

a rough guide to  
bicycle  
maintenance.



compiled for the workshop  
"how to love your bike right"  
at the 2003 portland zine symposium.



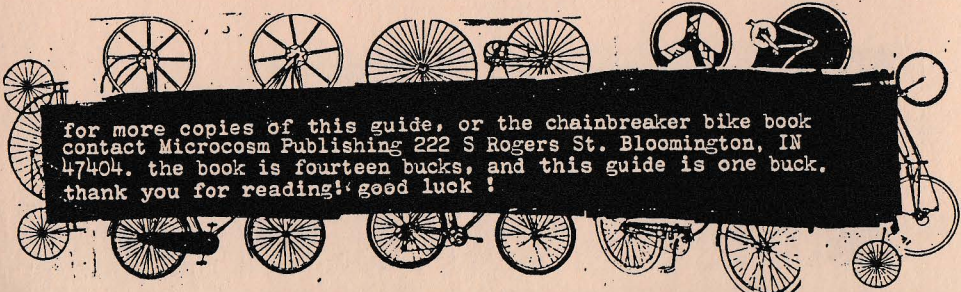
## Do It Yourself!

a couple days ago i was volunteering at plan b, the free bike project in new orleans, and a friend of mine came in to work on his bike. it was having some problems in the headset, and my friend, john, had not done much work on his bike before. i gave him a few hints and ran off to help some other people. when i came back, john had found his problem, a broken bearing ring and some missing bearings. we found him some used parts and he put them in with some fresh grease and his bike was good as new. he was so happy to actually see those bearings, to see what was broken and what was needed to fix it and actually get the job done all by himself. this is why i love mechanics.

for me, mechanics are stability in a world of variables, where there is so much to negotiate, navigate and traverse. mechanics, and machines are stable, solid, made up of metal that only can change under the most extreme conditions. with bikes, as with most machines, each part and component has its job. i always know what to expect from a bottom bracket. the bearings aren't just going to decide to melt to freak me out or otherwise ruin my day. they will simply do their job day after day until they wear out, and even that i have learned to expect. when something changes on a bike the cause is easy enough to find, and even in the worse case, broken is simply broken. there is no fault to be found but the simple truth of impermenence.

it is comforting for me to know that in a world where dealing with humans, jobs, money, etc. which can all be so trying, to know that something i depend on so much, daily even, can be so solid, and stable, and well, dependable for me! it gives me a little hope that if i can practice and someday master my problem solving skills with my bicycle, with some effort, the knowledge might spill over a little into my personal life... i hope at least!

so everyone... have faith in your bicycle and learn what you can to improve your relationship with it. love your bike with all of your heart and know that if you treat it right it will be with you always, even on those days when you feel the rest of your life or relationships slipping through your little fingers, your bike will be there, waiting for you quietly to be included in your day and your life. don't give up on it. though you may hear a million times to get a car, or drive where you want to go because it is "easier", know that people only think it is easier because it is the norm. you know better... bikes are more fun, cheaper, and quite often faster than vehicle transport. so..... go ride yer bikes!!!



for more copies of this guide, or the chainbreaker bike book contact Microcosm Publishing 222 S Rogers St. Bloomington, IN 47404. the book is fourteen bucks, and this guide is one buck. thank you for reading! good luck !

## how to deal with shops

even as an experienced mechanic, you will still have to sometimes rely on a shop for advice, and for parts and accessories (especially if you live in a town without a bike co-op or free bicycle space where you can easily acquire good used parts!) so the best thing you can do for yourself is find a shop close to you that you can trust. the best way to do this is to get to know the mechanics and their work. see how quick and reliable they are. ask locals and friends for their recommendations and see who gets the best reviews from the people you trust... also, try comparing prices on parts and accessories at different shops. get a feel for how they do their mark-ups. sometimes one shop will be best for repairs and another for parts. every shop is a little different in their specialties as well, and it is good to find a shop that is excited about the type of bike you like to ride.

when you do find a good shop, it is good to do what you can to have a good rapport with the mechanics. when you take your bike in for a repair, ask what they did, what parts were used in the repair, see if they can show you what was done on your bike, if you think you can do the repair yourself, ask if they can give you some pointers. sometimes it gets a little busy in a shop, and it is a little rough to take the time out to show a customer how to fix something by themselves, some shops don't like to do this at all

for the sake of not losing customers. but some will, and some mechanics especially will take the time to help a customer, and fellow biker, learn about his or her bike. these mechanics are priceless, and should be treated with love and respect. ask for their help, but be aware of their situation, when they have time to give you special attention, when it is just too busy to ask, or when the boss is around (if they are not the boss themself that is) and laying a little low might be better for them. these mechanics usually like the interaction with a dedicated and self-reliant biker and will give you the time when they can. so appreciate them!

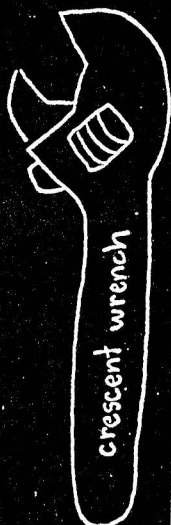


a note to ladies in shops: it is so hard being a woman in a bike shop sometimes! sadly they are often very male spaces, and no matter how tough you look, walking into a shop can make a girl feel 15 again. so ladies, again, be forward, be assertive. you don't have to talk components or about high end shit to get the respect you deserve. if you ride a crappy little 3 speed and you want to know why the brakes aren't working, ask. if the mechanic says, yes - your brakes are not working, ask him or her to show you why and where they are broken. don't be afraid. if the male mechanic calls you sweetie, or honey, call him sir. set your boundaries and let them be sure the interaction is about bikes and nothing more. you can do it. find the shop and mechanic who treats you as a customer, not a female customer and work with them. and don't feel like you are ahead by using your femininity to get extra attention, you may think you are in more control, but guess what, you're not.

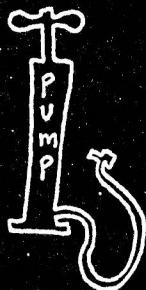
just remember that shops are our friends. they are fun to look at and full of information that we can use. make friends with them and engage with them. lots of shop owners are amazing bikers and even bike activists. not all businesses are ruled by capitalism, some exist for the good of the community, and if you can find a shop like this, cherish the hell out of it, cause they deserve it. cool.



# How to fix a **FLAT**



1. remove the wheel from the bicycle
2. deflate the tube of remaining air
3. remove one side of the tire (the bead) from the rim. do this either with your hands if the tire is loose, or with tire levers. never use a screwdriver (as you risk ruining a repairable tube or even the tire). if you have no tire lever, use something blunt like the end of a spoon.
4. lift the valve out of the hole in the rim.
5. remove the tire from the rim
6. take the tube out of the tire. fill the tube with some air to find what may have caused the hole. if it is a single puncture, it was probably something poking through your tire, a slit could be a rim bruise, (underinflated tires cause this), two slits also are caused by underinflation, a huge gaping hole is a blowout and you should inspect your tire for a corresponding hole, or a broken bead or sidewall on your tire. a hole in the inside of the tube indicates a spoke may be poking out and should be filed down.
7. inspect your tire, for holes, glass, nails, etc. run your fingers through the inside of the tire and feel for things poking through. this is most important for preventing future flats!
8. repair the tube according to the instructions on your patch kit, or replace the tube.
9. put enough air in the new or repaired tube to hold the shape of a circle. lay the tube inside or the tire with valve facing the right direction.
10. put bead back on the rim with hands, or in tough cases with your tire lever. put the valve through the hole in the rim being sure it is standing up straight. put second bead on the rim.



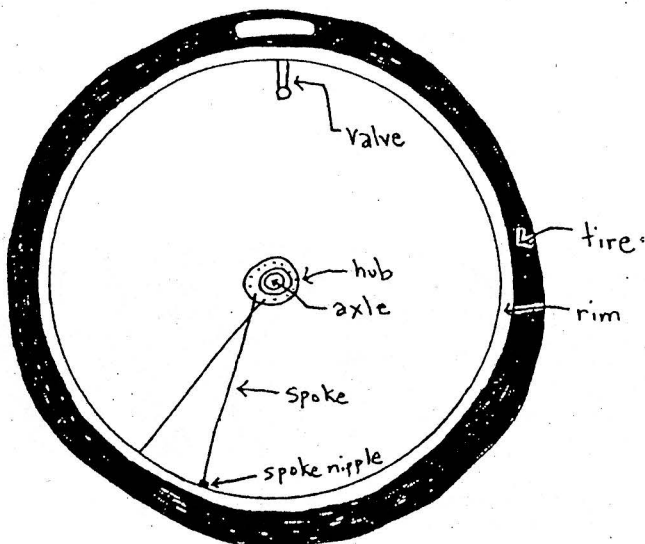
11. be sure tire is seated, meaning both beads are entirely and evenly on the rim. ad air slowly, watching closely to be sure neither bead is popping off the rim (otherwise you will blow out the tube and scare the hell out of everyone around you!)

12. when tire is up to the proper pressure (it will say what this is on the side of your tire) bolt your wheel back on being sure it is evenly spaced between the forks or chainstays.

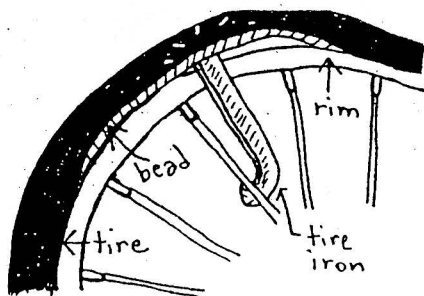
↑ front wheel    ↑ rear wheel

13. remind yourself that you rule cause you can fix your own flat which saves you money and makes you more self reliant. now go ride yer bike!!!

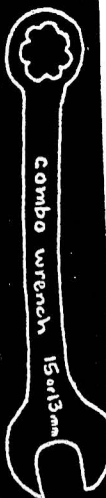
first thing is first! know proper wheel vocabulary!



this is a WHEEL  
(it contains all of these things.)



getting the TIRE  
off of the rim  
← with a tire  
iron.



Combo wrench 15x13mm

tools you may  
need...



Screwdriver



How To Do a Proper Tune-up!  
\*\*\*\*\*

First! inspect your bicycle. Check the frame for breaks or cracks, note items that need replacement, adjustment or repair. this will give you an overall sense of the bike, how much work it is worth, and what parts you will need to do the tune up well.

**1. WHEELS**

remove front and rear wheel, inspect them, check for straightness, holes in tire or tubes, smoothness of axles, be sure axle nuts or quick releases are functioning well.

- adjust axles (for multi speed rear wheels this will require removing the freewheel)
- replace worn tubes and tires
- true wheels
- oil freewheel (then put back onto rear wheel)

**2. BEARING SYSTEMS**

it is easier to adjust these things with the wheels off the bike. this part will entail either greasing and adjusting the system (an adjustment), or taking the whole thing apart, cleaning or replacing parts and reassembling with fresh grease (an overhaul). do what is necessary or go all the way just for fun.

- adjust and grease bottom bracket
- adjust and grease the headset

...replace wheels now... (single speeds - check for good chain tension)

**3. CABLES**

all cables should be inspected for broken housing or fraying cables. if they are broken or cracked or frayed they should be replaced. if not a simple lubing (with something like triflow dry lube) will be great. adjust them properly for smooth braking and shifting.

- lube brake cables
- adjust brakes
- lube gear cables
- adjust front and rear derailleurs

... now is a good time to examine your chain and lube it...  
(never use WD-40!)

**4.**

ETC...

tighten all bolts and such (seat post bolt, stem, kickstand, rack, or basket bolts, etc.) adjust seat height and bars to your liking, wipe off excess lube, shine her up a bit...

**5. RIDETEST!**

always good to be sure all is well, no squeaking brakes, wobbly wheels, tires seated improperly...

**6. CLEAN UP YOUR MESS!**

put your tools back neatly, clean the grease off of them a little, make them nice for their next use, love your tools and they will love you.

7. again, remind yourself that you rule. and go teach someone how to do it too!

special tips:  
\*\*\*\*\*

- 1\* never use excessive force, this will avoid breaking bolts, stripping soft metals, and help you to be sure you are using the right parts. if a bolt is getting hot and is difficult to put on an axle for example, it is probably the wrong one. don't do it.
- 2\* be patient when lining up threads (bottom brackets, axles, etc.) don't strip or crossthread them. it's a pain to fix!
- 3\* take your time and be neat with your work. it will help keep you calm when something goes weird.
- 4\* never use WD-40! it is not a lube, it is messy and it stinks. use the proper lubes on moving parts for your bikes (ask a shop), and if something is terribly stuck, try liquid wrench.
- 5\* having a book to refer to (a repair book) is great. having a shop to call or go to for advice is even better.
- 6\* use the proper tool (examples: cable cutters not wire cutters, a 15 mm wrench not a vice grip, a tire iron not a screwdriver). it will save you a lot of trouble, and keep your parts in good shape.
- 7\* Don't be afraid you bikers! bikes are simple and logical. you won't destroy anything trying to do a tune up (if you follow the above rules especially!). so get in there and go for it! and have fun. put on some good music, relax...

go fix yer bikes!!!

## the beautiful bearing!

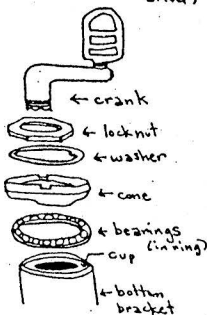


tool: cone wrench



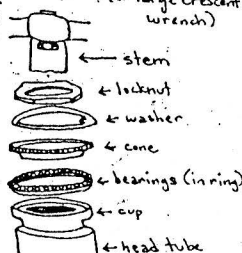
axle

tool: spanner (or screw driver)



bottom bracket\*  
(one piece)

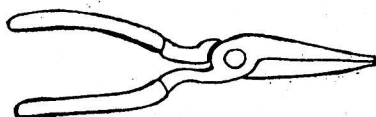
tool: headset wrench  
(or large crescent wrench)



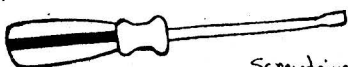
headset

# Tools You Will Need:

- \* = essential for most repairs
- + = not used very often, try to borrow it
- # = get the size specific to your bicycle



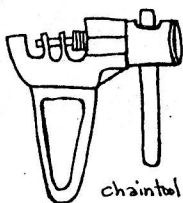
needle nose plier \*



Screwdrivers\*  
(flat & phillips)



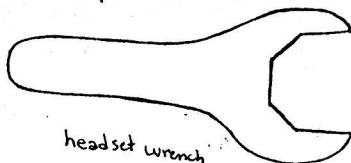
tire iron \*



chain tool +

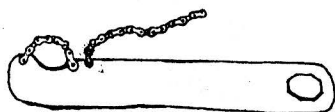


spoke wrench



headset wrench

30, 32, 36 - whatever is your bike's size #



use together!

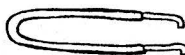
chain whip +



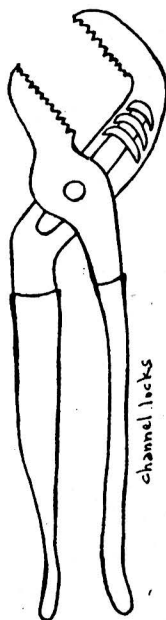
freewheel +  
remover



crank puller +



Spanner

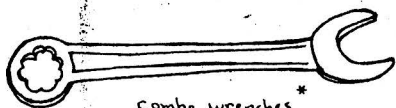


channel locks



cable cutters





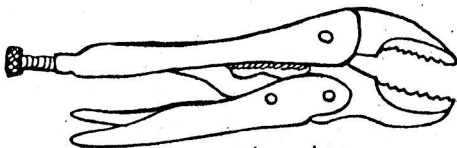
Combo wrenches \*  
8, 9, 10 \* 13, 15, 17 \*



cone wrenches \*  
13, 15, 17



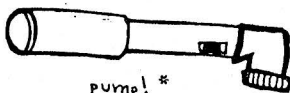
allen keys  
(sets are good)



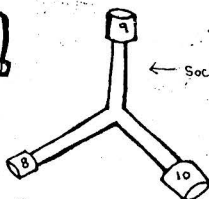
vice grip  
(emergency situations only!)



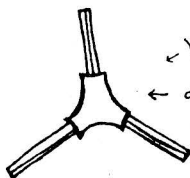
adjustable  
crescent wrench \*



pump! \*

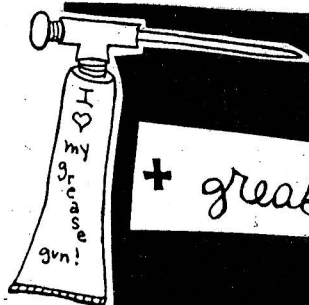
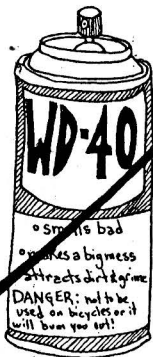
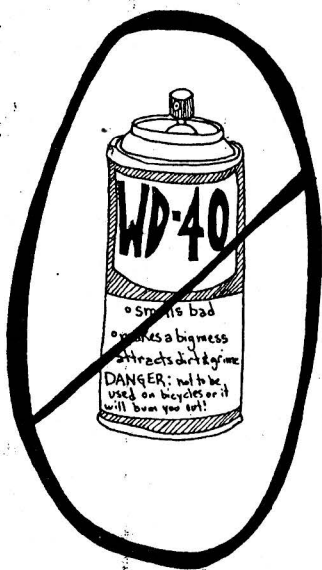


← sockets



← Y-tools (i love these!)

← allen keys



grease gun

+ grease & lube \*

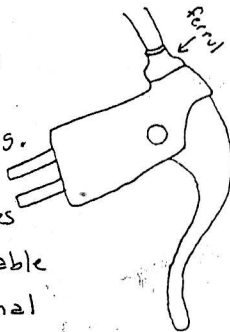
- o white lithium grease for bearings
- o dry lube (like triflow) for cables
- o chain lube (never WD40!)

# Brake basics

a simple guide to a proper brake adjustment

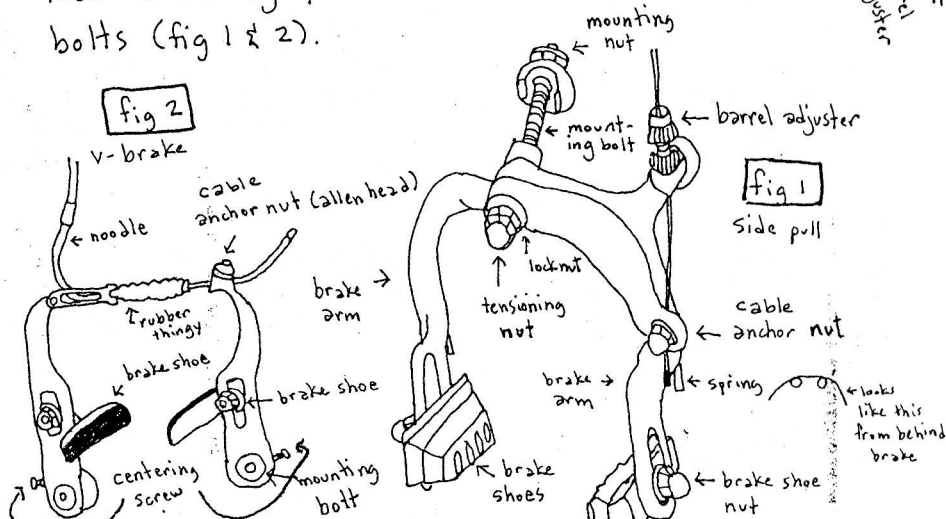
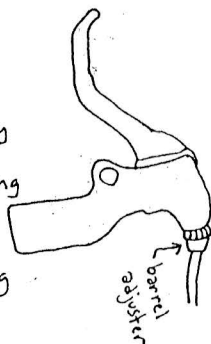
Inspect:

**Step 1:** Inspect your brake. make sure cable is in tact, that there is cable after the cable anchor nut adjust with ~~the~~, that housing is not split or rusting. be sure ferruls are in place & that the barrel adjusters are fully screwed in. Make sure brakes are intact, with all parts & that shoes are usable unless you have new ones. is the lever functional & tight on the handlebar? if everything is cool, move on to step 2.




Lube!

**Step 2:** loosen cable anchor nut (fig 1 & 2) to slack the cable. LUBE the cable (with tri-flow or some dry lube from a bike shop), slide housing ~~the~~ along cable to work it into the housing. Spray some lube on moving parts like around mounting bolts (fig 1 & 2).



# Step 3. Squeeze pads against the rim.\*

(if the shoes are way off rim, skip to step 6, adjust, then return here.) you can hold these in with a "3rd hand tool"  - or just try holding it with one hand & pulling the cable tight & then tightening down the cable anchor nut with the other. (make sure the housing & ferruls are in place!). When you release the shoes they should be about  $\frac{1}{8}$ " (|| < that far) from the rim. if it is close, make up the difference with the barrel adjuster on the brake or on the lever. if it's not so close, try the cable adjustment again. sometimes it takes awhile.

cable!

\* i like to do this by putting my hand in the spokes & squeezing from under the shoes.

# Step 4. make sure when you squeeze the lever that the shoes easily spring back off

the rim. if not adjust. On side pull: loosen tensioning

+ & locknut, adjust these until brake springs back well without causing brake arms to be loose & wiggly.

when this is done (play with it a little to feel how it tightens, or gets too loose) hold lock nut & tighten

tensioning + against it. On V-brake: Loosen mounting bolt, set spring end into higher

hole on the fork to tighten spring (for more springy-ness, or lower for less. re-tighten mounting bolt.



# Step 5. squeeze the lever, when you release both shoes should be the same distance from the rim. if it's not, it's time to center. On

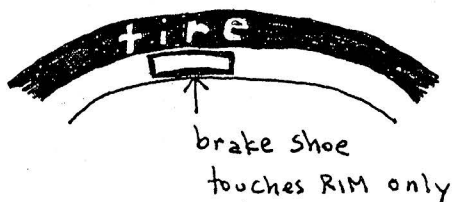
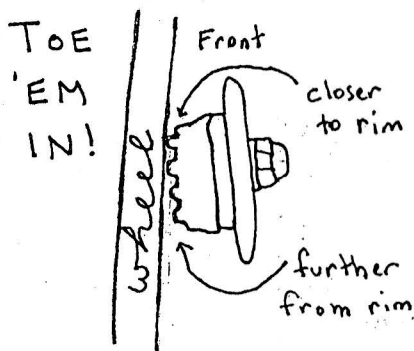
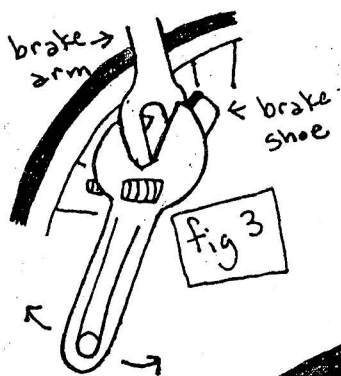
Side Pull: loosen brake mounting nut & move entire brake until shoes are equal distance from the rim. tighten mounting nut. test & re-do if necessary.

centering

springy-ness

On V-brake: Use centering screws (fig 2) to center brake, it's pretty cool how it works! just watch them move as you turn the little screw, loosen to make it closer, tighten to pull it away.

**Step 6**: adjust shoes so that they hit only the rim. loosen brake shoe nut (on V-brakes these are often allen screws) & move the shoe to its position. tighten nut. **TOE THE SHOES in** - by adjusting them so the front side of the shoe hits first. (this gets rid of awful screeching noises that happen when you brake!) On Side Pull: use a crescent wrench to gently bend the brake arm. (fig 3). On V-brake: do this with shoe mounting nut loose while you adjust shoe to rim.



thats all! squeeze levers & test them! check to be sure all the nuts are tight, spin the wheel & test the stopping ability, make any readjustments & then take it for a test ride... and a test stop! great!



# OVERHAULING

(an unsealed 1-speed hub)

The Problem -- A knocking noise emanating from either the front or rear of your bike. A feeling of sluggishness after a long ride in the rain. Just a strong desire to see the innerworkings of your hub.

Tools Needed -- 15mm cone wrench  
hex wrench  
adjustable wrench (optional)  
wrench sized to fit your locknut  
shop rag/t-shirt  
grease

Now Begin -- Remove the wheel from your bike with your hex wrench or adjustable wrench. Then throw away the wheel and buy a new one. Just kidding!! Start removing the nuts, washers, and spacers from your axle. It helps tremendously to line up the various pieces in the order you removed them...so that you won't have any confusion as to how they go back on. At some point of this removal process you won't be able to spin a piece off with your fingers. That piece, my friends, is the locknut. It is very important as it keeps your cones at the proper placement, therefore allowing the wheel to spin freely and smoothly.

Now we get to the good stuff. With your cone wrench, grab onto the cone and with either your 15mm hex wrench or whatever fits your locknut, turn your locknut loose. As soon as the locknut comes loose, spin it off, then pull off the washer or spacer or whatever is next...now you are at the cone. Spin that off while holding the axle in place, since as it gets looser, the axle will begin to wobble and you risk losing the bearings if they shake loose. When the cone is all the way off, slowly pull the axle out of the hub (1 side should still have all the pieces on it). Gently pry off the bearing cover on the hub to expose a dirty, gooey mess with bearings stuck in place. Start picking them out with whatever you think works best (finger, screwdriver, etc.) and place them in a pile of their own. Gently turn the wheel around and do the same to the other sides bearings. After they are all out, take your shop rag & wipe out the hub's inner shell. Be sure to get out all the

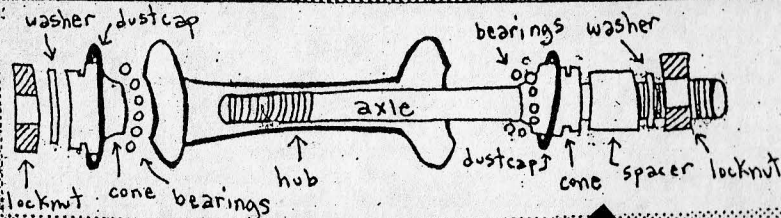
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gunk and buff the shell with steel wool if it looks to be scarred...meaning textured in any way. Then start cleaning the grease off all the bearings. All this takes is a little wiping with the shop rag. Be sure to check the bearings for any wear. If they are anything but smooth and round, replace them with new bearings or your hub will make noises again if you put them back in. When everything is cleaned up, fill the bearing cups with a liberal amount of new grease. Put a good amount in as it will help the bearings roll smoothly and will also hold them in place. Start placing the bearings into the grease and after they are secured in place, push the bearing covers back onto the hub.

Now slowly slide the axle through the hub, taking care not to knock any bearings out. With the axle pushed in as far as it can go, thread the cone you removed back onto the axle into a snug position against the hub. Your bearings are now safe from falling out. Slide on the washer or spacer and then the locknut. Now you are ready to adjust your cone...take a deep breath. This certainly takes some trial and error. Basically, you will thread your cone onto the axle and into a position where the bearings won't grind (too tight) and there won't be any "play" with the axle (too loose). Do this by holding your cone in place with your cone wrench and then tighten down your locknut with your other wrench. Pick up the wheel by the axle and spin that bad boy...if you feel any grinding, go back and loosen the cone. If it spins feely but you can feel the axle wiggle in the hub, go back and tighten the cone down. When you get the cone just right...you are good to go. Re-thread the pieces you laid out back onto the axle, put the wheel back on your bike and listen to the silence as you spin down the road.

You have now peered into the soul of your bike and pieced together those fragments of pain that were wearing away the comfort of...oh hell, what am I rambling about, just go ride your damn bike!!!!

--scott spitz  
leapfrog bike zine



WHAT IS YOUR FAVORITE REPAIR?  
write it or draw it out, send it to me  
and i will put it in the repair manual  
i am compiling. this is an ongoing pro-  
ject i hope to add to for a long time to  
come. the format is 8 1/2 x 11 folded  
and artwork is greatly appreciated.  
send it to me shelley at 621 north ren-  
don new orleans, la 70119. and if you  
want to check one out send me a stamp  
and i'll send you one. thanks!!!!!!

o Park Bench Wrench  
↑ this is a thin  
wrench



# Good Books

about



Bike

*for repairs & maintenance:*

Glenns Complete Bicycle Manual - written and photographed in the early 70's this isn't the most modern view of the bicycle, but the photos are great and easy to comprehend, the repair instructions are clear and easily applicable, the book is big and complete. it is easy to find this one used for cheap and it is my favorite repair manual.

Haines Bicycle Repair Manual - more modern with full color photos, i hear this is the second to the best for a bike repair book. the same people that make all those specific car repair manuals which have always been great to me.

Chainbreaker Bike Book - new mechanic manual and theory book by the authors of this zine. Specializes in fixing up older bikes and the kinds of repairs they require. Learn how to fix a cup bottom bracket with duct tape and a mallet. Illustrated throughout with lots of unique info. ISBN 978-0-9770557-3-9  
\$14 from [www.microcosmpublishing.com](http://www.microcosmpublishing.com)

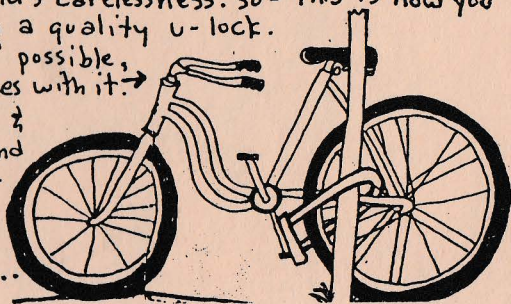
## Lock it up if you ♥ it!

it's always good to lock your bike well. in my city, bikes are stolen every day, often through the owners carelessness. so - this is how you do it! it is best to start with a quality u-lock.

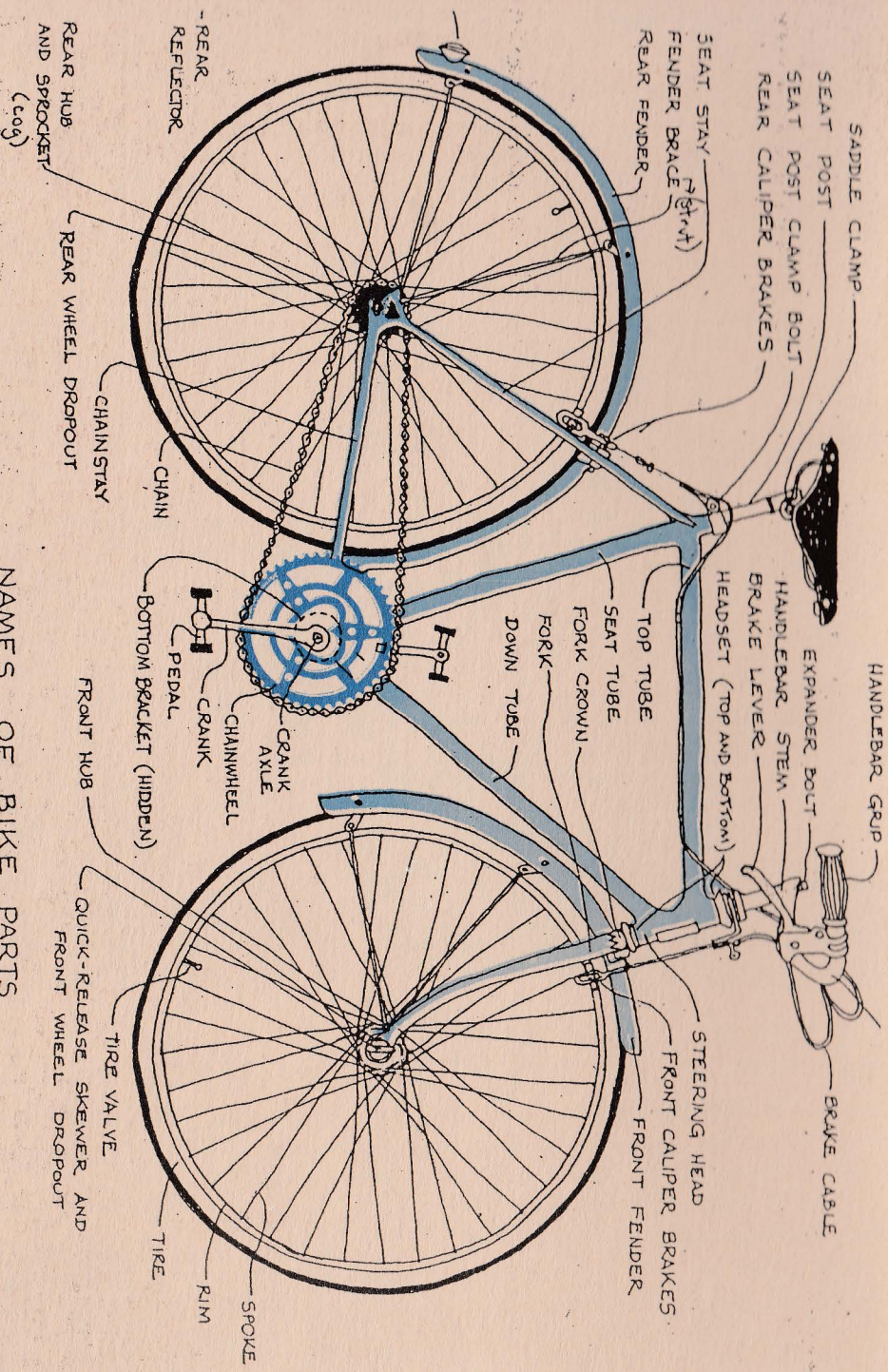
use this to lock the frame, & if possible, catch the rear wheel or some spokes with it. →

be sure what you lock to is solid & cannot be pulled out of the ground & that the bike cannot be pulled over the top. never leave your bike locked but in the city over night! paranoid? not here. so kids..

lock it if you ♥ it!







NAMES OF BIKE PARTS