts, and the usual paraphernalia easily add up to 40kg or so. I have met many who carried much more. Whilst you may normally be modest in your luggage requirements, and many British cyclists are, it's the unavoidable food and water load that can really pile on the weight. If you are travelling where you have a large climatic variability, common in mountainous areas, then you will require additional luggage for that. The long distance tourist is also likely to have an "overhead" of guidebooks, maps, first aid kit, film, and other stuff which may be needed for the road ahead rather than the immediate present. On gravel roads, loads like this put your bicycle, and in particular your racks, panniers and so forth, under considerable stress.
- **Reliability.** Are the important bits of your bicycle the bits which you can't carry and would have to ring home for a spare to be sent — going to stand up to the beating and last long enough before you have an opportunity to get a decent replacement?
- **Serviceability.** This means being able to avoid and recover from likely difficulties. How do you set up your bicycle so that you can recover from the likely problems which may occur?
- **Self-sufficiency.** Have you got everything you need to keep you going under all normal accidents and failures? If that is a very large pile of specialised parts and tools, perhaps you ought to consider some more basic components that can be fixed up locally.

One conclusion we draw from this is that lightness of the bicycle is of less concern than it would be for a normal tour. An extra two or three kg of bike is not a large penalty in comparison to your overall load, and may repay its investment in serviceability and peace of mind.



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Racks and Panniers

If you saw what a fortnight's tour on Chilean unmade roads did to the racks and panniers of the three Chilean cyclists I once met, you would suddenly appreciate the critical importance of selecting the toughest load-carrying equipment. They had relatively modest loads, and the kind of racks and panniers you might see on many mid-range bicycles sold in Europe, top equipment by Chilean standards. Four months of similar roads destroyed three front racks and one rear rack of mine, but I was eventually fortunate enough to acquire the racks which would keep me going thereafter.

Tubular steel

Racks inevitably break under these conditions. The question is not if, but how often. That's why the true expedition bicycle has tubular steel racks, because you can get a steel weld anywhere. Getting an aluminium weld is difficult to impossible, even at home. Tubular steel racks are not much heavier than aluminium racks, and break less often. You could get a good frame builder to make some for you, but a less risky alternative may be to acquire some tried-and-tested Tubus production racks made in Germany. You can track down a continental mail order supplier on the internet (eg, www.bicycles.de), as Swallow cycles no longer deals with them.

Integral racks

An even better solution, which I have seen done a couple of times, is to have a frame built for you with an integral rear luggage carrier. This avoids the weak point at the rear dropout where the rack normally attaches to a single 5mm Alien bolt fitting eye. In the past I have had problems stripping the thread in this eye. Some custom built racks use two fixings to fit both eyes on the each rear dropout. I also met a frame builder who fitted 6mm eyes to his own bike.

Front racks

A front rack is just about a necessity. Putting some weight on the front wheel will improve the road-holding of your cycle, especially on the climb, and also reduce the stress on components at the back of the cycle. But for some reason, front racks seem to be more difficult to engineer properly than rear racks. Despite the fact they usually carry less luggage, I found them particularly prone to break, as did many of the cyclists I have met on my travels. (The front wheel carries less of the rider's weight, so it bounces more - CJ)

Low-riders are a popular design, but when made in aluminium often have insufficient stiffness below the dropout. Commonly the strut below the dropout breaks. A worse accident, which I suffered, is when the bottom of the rack flexes into the wheel.

Several cyclists I met stiffened their low riders by bodging in additional struts, though this can hardly be a recommended long term solution. "Standard" front racks can also have a lack of lateral stiffness, this time at the top, particularly if fixed by a single bolt on the fork crown. If this shears off in the middle of nowhere, leaving an un-extractable bolt end stuck in the eye, you will require more ingenuity than I possess to fix it up. Upgrading to tubular steel is perhaps more important for the front rack than the rear.

You may be able to get by with an alloy rear rack, provided it is of the highest quality. A Blackburn rear rack certainly took me a very long way after I destroyed my Nimrod rack. It has rather thicker struts and better metal than most others on the market. I found certain points on the racks were inclined to get eroded by rubbing from the panniers. I slowed this down by wrapping the affected points in old inner tube. But you will take the worry out if you go for steel here as well.

Panniers

You will regret taking cheap panniers. Most long distance tourists use Ortliebs, which are equal to the task. Ortliebs do have one weakness, which is that the rivets are inclined to fail, so a goodly supply of short 5mm bolts and nuts is required to fix them up. The plastic hooks, often a weak point of many pannier designs, seem to be reliable. The roller design is more water and dust-proof. VauDe make a cheaper imitation of Ortliebs, with their own fixing system, but I have no experience with them. I use Ortlieb's more expensive light-weight front panniers, and they still look nearly new.

I also carry a light-weight nylon kit-bag. This gets slung across the back with bungies when the load of water, food and clothes expands, and is also useful for packing my panniers to comply with the two-piece luggage rules used by some airlines. It was also most useful when my front rack self-destructed.

Frame

Many people have travelled amazing expeditions on pretty ordinary (and extraordinary) bicycle frames, so this area is plainly less critical than others. But taking the right frame will increase your pleasure (or reduce your pain) from the experience. Important considerations are:

- Comfortable geometry
- Sufficient stiffness for load carrying

Mountain bikes

Most mountain bikes are designed to get you down a rocky hill-side, not carry you comfortably for long hours in the saddle hauling loads. Many of us would appreciate a design which minimises expenditure of energy, stiff necks and sore bums. Ordinary mountain bike frames are often pretty stiff, so with luck your load will not flex too much.

These days you can get frames which look superficially like mountain bike frames, and are therefore as robust, but are designed with a relaxed touring geometry. Many serious long distance cyclists use this type of bicycle. The only makes I know in Britain are Roberts and Orbit (Romany), but there is probably a wider selection on the continent where people are more inclined to such activities. (Similar

bikes are now also available from Thom and Dawes. - CJ)

Bars

Even if you choose a mountain bike type of frame, you may want to use something other than straight bars. They are designed for mountain-biking, not touring, and many people find them uncomfortable for extended periods in the saddle. Drop bars offer a choice of riding positions, allowing you to change position when you start to suffer a back or neck twinge, or saddle soreness, and reduce the risk of getting them in the first place. Special touring or "randonneur" drop bars are available, which are more comfortable than racing bars. You will also find drops cause fewer problems on public transport. (But drops put the handgrips further in front, so to fit them on a mountain-bike you'll have to use a shorter stem or risk being too stretched out - CJ)

Touring frames

The alternative, definitely a minority alternative, is to use a touring frame. You will not wish to use a touring frame unless you are happy with the wheels and tyres it is capable of taking, so make that decision first. Most tourers are built for 32mm tyres, but mine is built to take 40mm tyres which personally I find a good compromise between the rough and the less rough. There is a more extended discussion of this below.

The main issue with a tourer for expedition purposes is achieving sufficient stiffness, particularly in the rear triangle. Having in the past used a fast light-weight tourer for things it was not designed for, I know the remarkably energy-sapping effect of having my rear triangle flexing when climbing a hill under load, not to mention discovering my chain and tyre rubbing bits of the frame they are normally nowhere near. Production bicycles ostensibly designed for a bit of cycle-camping may well not have the unusual degree of stiffness and strength required for this type of activity.

Today several UK frame-builders can put together a tourer with oversize tubes which solves this problem. Roberts Transcontinental is the frame I used in the Andes, and has also been used by several well-known UK cycle writers.

Suspension

Suspension is little seen on the long distance tourist's bike. There are a number of reasons. One is the risk of it breaking down. Another is that it is difficult to fit a front rack on suspension forks. Although I have seen it done, I would be concerned about the additional shaking given to a component already known to be vulnerable. Another reason is that suspension eats your energy. Those who are reluctant to give up their suspension could consider using handle-bar suspension of the variety that can be switched off on better roads.

Some other details to take into account: A steel frame is indicated for repairability.

The trick of building the rear fork off-centre so that the rear wheel can be undished is worth discussing with your frame-builder.

- Something that doesn't look too flashy minimises the risk of theft I was entirely pleased to let people think my £1,500 bike, with its old-fashioned appearance, conservative paint-job and multitude of scratches, was cheap rubbish.

Go native!

The iconoclast may wish to consider an alternative strategy. Bicycles are common in the third world, and the locals need to fix their bikes, and fit luggage racks strong enough carry their family and/or livestock. Why not buy a local model? It may be heavy and hard work, but it will be probably be robust and any recurrent weak points should be capable of being fixed up locally. Not ideal for the remotest desert wildernesses or enormous mountain passes, but it will probably take you further than a western fashion toy. Some acquaintances of mine, who (illegally) cycled the 5000m passes of the trans-Tibet highway, said they met a Chinese long-distance cyclist coming the other way on a one-speed....

Wheels

Wheels take some punishment, and most of us are unlikely to get through on the tyres we set out on, and perhaps not even the rims. The availability of replacements was a major concern to me. I broke a rim in Argentina and was exceedingly lucky I didn't need to ship out a replacement. I once met some cyclists carrying spare wheels, but that is going to extremes.

If you have broken a rim or worn out your last tyre you will take what you can get - at least until you can arrange to get something decent sent out to you. So serviceability in this department means being able to use the locally available equipment, and that means knowing what size is available.

Wheel sizes

There are four sizes of large wheel in use around the world and the nomenclature is confusing. 26in, 27in, 700C and 28in we call them. But there are several different 26 inch sizes, none of which fit each other's rims, and 700C is also known as 28in. If you look at the small print on the tyre you should usually find some other numbers, like 32-630 on a 27x 1 1/2. The first number is the tyre section and the number after the dash is the bead diameter. This is where the tyre sits on the rim, so it's the most reliable guide to what will fit. The main large wheel sizes are listed below by bead diameter, followed by its usual common name.

635 28 x 1 1/2 (sometimes called 700B) is probably the most common third-world wheel size, standard in India and exported by the Chinese to many other countries. So this is most likely to be the 28 inch you hear about. But it is little used today in western Europe and there is, so far as I am aware, nothing available in a quality you would actively seek out. But I would be pleased to discover I am wrong.

630 27x 1 1/4 is still widely used in American influenced markets and probably the next most common. But 622 (700C) is tending to supersede it

in the developed world, where it will often be known confusingly as 28in (see below).

622 700C is commonly known as 28 inch in German-speaking countries (28 zoll), because it's an old 28x 13/4 roadster size that's been on a slimming course. A tremendous variety of tyre sections are made in this size for the European/American market, but only the ultra narrow racing types seem to reach the wider world. The availability of such fragile tyres is no use even in an emergency to someone riding a gravel road! I would have more hair and fewer grey ones if I had known this before I left home. Perhaps when the Chinese move on from mountain-bikes and start exporting hybrids to all and sundry this will change, but for now, if you choose this wheel size you'd better be self-sufficient in tyres.

590 26 x 13/8 (also known as 650A) used to be the one size you could be sure of finding all over the world. But no more. For added confusion there are a couple more old european 26 inch sizes: 597 is 26x 1 1/2 and 584 is 650B (also known as 26x1 1/2). Avoid them all.

559 26 x something with a decimal point (the 26 inch mountain-bike size) is rapidly becoming the closest there is to an international standard for wheel size. In recent years the Chinese have taken to building mountain bikes and exporting them to all sorts of surprising places, so the availability of 26" mtb tyres and rims has taken off world-wide, in cities if not out in the countryside. Coupled with the availability at home of high quality rims and tyres to minimise your need for spares, it is probably by now the best compromise.

A heavily laden bike ridden on the rough delivers some punishment to its wheels. You want bullet-proof wheels, and this turns out to be quite complicated to deliver. I spend more time in bike shops because of my wheels than the rest of the bike put together.

Rims

I have met people who travelled on steel rims, and whilst this is one way of taking much of the worry out of your wheels, it is not something most of us are prepared to stoop to. I have not found an obvious ideal rim, at least from what is today available in this country. Lightness rather than longevity is the characteristic of many modern rims. Paying more can get you less metal not more. Phone round the more reputable dealers and get the latest story.

Alloy rims are eroded by conventional braking. Eventually the rim can fail explosively, perhaps making holes in your leg. Once upon a time, some rims were notable for the generous thickness of metal on their braking surfaces, for example Wolber and Campagnolo Amber, which I believe are both no longer produced. The modern cycle industry treats rims as an expendable item, which is not reassuring for those of us who require long-term reliability. In Iceland I wore out an Alesa 917 in 1,500km - and that was one of the thickest still made.

The best you can do is take the latest advice from reputable dealers.

Brakes

Some brake blocks are worse at wearing rims than others. Generally speaking, it is better to wear out brake blocks than rims, so it could be wise to go for cheap, soft blocks and carry a pile of spares. I was persuaded to shell out a fortune for some Ritchey blocks and am amazed that they are still in use after 16,000km, and didn't wear down my rims too fast. The worst is travelling on wet gravel roads where you have to brake a lot, as bits of grit get between the rim and the brake blocks. So try to avoid cycling in bad weather on hilly gravel roads if you have the time to afford that luxury.

Hub brakes will avoid the problem altogether, as well as giving better braking in wet or snowy conditions. Hub brakes are tried and tested technology, not uncommon in places like China, and modern models are proving highly reliable. The disadvantages are reduction in choice of hubs you can use, complications when you need to take your wheels off, and additional weight. If they do go wrong, you can always refit rim brakes. They are well worth considering.

Spokes

When you ask your wheel builder for bullet-proof wheels, he may offer to search out some 40-hole rims and hubs for you. 36-hole is what the world uses, and if you need a spare, you could be grateful for sticking to the standard.

You want the best special thick spokes, that are 13 gauge (2.3mm) at least at the hub (e.g. 14/13g single-butted). And you want a substantial pile of spare ones of the right length, particularly for your back wheel. I keep them with my tent poles. If you do run out, spokes are something you can often get even in the third world, but they will not be as good as the ones you get here. Once you have broken and replaced two or three spokes, the wheel probably has several others partly cracked through, so further breaks are going to occur regularly until you find a skilled wheel builder to replace them all.

Crossing pattern is not usually that important, but when my wheel was rebuilt four-cross I found that each spoke touched the adjacent spoke head and was notched by it, which may have contributed to the high spoke failure I then experienced. This was not a problem when I went back to three-cross.

Some wheel builders think that to make a wheel bullet-proof you should make the spokes very, very tight. The argument is that if the wheel is permitted to flex in response to a bump, then spokes are more likely to break. But the consequence is that the rim takes more of the energy of the bump and can crack at the spoke holes. They are correct that a very floppy wheel will suffer, but few have sufficient exposure to awful road conditions to understand that an over-tight wheel can cause rapid rim failure. I would rather break spokes than rims. Whilst it is usually better to let a skilled wheel-builder get on with the job, on this point it is important to be firm.

Hubs

It is worth choosing high quality "sealed" hubs which have a good chance of surviving the course and reduce need for regular re-greasing. Hub bearings are never really sealed, so you will still have to re-grease every few thousand km, more if it rains a lot. Carry a small quantity of best quality water-resistant bearing grease (I recommend Black Gold- CJ), some spare ball bearings just in case, and necessary tools. It is awkward, but you can re-grease a rear hub without removing the sprockets.

I used to break rear axles regularly on rough roads, but this has stopped since I moved to a freehub and cassette, with its symmetrically positioned cones. I have not seen a system for combining hub brake and freehub, but with a hub brake you should have a solid axle which is less likely to break. I now always carry a spare rear axle and cones. You can get a combined hub brake and hub gear.

Tyres

The main requirement is for longevity. In many tyres the sidewall gives up well before the tread wears out, especially when used on rough roads. Since we rarely wear tyres out by the tread, we are often unaware of how far the tread will last. For the kind of distances you may have in mind, you will not only want a tyre that does not tend to suffer early sidewall failure, but also has enough km in its tread. At home you can afford to use cheaper or lighter tyres and replace them every 2,000km or so. Abroad you may be planning to go rather further between quality sources of supply. Local tyres will frequently be available in an emergency, if you have the right sized wheel, but you could end up on something with a tread more suited to a tractor and think yourself lucky if you get 500km on it.

Most long-distance tourists choose a tyre with a thick flat running surface, a tread indented into that surface, and a fairly substantial sidewall. This type of tyre has the potential to last very long distances, and is a reasonable compromise between the requirements for rough and less rough roads. Knobbles are good for very bad surfaces, but rapidly become a liability when the going is easier, and they do not appear to last very long. My Continental 2000s each lasted between 9,000km and 13,000km. Tyres wear faster on the rear, and these distances were achieved by giving each tyre some distance on both wheels. On the other hand, older style brown-wall Continental Top Touring are prone to early side-wall failure, and Michelins do not last long either.

A wider choice is available in 26" tyres, of which I have no personal experience. However I have regularly been advised that Panaracers do not last long on bad roads. (Several long-distance tourists report good service from Schwalbe Marathon - CJ.) It is wise to carry at least one spare tyre.

Riders will have their own view on the appropriate width of tyres for this type of tour. Many people feel that if they are going to ride on gravel at all, then it is "impossible" to use anything other than 50mm tyres. There are also people who ride 50mm tyres and stick to tarmac. Personally I prefer something intermediate (37-40mm) as a compromise given the range of surface qualities that will be met.

Tubes

Longevity is again the requirement, and most expensive is not necessarily the best. Many tubes are designed for lightness rather than strength. It is better to have a tube that does not need to expand much to fill your tyre. Fortunately tubes available in less developed countries are often more robust than those generally sold here, provided you can find something with the right valve. I got away with using 26" tubes on my 700Cs. Prestas are the hardest to find, except in racing dimensions. Brazilian Regina valves are presta-compatible.

Less developed countries often use large, strong car tube repair patches for fixing bicycle punctures. I found punctures a serious nuisance in humid tropical environments. Old patches lifted. The rubber softened so that it was cut up by apparently blunt edges inside my rim, forcing me to line my rims with duct tape. New patches wouldn't stick, at least not unless they had a few days to cure before they were used. In these conditions it is wise to carry extra, un-punctured spare tubes.

Other components

My general philosophy in choosing components is "keep it simple". Simple doesn't mean poor quality, it means something that is compatible to some degree or replaceable by traditional Chinese cycle components, which are all you are going to find most of the time. Shimano is by far the most widely available of the quality brands, which means that you are more likely to be able to get a quality replacement if you are using Shimano-compatible components. But even Shimano is thinly spread, so anticipate having to get by on the basic Chinese-made spares you can find anywhere. A regrettable disadvantage of some Campagnolo parts is that they have peculiar threads and sizes, which can make it impossible to replace even a lost nut with anything else.

Molybdenum grease is very good for greasing threads so that they will come undone again months later, but I doubt your bike shop will use it. (Black-Gold anti-seize compound is available from the CTC shop -CJ.) You might like to put some on yourself on the things that have to come undone, albeit rarely (pedals, handlebar stem, crank bolts, carrier fixings).

Gears

Normal physiques will demand some very low gears, starting well below 27 inches. High gears are unimportant. I used my small sprockets so rarely that as the chain wore they became unusable.

I don't think that derailleur gears are an inherent liability, but it is worth considering hub gears. The advantage is that there are few exposed parts to get knocked, and they are generally reliable and robust. On the other hand, if your hub gear does mis-behave, they are not so easy to fix. The narrow range, even on

modern 7-speed models, means that hub gear users often end up using some kind of hybrid arrangement to get the range they require. A hybrid arrangement appears to increase the risk of a breakdown, but at least you've still got half a gearing system if either the hub or derailleur breaks.

Indexed gears

Old-fashioned friction change derailleur gears keep going in a wider range of circumstances than indexed gears. When the chain or gear parts get worn, or something gets a bit bent, or you have to replace a widget with something made out of tin can, then you can carry on going if you have friction gears. If you want to keep the luxury of indexing, then the ideal solution is the type of index lever which can be "switched off to run in friction mode. (Only down-tube and bar-end shifters still have this facility. For flat handlebars it disappeared around 1993 with the last switchable Deore 7-speed thumbshifters. These may still be find-able second-hand, or you could carry a pair of cheap friction thumbies to fit if/when your Rapidfire burns out. - CJ)

Some people swear by the convenience of "Ergopower" combined brake and gear levers. Wonderful for touring the USA, but in the developing world they are an unnecessarily nasty accident waiting to happen. Your bike is going to take a few knocks. Brake levers stick out waiting to be broken off, and to lose both a gear and a brake lever at the same time with little prospect of a spare would be more than inconvenient. Other people swear by bar end levers. They are also sticking out waiting to be knocked off, though they would be a bit easier to patch up. (Best of all for dropped bars is a pair of down-tube shifters on Kelly Take-Off mounts. These put them inboard of the brake lever hoods: just as handy as Ergopower but more serviceable, with a friction option and protected by the handlebar. - CJ)

Teeth and chains

My experience is that Ritchey and TA chain rings last the course. I once used Shimano chain rings but the teeth were completely worn off in less than 5,000km. Cranks are rarely a weak point, but if they are Shimano then you will be more likely to get spares. (Smallest chainring should be steel, not alloy. - CJ)

You can get a spare chain almost anywhere. Take a good chain. A couple of spare links in your tool-kit should get you out of trouble until you can get a new one. Ideally block and chain should be changed together or the gears start misbehaving. But this is rarely going to stop you, and there should be plenty of time to get someone to mail you some bits a few weeks down the road. Don't forget to carry a wee bottle of oil to keep that chain lubricated. I use hypoid gear oil (available from motor spare shops) for preference, as it is cheap and lasts longer than most "bicycle" oils (except Black Gold mountain-bike chain oil - CJ). Car engine oil also works and you can often find enough in the bottom of discarded containers at aaraaes.

Bottom bracket

I had no trouble with a top-of-the-range Shimano sealed bottom bracket, and others have said the same. This offends my keep-it-simple rule, but they do seem to be able to take the punishment.

Bottle cages

My alloy bottle cages all broke pretty quickly, but nylon ones have stayed the course. (Zefal make an excellent nylon cage. —CJ)

Pedals & shoes

Long distance tourists rarely take SPDs. If you break the shoes, you are in trouble. The only long distance tourist I met with SPDs had the "beginners" type combination SPD/bear-trap, which allowed him to use walking shoes if he needed to. Pedal bearings need re-greasing from time to time, so try to find a model which is relatively easy to dismantle and adjust. But it is amazing how long loose pedals will just carry on working. You need to take your pedals off on aeroplanes, so grease the threads, do not over-tighten, and check they will come loose about once a month.

Long distance tourists generally use walking shoes rather than cycling shoes. When my Shimano ATB shoes fell apart in Bolivia, only 7 months old, I felt it was a release. Walking shoes were a better idea. Inevitably your feet visit the ground much more often on rough roads than they do on smooth, sometimes for several kilometres at a stretch. I always carry a pair of light sandals, which can be used for fords.

Lighting

Take some. Sometimes you just have to ride after dark. If you use battery lighting, don't forget to oppose the batteries when out of use, or they will be flat when you need them.

Cycle computer

Useful for assessing progress and navigating: An altimeter also assists in navigating in mountainous places. Take a compass. GPS is only useful if you have survey maps, and then it becomes very useful.

Mudguards

These are an optional extra, much appreciated on wet roads (where they keep a lot of muck not only off you but off your chain, out of your headset and other bearings. - CJ).

Pump

Light-weight pumps are not easily found in developing countries. I carry a spare pump as insurance against theft or malfunction, but that is perhaps eccentric.

Spares and maintenance

Dervla Murphy has never learned even to mend a puncture, and she always gets someone to fix whatever goes wrong. Her tale of a mechanic whose only tool was a hammer suggests the risk inherent in this approach. I have met mechanically naive long distance cyclists.

Some, like Dervla, get through with an angel on their shoulder. Others discover the pleasure of bus travel.

In general my travel philosophy is self-sufficiency. That means knowing I can mend minor niggles on the road, and keep going through all but total disaster. I also like to fix my own bike, so I know what the score is and I'm responsible. A lazy mechanic may not think to ask himself why did this problem occur, and will it happen again. When I mend it, I have a clearer idea of whether it is fixed, or whether I should be keeping an eye out for it happening again. In this way I make my own luck by being prepared and knowing when not to take risks. My resourcefulness grew as the assistance waned. My greatest regret is that I can't build wheels, a skill which would have served me well, though wheel building skills, after a fashion, do appear to be widely spread. I would not have got by had I not had the tool which the wheel-builder needs to remove my sprockets, and the knowledge to tell him the trick of how to do it. I knew I couldn't carry a vice, so I also chose not to carry a large adjustable spanner, on the grounds that I would be able to borrow both of these at any workshop.

You will have your own views on what tools you should carry. If there is a tool that is essential to fix your bike and not universally available, then my view is that you should carry it, even if you cannot use it yourself. You will need to lend this tool to the mechanic so he can fix it. In some places, this might be something as basic as an Alien key.

This is what I carried in the Andes, with some comments to assist you to form your own conclusions.

Cool-Tool multi-tool. I found this useful. It incorporates a smallish adjustable spanner (whose shaft can be extended with Alien keys for extra leverage), 4mm, 5mm and 6mm Alien key heads, cross-head screwdriver, chain link extractor, and a standard crank bolt socket. The 4mm and 5mm Alien keys are not always sufficiently accessible, so I carried a full set of ordinary Alien keys in addition. You can additionally purchase a part to convert it to a headset spanner, and this is useful as proper head-set tools are rarely found. If you need additional leverage from an Alien key or a spanner, a metal tube such as some old plumbing or chair-leg can be used to lengthen it. I also carried two small fixed spanners (8-11mm) for fine work.

Cone spanner and bearing grease for overhauling hubs and pedals. Regularly used. I also carry a spare rear axle, cones and bearings.

Cassette tool and spoke key and a pile of correct size spare spokes. Regularly used. You don't need a chain wrench. One can be improvised by wrapping an old chain around a sprocket and clamping the free ends against each other in a vice. If you have no vice available, you can also hold the sprockets by using bits of steel wire to attach the chain to some spokes, but that is a trick for emergencies only. (The Hyper-cracker weighs very little removes current design Shimano cassette lockrings against the frame, using the pedals to turn the sprockets. - CJ)

Crank extractor and spare **smallest chain ring**. Don't forget to check your cranks and chain rings are tightly fixed from time to time.

Brake blocks. Always carry spare brake blocks — if you wear through to the metal you need to change the brake block immediately.

Spare cables for rear gear and brake. Cables need greasing from time to time.

Jubilee clips and **strong** scissors. It is amazing what you can fix with a cut-up tin can and a pair of jubilee clips, even a temporary fix for a frame or rack fracture. The scissors double up for beard-trimming, nail clipping and food-cutting.

Pile of nuts and bolts, Alien bolts, a couple of spare chain links, bit of steel wire (found by the roadside), **cable ties**, **duct tape**, **string**, **bungies**.

Spare tyre(s), **spare tubes**, **puncture repair**, **tyre patches**, **tyre levers**. Bits of old tubes can be used for wrapping round vulnerable bits of bike, tying up breakages, and as fire lighters. Keep an old valve with a bit of its original tube attached it so you can glue it on if you can't get a tube with the right valve.

Some final suggestions

Rough roads shake the most recalcitrant of bolts loose, so keep a regular check on vulnerable points (rack fittings, crank bolts, chain ring bolts, head-set, mudguards, hubs, pedal bearings, etc) once a day when you first set off, or on unusually rough terrain.

Listen to your bicycle. Immediately investigate any new or changed bicycle noise, and keep thinking until you know what it is.

Hide some emergency money and a photocopy of your passport and air ticket in a plastic bag somewhere inside your bicycle frame or handlebars. Spread your money and documents in unlikely places around your panniers.

In traditional societies, you can reduce the "cultural gap" if you avoid wearing skin-tight cycling clothes and respect local sensitivities. In many places "Where are you going?" is no more investigative than our "How are you?", so a short and upbeat reply, even if untrue, is courteous, at least as a first answer.

Getting directions is often essential but frustrating. Poor people rarely travel far, and may go in the back of a truck with no visibility. So often they will not know how to get to places further than walking distance. But they consider it polite to give an answer and dishonourable to expose their ignorance. If it is appropriate, to ask "where does this road go?" rather than "How do I get to..." offers them less scope for use of the imagination and more scope for a true (though possibly unhelpful) answer. Vagueness is a polite admission of ignorance. Beware of estimates of journey time. They may find it polite to suggest a very short time ("you are very fast on your beautiful bike") or honourable to give a very long time (to justify why they would not attempt such a journey). Try asking how long the journey takes by public transport - you'll soon learn the conversion rate.

Keep the skin on your nose. Most sun cream is quickly washed away by sweating. One tube of hard-to-get sweat-proof "sport" high factor sun cream brought from home can last over a year if you reserve it for use on vulnerable points. A wide-brimmed hat helps.

A cyclist needs more time to acclimatise to altitude and tropical climates than inactive people. In particular, vigorous activity is more likely to provoke unpleasant symptoms from lack of acclimatisation than inactivity. Altitude sickness and heat-stroke are both potentially dangerous, so plan adequate time for acclimatisation. There is no rule for everyone; learn your own body's needs.

Keep your multi-fuel stove almost soot free (and fingers cleaner) by priming it with 96% alcohol (meths), usually available in pharmacies. The fuel line will still need regular and vigorous scouring and flushing.

Start assessing the terrain for "campability" before you need to stop, so that later on when you are tired you already know the score.

Keep mothballs in your luggage to discourage unwanted passengers.

Double bag items you really must keep dry, like documents and your sleeping bag. In remote places with cold nights, your sleeping bag is the single most important thing you have. Have an exciting expedition.

Ivan Viehoff, May 1999