A Quick Lesson in Bicycle Anatomy
hello reader!

This zine was created for a series of workshops called Women/Trans/Femme (WTF). The hope being that this movement of DIY community run safe spaces continues to grow and thrive, offering opportunities of self-empowerment and a dialogue regarding social issues and gender identity. Thank you to the folks at Davis Bike Collective, and Bicycle Church of Eugene for making such ideas a reality, moving out of the margins into the stanzas. 

Ride on.

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WOMEN: a person who identifies as a woman
TRANS: transgender, gender queer, gender non conforming, gender creative, anyone whose gender identity is fluid &/or transitioning
Femme: a gender identity in which a person of any gender embodies a feminine appearance/expressions
Ally: a person that provides assistance & support
**Wheels (of Fortune!)**

**WTF! Workshop #1**

**Key-Way Washers**

The tooth keeps them from turning as a result if you turn one way, the other (on the opposite side of the washer) will spin with it. The washer is fixed with a small tooth run in a slit that vertically across the bolt's threads. Thus, the only force transmitted between the nuts is vertical, not rotational.

**Headset Pieces**

- Various sizes and types of components:
  - Some have a ball nut that complements your headset race
  - Others have a hex lock nut
  - Others have a hex lock nut and a hex bolt
  - The hex bolt must be the correct size for the nut
  - The nut must be the correct size for the bolt

**Removing Headtube Race**

- Use a C-clamp to clamp the headset in place
- Remove the race with a puller
- Ensure the race is completely removed

**NOT TO BE FORGOTTEN**

If you don't use the lock nut & ball nut, remember that the headset should not come loose or come loose if you turn the handlebars. If the nut does not hold, the headset may come loose.
THE MOST IMPORTANT STUFF ABOUT WHEELS:

1. On rear wheels, you generally need to remove the cone to get the axle out. You always have to remove it to replace spoke.

2. Your wheel will not be straight if...
   - Axle is bent
   - Axle hub is out of round
   - Axle hub is worn
   - Spokes are loose
   - Spokes are bent
   - Spokes are damaged

3. You must remove the cone and look at all the parts to see if they are all lined up correctly. If they are not, they can move around and loosen your hub.

WHAT HAPPENS IF...

- The hub is loose?
  - LOOK AT ALL THE PARTS - ALL THE SPINDLES, AXLE, SPINDLE, ETC.
  - BENDS, SPINDLES, ETC.
  - OR, FIND OUT WHAT'S CAUSING THE LOOSENESS.

- The cone is loose?
  - NO SUCH THING
  - IT'S PARTS IN THERE?
  - IT'S PARTS OUTSIDE?
  - IT'S PARTS OF THE WHEEL?
  - IT'S PARTS OF THE AXLE?

- You have to clean it up?
  - PIECES ARE FITTED?
  - REASSEMBLING - WHEEL FITTING
  - YOU MUST REPLACE THE PART

- When assembling the wheel, check for size (length, width, hub diameter, etc.). Match up the diameter, surface and thread of the threads, etc., with the correct hub.

TOOLS INVOLVED:

STEERING

HEADING ROLLER scheme.

QUILL STEM

HEADSET (threaded)

FOURK

A HEAD AND FORK HEADSETS:

1. If you have to remove the cone, check to see if there are several directions of holes, and several pitches of threading. At usual, you will have the most trouble with French and Italian bikes. Good luck!

2. It's designed to fit if it's knurled and hard. If you crack it, you won't damage anything.
**Finally... CHAIN of tools...**

**THE CHAIN TOOL** works by pressing, JUST LIKE THE CRANK PULLER. It forces OUT THE PIN THAT HOLDS LINKS TOGETHER.

**Fyi: When breaking your chain, put chain on lower ring & tool on links. You can use the tool! Also, watch not to push pin all the way out: Leave it stuck in last piece of link.**

**Sticky Links:** if you put your chain back together & the links stick, put the chain on one higher ring & apply a little pressure with the tool: you'll squeeze it out & stick it.

**How Long Should You Make Your Chain?** Stretch chain as tight as you can across your largest chain ring & biggest cog, where the last inside link meets the last outside link. Add one more inside & one outside link (all held: the tight length plus 3 links).

**WTF Workshop 2**

**BRAKES!**

- Road Levers
  - Cylindrical cable head fits in this stupid rotating, might thread cable in from the bottom of the lever arm, making sure to leave space for the lever arm.
  - Figure is the right hand bolt to secure the lever to the headstock. You can use a screwdriver in the hole where the lever is pushed down.
  - Brake lever has a hole for mounting clips. Brakes.
  - Cantilevers are cool because they are adjustable in several dimensions: you can change the height of the brake pad, its position on the brake arm, its angle with respect to the frame, and its angle on the horizontal axis.
  - HOWEVER, THEY CAN BE A PAIN IN THE NECK to adjust as a result of their versatility. Try to compress washers on brake arm to move the brake pad. There can be many holes to allow you to reposition the spring.

A word on springs: all brakes require springs to work. The springs push the arm back to its original position, open. Brake bosses often have multiple holes to allow you to reposition the spring.
**V-BRAKES**

- Brake levers:
  - Foreward (front)
  - Backward (rear)
- Brake shoes:
  - Lined shoe
  - Steel shoe
- Brake pads:
  - Flat
  - Concave

**SIDE PULL CALIPER BRAKES**

- Threaded brake pads
- Individually adjustable

**FRICITION SHIFTERS**

- Bar-end shifters:
  - Tighten to 350 inch-pounds
  - Don't over-tighten

**INDEX SHIFTERS**

- Cable head goes into a cylindrical slot
- Cable head slot going up

**SHIFTERS...**

- These are more common on older bikes.
- The idea is that the resistance of the lever to rotate (due to friction force) at the pivot point to exceed the tensile force of the cable. There is some less precise adjustment than Tektro, but you can adjust with some more effort.

**INSTRUCTIONS:**

1. Tighten to 350 inch-pounds
2. Don't over-tighten

**INDEX SHIFTERS:**

- Cable head goes into a cylindrical slot
- Cable head slot going up

**ON SETTING UP SHIFTERS:**

- The key is to look for the:
  - Cylindrical slot where the cable head goes.
  - It will be clear which direction to thread the cable through.

**WHEN ROTATING CABLES:**

- Follow cable guides, give more slack near maximum curvatures, use formulas when necessary.
CABLES & HOUSING

WHAT IS HOUSING FOR?
It allows the friction force of the cable to go around curves, it receives the cable's "equal force" force to the lever.

Skeletor Brown's Four Commandments of Cable Routing:
1. All cables should be as wide as possible.
2. Curves should be as wide as possible.
3. All curves should be as wide as possible.
4. Make housing as short as possible without violating the above rules.

FERRULES
are three-legged metal housing tips. Use a blunt finish where the housing bends to smooth it as snugly as the cable will allow.

SIDEPULLS & BRAKES
Don't require cable-damping devices, but CANTIS & CENTERPULLS DO.

SET the LIMITS:
Push derailleurs all the way in and all the way out while turning the cranks. Does it go to all gears? Does it go far enough to push the chain off the cog?

NEVER FAINT:
Bend-on cable guide
Thread-on cable guide
Braze-on cable stop

WHERE DO I PUT THE CABLE? At the bike will give you a hint:
If there are flashes, or tape...you'll see some structures that direct the cable.
**Top Five Reasons Why Your Brakes Suck:**

1. Poor friction due to buildup of crud on your rims or pads; try filing the surface of your brake pads & cleaning your rim.

2. They're poorly aligned: check for alignment & adjust if necessary.

3. They're too loose: you can tighten them using your barrel adjuster for only so long before you have to loosen the nut holding your cable. Squeeze your brakes together, pull the cable tight & resecure the cable in there. Make sure to put barrel adjust in middle position first.

4. If the brakes don't open up again after you brake, you probably got excessive friction in your housing. Sometimes it works to clean it out, but if it's too soaked you might just have to replace the housing altogether.

5. Your brakes are asymmetrical: one pad contacts the rim before the other, making it squeaky & not effective at braking.

**Tools for Brake Adjustment:**

- Small wrenches: 8, 10, 11—normally need two.
- For adjusting brake pads.

**Holy Shift, Batman!**

**Drive Train:**

1. Set limits (see next page).
2. Put barrel adjust in middle position (if applicable).
3. Hold derailleur in outermost position, set shifter to 3rd gear (a little slack in friction shifter) & get a friend to pull cable twice & clamp it down tight.
4. Fine-tune with barrel-adjust to get shifting smooth.
**Tools for Bottom Brackets**

*They involve the use of a suite of odd characters. What follows is the gallery...*

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**PART ONE: CRANK ARMS...**

The crank pulley is pretty elegant. Piece one threads into your crank arm. Use a wrench to do this so you get as many threads as possible in there—people sometimes strip their crank threads if they don’t try. You’re about to apply a lot of force. 

Taper threads are similar to the threads. Piece two into piece one (you need quite a bit of torque). It will pull against your main spindle, while gripping the crank and forcing it off.

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**PLAN B:** If your crank arm threads are not, it’s hammer time: grab the pickle fork.

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**ALL YOU HAVE TO DO TO GET THE CRANK ARM BACK ON IS TIGHTEN THE CRANK NUT/BOLT WITH THE SOCKET!**

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**MOVING SPINDLE CRANKS...**

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**BOTTOM BRACKETS, CRANKS & PEDALS**

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**SQUARE-TAPER**

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**SQUARE-TAPER CRANKS CAN HAVE 2 KINDS OF SPINDLE HUBS:**

- Diamond
- Square

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**Another note on spindle hubs:**

- If your crank arm gets loose, take it off. Your spindle will probably all fucked up.

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**The pedal wrench!**

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**The pedal wrench!**

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**NOTE! Right pedal thread on clockwise and left pedal thread off clockwise. It’s as if it forces up until it renews itself by pedaling.**
**WTF Workshop**

**OTHER KINDS OF CRANKS & BBs...**

**COUNTERED CRANKSET**

(3-piece bottom bracket) **FRONT VIEW**

- Countered cranksets take the same BB setup (cone, bearings) as the square taper. The only difference is how the cranks attach to the spindle.

**ONE-PIECE CRANKS**

**THE CHAINRING PARADOX:**

- Note the bolts. On REAL TIGHT!!

- Purchase a piece of 1/4" brass tubing & glue chainring to it.