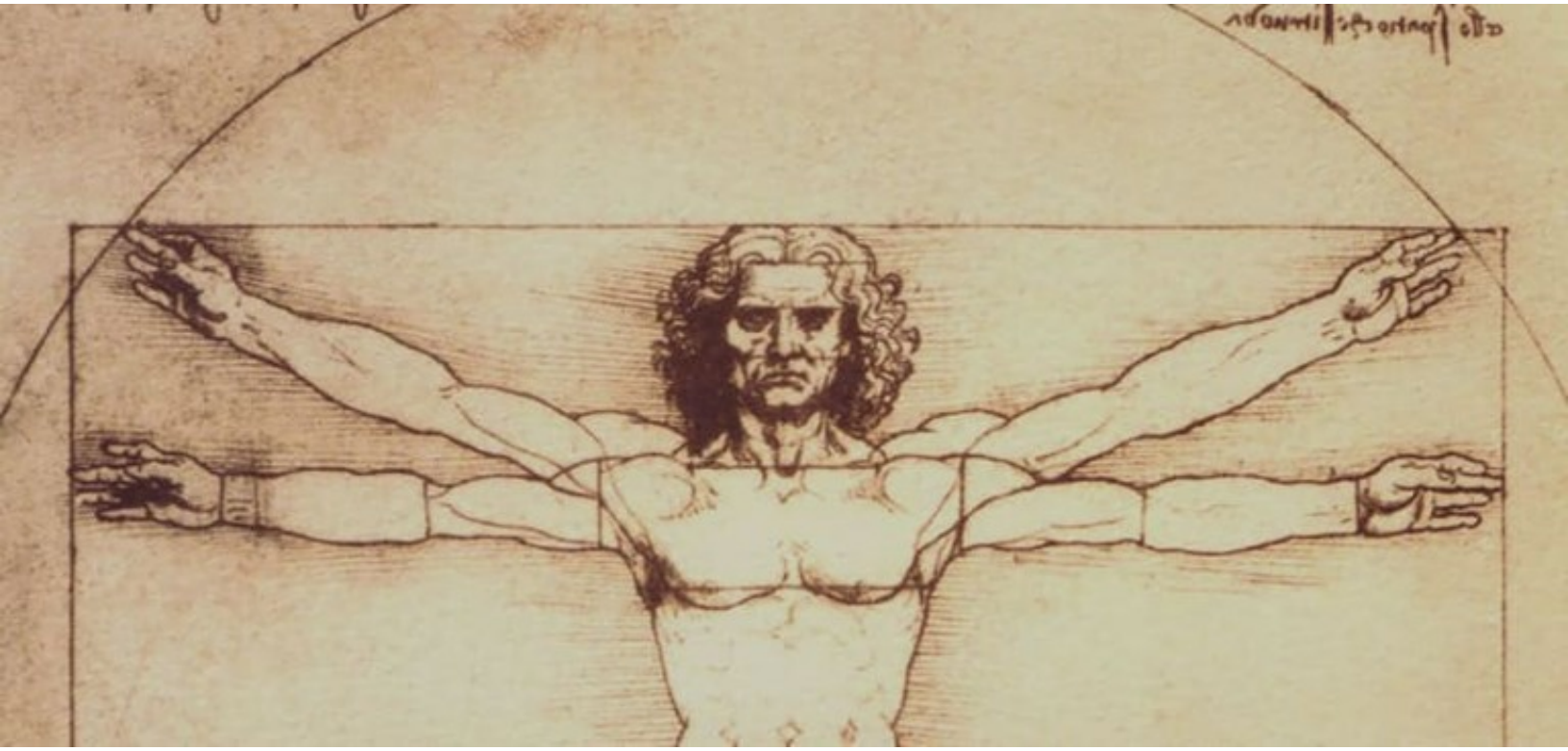

Drawing Less Wrong

Drawing Less Wrong: An Introduction

> *You have not found a way to connect your hobby to rationalism yet. It itches. You are not whole. It is forbidden to post an article entitled Rationalist Hobby on Less Wrong. You lie awake at three in the morning, trying to create puns.*
>
> *-- Alicorn, Rationality Gothic [2]*

(Note from 2017: This sequence was written before Alicorn's classic jab at people shoehorning rationality into random hobbies. I'm fairly embarrassed by it at this point, but don't have time to rewrite this into something I'm not embarrassed by, and several found it a very helpful introduction to drawing.)

((Also, this sequence ends abruptly when my 2011 life got in the way. If you get to the end and go "aarrg! what do I do next!?" the answer is "purchase 'Drawing on the Right Side of the Brain' and finding a figure drawing class))

This post begins a mini-sequence that discusses how to draw, reports on an experiment about teaching people how to draw, and examines how rationality and good drawing practices are related. (As it turns out, a fair amount)

I'm a professional artist. I have a fairly extensive background in traditional drawing, but most of my training is in computer animation. I chose my career because I liked the control offered by the computer - the ability to undo, to manipulate art in procedural ways, and most of all for the flexibility to duplicate things, repurpose them for different projects and combine my love of visual art with my love of game design, animation, and various other mixed media.

But now I work 10+ hours a day at an advertising agency. I spend all day getting paid to stare at a computer screen. Most of my other hobbies also involve staring at a computer screen. And many types of digital work are taxing on the same set of creative muscles, so at the end of the day I didn't have energy to work on the personal projects I wanted.

One option would be to get a different job that didn't tax those creative muscles or involve staring at a screen. I've actually considered getting a "physical" job - after years and thousands of dollars of college to get a nice posh job without physical labor, I actually think it might be better to get PAID to exercise. And instead, use my free time to channel my skills from colleges into personal creative projects that I'm passionate about.

I may do that some day, but I DO like my job, I like the people there, and I continue to learn important skills. So instead of modifying my job, I modified my hobbies. A few months ago I began drawing people - on subways, in coffee shops, in parks, etc. This gave me a new creative outlet, as well as a new social outlet. (Starting a conversation with "Hey, can I draw you?" is a pretty useful technique - not only does it provide an excuse to begin talking, but if you follow up with a good drawing, you've established right off the bat that you're an interesting person with a valuable skill. You've also flattered the other person a bit, and if the conversation enters a lull, it's okay - just draw for a while until you can think of something to say.)

So I've been getting better at traditional drawing, and better at social interaction, and more confident in general. And at a local Less Wrong meet up, it recently it became clear that...

1. Other people wanted to learn to draw
2. I wanted to learn to teach
3. A few people wanted to model. So the "Drawing Less Wrong" meetup was born. I prepared some lesson plans and began holding 4-hour workshops.

What interested me was how much the study of drawing was relevant to rationality. Not only do you have to learn to observe reality (this is surprisingly hard), but you have to pretty much scrap your entire model of how you think drawing works. (Almost everything you will naturally gravitate towards is wrong). Most artists don't notice that they should be applying these lessons to the rest of their life, but I think the skills can generalize if attention is brought to that notion.

In the past, I've been to figure drawing workshops where I saw people go from not being able to draw much at all (one person showed up to class with a *horribly* copied manga drawing that they said had taken them 12 hours), to being able to execute a reasonable gesture drawing1 in about 60 seconds. It took them about 8 hours of dedicated practice. I wanted to try and replicate that.

Soon to follow are a collection of posts discussing the nature of talent, how to draw effectively, and lessons I learned from trying to teach people extremely counterintuitive models of reality.

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[1] "Reasonable Gesture Drawing" is a specific phrase that means something to trained artists, which non-artists may misinterpret. It doesn't mean "looks amazing." It does mean that this person improved in important ways in a short time.

[2] I refuse to call it "Rationalism Gothic" because Rationalism means an oddly specific philosophical school that is actually kind of the opposite of what Less Wrong is about.

Drawing Less Wrong: Should You Learn to Draw?

This is the second post of the Drawing Less Wrong mini sequence, in which I discuss how to draw, how learning to draw *effectively* *relates to rationality, and what the initial results were when I started running a drawing workshop, teaching people with essentially no experience.*

Information here is a combination of lessons I've learned from numerous art teachers who all agree with each other, and some of my own observations that I'm pretty confident about. When I talk about "how the brain does things" I'm using a mix of folk psychology and guesses based on my limited knowledge of neuroscience, which may not be technically accurate but should be sufficient to make useful predictions.

The Nature of Talent:

"*Am I talented enough to draw?*"

This is a question people think about a lot. It's a wrong question.

Here are a few related, relevant "right" questions:

- Do you have pre-existing skills that can be repurposed for drawing?
- How quickly are you able to acquire skills relevant to drawing?
- Do you naturally enjoy drawing?
- If not, can you easily BECOME the sort of person who naturally enjoys drawing?
- WHY and WHAT do you want to be able to draw?
- How well do you want to be able to draw? How much do you value being able to draw that well?
- How many hours of dedicated practice are you willing to put in to achieve this?

"Talent" is a real thing, but it doesn't mean what most people think it does. It's not a magical attribute you either have or don't. It's not an absolute cap on how good you're allowed to get. Talent is two different things:

- How much you naturally enjoy doing something (This is most important, and fortunately I think this is fairly easy to re-wire, though it does take effort and requires some environmental factors)
- How good you are at *improving* at something. Think of this as a "talent coefficient."

The Intrinsic Enjoyment/Improvement-Coefficient model of Talent is simplified, but like folk psychology, it's a useful way to make some predictions.[1] If you have a talent coefficient of 1 (average), and you put in 4 hours of practice, you'll get 4 hours of "effective practice." If your talent coefficient is 1.5, you'd get 6 effective hours. If your talent coefficient is .5, you'll get 2 effective hours.

And if you enjoy doing something, you will do a lot of it.

I have always been bad at sports. A lot of this can be attributed to me not really liking sports and hence not putting in much practice. But in high school, I noticed an interesting trend: We would spend a few weeks on a particular activity (basketball, badminton, tennis, volleyball). We would do the same activities each year. And at the beginning of any particular activity, I would suck at it.

I more or less liked each activity equally, and put the same effort into each. But after a few weeks, some activities I would noticeably increase in skill. Others I would not. I was terrible at basketball no matter how hard I tried. But I got better at tennis and volleyball, and I got much better at badminton.

It's possible that badminton was just an easier game (the birdie does move slower and you have a wide racket to catch it with). But I got better at badminton *relative* to other people in the class, and other non-athletic people in the class were always relatively better at me at basketball. I didn't do a formal study, but my nonscientific guesstimate is that I have a high-ish talent coefficient at badminton (maybe 1.1) and a very low talent coefficient at basketball. (.5? .2? .1?)

I'm sure that the things we naturally improve at ALSO tend to be things that we naturally enjoy doing, which confuses the issue. If you naturally improve quickly, you get to feel good about yourself sooner which inspires more effort. It also is probably an activity that feels comfortable and hence enjoyable to you. But there are also things I'm good at that I didn't become motivated to do until recently (for example, programming). So it's worth drawing the distinction.

It's also worth noting that skills like "basketball" and "drawing" are really made up of numerous sub skills. For example, various ball games can be broken down into things like:

- Being able to run quickly
- Being able to change direction while running accurately
- Being able to move your hand to intercept a moving object
- Being able to catch said object without dropping it
- Being able to throw an object accurately towards a target

(I think the key difference between basketball and badminton is my ability to *throw*. In Badminton, Tennis and even Volleyball, the way your hand interacts with the ball is very different from basketball.)

In drawing, some sub-skills might include:

- Being able to accurately observe shape and value
- Having the coordination to draw marks where you want to
- Being able to fluidly alter the pressure on your pencil to apply different line thickness/darkness in useful ways.
- Weirder skills like "being able to instill emotion into your drawing," which may be frustrating for logical-brained people to understand. I'll try to break them down later.

When I say "your Drawing Talent Coefficient," I'm referring to an approximate average of various relevant skills. If you think you can't draw, I'm about 80% sure that your drawing talent is, at worst, around .75. You probably stopped putting as much practice in at a fairly young age, and/or never received proper instruction.

Why do you want to draw?

Here's a few reasons you might want to draw:

1. You naturally enjoy drawing. You want to get better at it, but you're not trying to reach a particular level of competence. (Your terminal goal is to draw, and to improve at it enough that you notice yourself improving)
2. You enjoy being able to record interesting things on paper (these can be real things like people or imaginary things like dragons). You have a terminal goal, not of drawing, but of drawing particular things in interesting ways.
3. You enjoy the creative process - being able to design NEW interesting things. Drawing is an instrumental goal necessary to try out various ideas and see how they look, both to yourself and other people.
4. You like to be able to impress people (with good drawings - possibly drawings of cool things, possibly drawings of the particular people you're trying to impress.) Drawing is an instrumental goal towards impressing people.
5. You want money, you enjoy drawing, you think you can become good at it with less effort relative to other things, so you're considering learning to draw as an instrumental goal towards making money.

All of these are reasonable goals (possible exception of 5 - I don't know that *drawing* is a reliable way to make money, but I do think that drawing is a skill that helps build towards OTHER skills that reliably make money). But whether they're a good idea hinges on some additional information.

Like anything worth doing, learning to draw REALLY well takes somewhere on the order of 10,000 hours.[2] And even when you've put 10,000 hours in, you'll start looking at people who've put in 20,000 or 30,000 hours and you'll finally comprehend how much skill went into their work and realize how much farther you *still* have to go and you will never, ever be satisfied.

But drawing skill doesn't follow a linear curve. You'll improve more in the first hundred hours or so - a lot of sub-skills are low hanging fruit that can be quickly acquired if you dedicate yourself. If you want to make money, you'll need to put in the full 10,000. But if you want to do something reasonably cool, fun, impressive and occasionally useful, you can get achieve that in a relatively short time period.

Most kids who like drawing have probably put in close to 10,000 hours in when they reach high school. By the end of elementary school, the kids with slight advantages have made enough effort that the kids with slight disadvantages look at them and think "man, I suck at drawing." They lose whatever intrinsic motivation they had, falling further behind. They come to identify as people who "can't draw." People who can "only draw stick figures."

Most of those people are wrong. They can become good. And they don't even have to put in the 10,000 hours that the "good artist" kids put in, because most of the "artists" were spending their time doing horribly, horribly inefficient things (which is why they need to put in another 10,000 hours when they get to college and realize they were doing it wrong)

The "Right" Side of the Brain

Here's the problem: most aspiring artists are motivated by goals (1), (2) or (3). Drawing is comfortable and fun. They like drawing cool things. They like being creative.

But the comfortable, fun way to draw is not the same way to IMPROVE at drawing quickly, if your goal is to be able to draw things that other people recognize. The cool things you want to draw are not the optimal things to practice. The creativity you want to express cannot help you improve at drawing much at all until you've learned to be creative in different ways.

Learning to draw in an efficient way is initially uncomfortable. It is counterintuitive. It will feel weird and wrong. There will be a period of several hours where you will not understand why you are doing things this way, and your drawings don't seem to improve. This is because you're building up new skills essentially from scratch - skills you always had the capability to gain, but the relevant parts of your brain are extremely underdeveloped.

Art teachers in high school and college face the difficult task of convincing students (even "good" students) that they are approaching reality in a fundamentally wrong way using a horribly inefficient method, harnessing the power of the wrong parts of their brain. Most students never make the adjustment. They stick with the comfortable things that motivated them in the first place.

Learning to draw "the right way" is a high level action. Eventually you'll be able to return to the initial fun, comfortable and creative motivations that first inspired you. And you will be much better at it when you do.[4] But you must be sufficiently motivated to make it through 6-10 hours of difficult work.

If you AREN'T intrinsically motivated, you will give up, not try hard enough, and never understand why your teacher was making you do it this way.

But if you have the motivation and proper instruction, you can rewire yourself.

In 3-5 hours, you can develop an understanding of WHY you need to rewire yourself. For the next 2 hours, you'll have developed to the point that you'll understand what's SUPPOSED to be happening, but it won't be happening yet. This will be extremely frustrating. Somewhere around hour 6-10, you'll have developed new skills to the point that you can start showing improvement. (It may still not be clear to other people that you've improved. Your drawings will look messy in a particular way that others might not get. But you and other trained artists will be able to look at your drawings and see that your newfound skill is reflected in your work. And you'll probably have produced at least one drawing that untrained bystanders will recognize as much better than what you started with).

I haven't studied the issue as much past the 8 hour mark. Right now I've run two 4-hour workshops. Among students who had practically no drawing experience, my predictions proved accurate. Participants are enthusiastic for more meetups and my new, less certain predictions are:

In 12-20 hours of concentrated effort, you'll have reached a point that the average person will watch you draw and say "hey, you can draw, that's cool." If your goal was to use drawing to develop creative ideas, you'll understand how to study things so that you can synthesize new, better creative ideas. If your goal was to enjoy the process of drawing, you'll have rewired yourself so that you enjoy a new, faster process of drawing.

Low hanging fruit will start to drop off after the 20 hour mark. By the hundred hour mark, the average person will look at your work and say "Wow, that's a good drawing! You're talented!". (You'll also have been able to do that drawing in 30-60 seconds, which makes it even more impressive, if you care about that sort of thing)[5]

(I expect interest among NYC rationalists to drop off around after 4-5 sessions. I'll report on that, in addition to the report about the first two sessions that I'll be doing this week. I do not expect to get good data on the hundred-hour prediction, unless I can find good, pre-existing data about similar programs).

So... should you learn to draw?

I've given you a sense of the time involved. You can figure out how motivated you are. A big remaining question is: Can you find a good teacher?

Having a good class environment is important for many people's learning and motivation. There are a bajillion subtle things you will get wrong (or get right) and not notice - having a teacher who can identify those things is important. A major difficulty I found teaching was finding ways to articulate ideas that I've long stopped thinking about consciously. I will attempt to outline as many techniques as possible, and I may even post some youtube videos (or link to good ones I find). But the participants in my workshop all agreed that it was very useful to actually see me drawing, to understand how they were actually supposed to move their pencil.

After I've finished this sequence, if you live in the NYC area and think you want to give it a try, shoot me a PM and I'll let you know when the next workshop is. (For the time being I am not charging for this, since I'm still learning a lot myself about how to teach. That may eventually change).

If you don't live near Manhattan, look for a local figure drawing meetup or class that stresses **30 second gesture drawing**. This exercise is the crux of the material I'm presenting, and a teacher that emphasizes it will probably also emphasize a lot of the other things I talk about.

If you have previously decided you "can't draw," but are motivated to try again, I recommend going to a class that's similar to what I advocate, put in at least 8 hours, and then evaluate from there.

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[1] If Lukeprog or anyone else has information on the science (neuro or otherwise) of skill acquisition, I'd love to learn more about it.

[2] Whenever I say "expect X from Y hours of practice," I'm referring to the average person with a coefficient of 1. But I'm pretty sure the 10,000 number is a highly approximately made up number to begin with, so it's not that important. (If I give a range, like 3-5 hours, I'm accounting for ranges in talent)

[3] I know "right and left brained" isn't exactly a real thing. But the set of abilities generally associated with the Left Brain (i.e. the stuff Less Wrongians are particularly likely to favor, as well as what most novice drawers gravitate towards), are mostly the wrong abilities to be harnessing for the purpose of drawing.

[4] It actually does take extra effort to translate the kinds of skills I'm about to talk about over to "cartoonish" drawing. Cartoonish drawing is its own skill that requires it's own kind of practice. BUT you will still end up much better at drawing cartoons if you have an understanding of reality. More about that later.

[5] You may not care about drawing quickly, but fast drawing is actually an instrumental goal towards drawing well. Drawing quickly FORCES you to develop mental processes that make your drawings more energetic and interesting, which drawing slowly never will.

Drawing Less Wrong: Overview of Skills, and Relevance to Rationality

So, you've considered your past experiences and your motivations, and you've got a decent idea of the effort required of you: Six to eight hours of solid work before you start showing improvement, and about twenty hours total before you start to exhaust the low hanging fruit. You want to learn to draw. What exactly does that entail?

A lot of things, really. There's probably hundreds of subskills, techniques and bits of knowledge that go into creating a quality drawing. But I think they cluster into three main categories:

- Observation
- Technical Skill
- "Instilling Energy and Weight"

Each of these skills is developed with different exercises, requiring different mindsets. Switching between those exercises can be difficult. Studying any of them can produce something that is interesting to look at, but ultimately you want to integrate them into a single, fluid mental process. You'll need to develop some competence in each of them first. As you begin, the most important thing to remember is that *learning* to draw is not the same as actually drawing. To improve as quickly as possible you may have to set aside the reasons you wanted to draw in the first place. Don't worry - you'll achieve those terminal goals in time.

In this article I'll briefly discuss each of those skill clusters, and how I believe they relate to rationality.

Observation

The ability to see reality, as it truly is. "Reality" refers both to the physical objects and light that you're looking at, as well as to your perception of your own mental processes and how they should be interpreting those physical objects. If you have previous rationality training, this is where I expect it to benefit you the most. Your model of reality will be flawed, and you'll need to fix it. Existing ability to notice biases and counter them should give you an advantage.

The advantage *may* come in reduced study time (I'd need a lot of data to confirm this) but mostly of the advantage will come from willingness to actually study effectively in the first place (this is a genuinely big deal). With minimal instruction, you could probably figure out where your biases lie and how to fix them. Some knowledge of cognitive science might even give you insight as to where and why they might be flawed. I'd be interested if someone without much drawing experience attempted to predict their biases in advance, once before having drawn at all in the recent past, and once again after one or two drawings.

It would still take a long time to do that, which is why in the next article I'm going to give away a lot of common answers. As a bonus rationality exercise you may want to predict those answers in advance. (For the benefit of others, leave your answers encrypted in the comments)

I'm not sure how to test for it, but I believe the skills here can transfer to other domains, if one deliberately made the attempt.

Technical Skill:

The ability to control your pencil, moving it in the direction you want it to go, applying different amounts of pressure to make it darker or lighter, thicker or thinner. As your observation and technical skill improve together, you'll learn to identify important parts of reality, and use pencil techniques to emphasize them properly. It's important to develop a minimal threshold of technical skill. But afterwards, it can wait until you've gotten a solid understanding of Observation, Energy and Weight.

Nine thousand hours practicing technical skill is what makes the difference between a competent amateur and a professional. A few of those hours will yield low hanging fruit, but not many. Rationality won't be particularly relevant here. I'll be doing one article that covers the basics, and later on I'll link some online tutorials that may be useful *after* you've put in an initial twenty hours or so.

Instilling Energy and Weight

This is the most mysterious of the skill clusters. It's (fairly) obvious to a lay person that they need to look at things and practice moving their pencil in order to improve at drawing. That's what high school art students focus on. But their drawings feel flat, and lifeless. They'll copy something from a photo and there won't be anything obviously wrong. It's just... boring somehow.

The problem was that the technical skill they developed focused on small, slow, precise movements. To instill energy and weight, you need to be able to draw big, bold lines, and to draw them quickly. They require a kind of hand-eye coordination (and more importantly, arm-eye coordination) that you've probably never developed. The first big, bold lines you draw will look hopelessly wrong against reality. You need to keep practicing, until your entire arm can do what your brain wants it to. Until then, much of the technical skill you acquire won't be implemented correctly.

The harder part is the that to instill energy and weight, you may sometimes need to NOT draw the reality you see.[1] As this skill develops alongside technical knowledge, kinesthetic skill and observational ability, you'll learn how to draw lines that differ from reality to make your drawing more interesting and creative, without sacrificing a realistic look that captures the original likeness. And you'll need to start doing this with a part of your brain so small and underdeveloped that it doesn't even show up on your model of yourself.

Your rationality training will probably not help you, because it doesn't directly prepare for this sort of thing. The actual skills you're developing here are kinesthetic, not high level cognition. But I think preparing for this sort of thing is a kind of instrumental rationality technique we *should* be working on. This weirdness you feel as you practice, the certainty that your teacher is screwing with you and that you should go back to the comfortable ways you're familiar with... this is the feeling of your model being _wrong_, and butting up uncomfortably against reality of how your brain works. Not just getting a fact wrong. Not even failing to ask the right questions in the first place, but lacking the sense capabilities needed to even interact with the part of

reality you needed to see in order to ask those questions. It's having your decision-making algorithm *be* wrong on a gut level that can't really be explained, only experienced.[2]

I think this is among the more important experiences that drawing offers[3], if the effort is made to understand it. Obviously, not every "wrong" feeling you ever have will stem from a model-reality mismatch. Sometimes when something feels wrong, it really is wrong. "Wrong" feelings are still evidence. But they are not absolute evidence.

Yes, I know you already "knew" that. But unless you've already had a similar experience, you probably didn't really understand it on a gut level. Being able to recognize when you're approaching things is a fundamentally wrong way, and be okay with it, is an incredibly important skill. And because each way of being fundamentally wrong is slightly different, we could use a variety of examples in order to better understand new ones in the future.

Existing Less Wrong literature has two areas that I consider to have helped build this skill for me. One was the overall "woah" moment when I realized I should actually incorporate the Singularity into my model of the world (Even this doesn't really count, because the "that can't possibly be right" feeling was accompanied by "it would be *sooo cooool* if it were!" instead of "ugh this is painful to think about). The other was the emphasis that quantum physics isn't weird, YOU are. Those realizations may have more serious consequences on how I interpret the world, but the experiences themselves were weird on a similar level. Plenty of other content here *talks* about this sort of thing, but there's a limited number of ways to actually experience being wrong in this way. I think we need more of that.

Somewhere in your brain is an invisible mental-muscle that you never knew existed.[4] You'll need to trust that it exists, and start practicing with it. Eventually you'll be able to "see" that part of your mind, and you'll incorporate it into your model of yourself.

And then you can learn how to make interesting depictions of reality.

Perhaps more importantly, you can learn to create Art™.

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[1] Many readers may notice that this statement... really makes no sense. That's because it's a simplification. I'll explain the more complex rule that actually governs it in a later post. Feel free to speculate in the comments about why I chose to simplify it that way.

[2] I know that's three posts in a row where I hint at the same mysterious thing. I'm building it up because it's important and needs to be emphasized. You're still not going to really understand it until a teacher makes you do it and helps explain some kinesthetic things that I'm going to have a hard time communicating through written text. Three posts from now I'll attempt to explain it well enough that you'll understand the teacher the first or second time e explains it, rather then after many frustrating hours.

[3] I do NOT recommend people learn to draw purely to experience this feeling of wrongness. In order for any of this to work you need to be instrinsically motivated.

[4] This may technically be untrue, if you HAVE already become aware of this mental-muscle and used it in some fashion. It may not even strike you as an odd thing, if you've had it for a while. But I'm willing to bet it'll be a new thing for most people here. I actually think we'll have a higher percentage of people who have a particularly hard time working with it.

Drawing Less Wrong: Observing Reality

To draw a city, you must walk around that city and look at it.

You can't sit in a room with the blinds closed and create a map and expect it to be accurate. You cannot draw what you cannot see. To draw things, you need to look a things. This is surprisingly hard for a few reasons.

One is that you may want to be drawing imaginary things. I'll talk about this at length in the a later post. For now, let me just say that you can't *learn* to draw realistically (even realistic fantasy) by drawing things that aren't real.

Another reason is that when people begin, they do not have very good hand-eye coordination. Your can't trust your hand to move on its own - you feel like you must be watching it the entire time, staring intently at the pen and paper and making sure they're doing what you want them to. Coupled with this is a gross overconfidence in how good your memory is.

The third, and most significant reason, is that you don't know how to see in the first place.

How you will probably draw

(even knowing this is how you will probably draw)

Inexperienced artists will take a look at their subject, create a mental map of them in their brain, and then turn back to their paper. Slowly, carefully, they draw lines corresponding to that mental representation. Occasionally they may look up - but in the moment they look up, their finger slips and they draw a line that's completely inaccurate. This reinforces the mistrust in their hand-eye coordination, so they spend more and more time focusing down on their paper.

At the same time, as their drawing takes shape, it starts to look interesting. They've already stopped looking at the reality in front of them, but now they start getting distracted from their mental model. If you're drawing a human, you might get get focused on their eyes. You spend a lot of time on them, and they become the new map from which you navigate. You draw the nose or the lips based on where you drew eyes, the chin based on the lips. Your pencil journeys through a map by following a map which was following a map. You work from one small, interesting area to another, never considering how the drawing will work as a whole. Occasionally you'll think back to the original mental model in your head, but it will have grown fuzzy by this point.

And all this time, you probably drew slowly, using small, careful lines. Because after all, your hand-eye coordination is untrustworthy, and you wouldn't want to draw something too big and sloppy.

Minutes go by. Eventually you'll look back up at the real territory that was in front of you, and all the lines will be off. You drew the legs crossed when they were wide apart. The elbow is pointed up rather than sideways. The lips, nose and eyes, rather than forming a straight line up the center of the face, are crooked - each one slightly off, and referencing the lines of the previous one until they had little relation to the actual face.

Your conscious mind won't process most of this. The drawing will just feel "off".

In that moment, you're in the middle of a kinesthetic process that *felt* like the right way to do it, so you probably won't realize the obvious problem: you should never have been drawing from a mental representation in the first place, you should have been drawing directly from the reality in front of you.

How You Should Actually Draw

An unfortunate truth for beginners is that you must spend most of your time looking at your subject, and that you must also spend most of your time actually drawing. But you don't have the technical skill necessary to do both of those things at once without your drawings looking horrendous.

(First off, be okay with your drawings looking horrendous. You're building new skills from scratch. Your drawings WILL look messy. That's fine.)

To start with, develop a habit of spending at least half of your time looking at your subject, switching back and forth every 2-3 seconds. If you've spent more than 5 seconds looking at your drawing, it's time to look back up and make sure the lips you're drawing are in the right spot compared against the REAL chin and the REAL eyes. This actually isn't too hard, except that you'll forget a lot. Having a teacher to remind you to stop looking at the paper will be helpful. If you don't have a teacher handy, find a person to draw and ask them to remind you to look at them if they notice you staring at the page too much.

A step up from this is to practice making pencil strokes *while* you're not looking at the paper. Eventually you want to be able to do this for extended periods of time. For now, a good technique is to allow yourself to look at the page as often as you want, but *_only_* make marks while you're looking at your subject. (In practice this also means drawing for 2-3 seconds at a time, and glancing down to make sure your pencil hasn't gotten lost)

Again, your first several strokes following this technique may come out very off. Don't worry about that.

The problem with Mapmakers, and Territory

So, one big problem is that you aren't going to naturally look at things, and your underdeveloped coordination will reinforce this.

But there's another problem - a huge problem. Which is that even when you're looking at something, you're usually not actually "seeing" it.

Human brains take a lot of shortcuts when they're observing things. When you look at a person, what you perceive is not a series of shapes and colors that correspond to what's there, but rather a bunch of hastily constructed symbols that convey the information that the brain thinks is important. If you haven't rewired your brain for drawing, then "important" questions do not include "*Is that elbow angled at 90 degrees or 75?*" or "*Where are the eyes in relation to the top of the head?*" Instead, what you usually care about are things like "is this person happy, or angry?" and the information that gets recorded is a little tag that says "Smiling" with a vague curving-upwards-line symbol accompanying it.

A large chunk of the information we usually need has to do with the face. This plays a role in two common biases that are near-universal in inexperienced artists:

- Drawing the head much larger than it actually is, compared to the rest of the body
- Drawing the "face" (i.e. everything between the eyebrows and mouth) as if they took up the entire head rather the bottom half. Practically everything above the eyebrows conveys no relevant information, so it's just ignored.

Your brain has a mental model of what a human is "supposed" to look like, and that model is wrong. You can see major gains in drawing capability just by learning the "ideal" proportions of a human being. Most humans are shaped pretty similarly. But I'm hesitant to just give you that information, because it can actually be damaging. A few reasons why:

1. Not all people are shaped the same
2. "Shapes" change dramatically depending on how a person is posed.
3. You probably want to learn to draw things other than humans, at some point.

It's not good enough to create a more accurate model of what people are "supposed" to be. You need to look at a subject and discard all your preconceived notions of what they are "supposed" to look like, along with all the symbols and names that your verbal center assigns to the pieces. You need to ignore the little tags that say "face" and "arms" and "hands" and "torso," and instead see the lines, shapes, colors and shadows that are there in reality.

"Drawing on the Right Side of the Brain" (Again)

Much of our knowledge of how this works and how to improve the process is relatively recent. In 1969, an art teacher named Betty Edwards was frustrated with her students, some of whom were having extreme difficulty. They could clearly see where things were, but that knowledge didn't translate into the drawing.

> "*Can you see that the orange in this still life is clearly in front of the vase?*"
>
> "*Yes.*"
>
> "*Well, in your drawing, you have the orange and the vase occupying the same space.*"
>
> "*Yeah I know. I didn't know how to draw that.*"

On a whim, she asked students to copy a painting while it was upside down. There was an immediate, dramatic improvement.

"*How can you draw upside down when you can't draw right side up!?*"

"*Upside down, we didn't know what we were drawing!*"

That experiment prompted a series of questions and investigations that led Edwards to the neuroscience of the time, which suggested that humans used two major processing centers, located in different hemispheres of the brain. The "left brain" dealt with verbal and analytic processing. The "right brain" dealt with visual and perceptual processing. Many people naturally draw using their left brain, which wants to name things and refer to existing knowledge about them. Edwards developed a series of techniques to suppress the left brain so that right brain processes can take over. She published a book in 1979 called "Drawing on the Right Side of the Brain," that discussed her research and the accompanying exercises.

(Later on, neuroscientists learned that while the two processing centers are real, they are not neatly divided between brain hemispheres. The modern edition of the book uses the terms "left mode" and "right mode" to distinguish between the modes of thought)

The book has become extremely influential within the art field, and in recent years Edwards has worked to find ways to transfer "right mode thinking" into areas beyond drawing. In corporate seminars (typically lasting three days), she spends the first day and a half teaching employees how to observe and draw. The second day and half, she helps them outline workplace problems using drawn visual metaphors, which allow them see things from multiple perspectives and stumble upon solutions that seemed obvious in retrospect, but which had gone unnoticed (in one case, for decades).

Edwards breaks down drawing into five main subskills:

- The perception of edges
- The perception of spaces
- The perception of relationships
- The perception of light and shadow
- The perception of the whole, or gestalt

She considers these the building blocks necessary to develop two final skills: Drawing from memory, and drawing from your imagination.

Integrating Observation and "Gestural Thought"

Eventually, your goal is to be able to do observe near instantly. The 30-second gesture drawings are important because they train you to evaluate and draw in one fluid stroke of thought and pencil. In less than five seconds you should be able to draw a line that describes the general size and shape of the body, and a small ovoid shape that describes the relative size of the head.

But that will be difficult, until you've practiced several slower-paced exercises that develop your ability to see reality and compare objects to each other. In my first

workshop I realized that it's difficult to develop "gestural thought" unless you can do one of the following:

1. Construct a mental model of your subject in a matter of seconds (and be able to revise it on the fly)
2. Have a pre-existing model (i.e. "ideal proportions") to use as your starting point, which you then fix as you have time to observe in more detail.
3. Spend time observing your subject, creating a specific model of them, before you begin drawing.

I'm still experimenting with the ideal order to present various exercises, to develop sufficient observational skill as quickly as possible. As I noted in the last installment, observation and "gestural thought" require different types of thinking that initially will be hard to switch between. Giving them time to gel independently is important, but I believe students should learn to integrate them as quickly as possible. My students and I both made progress in second workshop (mostly by using the third technique listed above), and there is definitely room for improvement.

In a future post I'll be outlining some specific exercises to develop observation. Several of which will be lifted directly from Edwards' book, others developed from my teaching experiences. Developing your observation will, initially, involve many slow-paced exercises. Some focus on helping you break down the barrier between "left mode" and "right mode" thinking, but typically won't be used as often when creating a polished piece of art. Others specifically develop the skills you'll use to observe during "regular" drawing.

The goal will be to develop a baseline competence in observation, so that you can continue to develop it simultaneously alongside your ability to work quickly and energetically.

Drawing Less Wrong: Technical Skill

The ability to observe is probably at least 2/3rds of what separates non-artists from amateur artists. But those 2/3rds are near-useless without the ability to move your pencil the way your eyes want to it to go. And once you've transitioned into an amateur artist, around 9,000 hours of honing your technical skill is what separates you from a professional.

"Technical Skill" is a broad term - kind of a catch all for all term for various motor skills you'll need to develop, background knowledge about how particular types of lines and shapes are perceived by most humans, and how to combine those skills and knowledge to produce particular effects with your drawing.

I can't even begin to cover all of it, and most of it isn't really appropriate for Less Wrong. But I will talk about some key motor skills that tie in with the next article, and a significant bias that plays a role in them.

This article was challenging to write - distilling a kinesthetic process into written words is difficult. This article will not be a substitute for having a teacher and a model, nor will it tell you exactly what exercises to do. But it will try to lay down some concepts that I'll further expound on later.

Holding the Pencil

For many of you this may seem basic, but at least one reader commented that they went for years without understanding this, and because it seemed basic, nobody ever noticed it and corrected them.

Holding a pencil should look approximately like this:

But its a bit more complicated that that. Many skilled artists hold the pencil in different ways. The biggest things to keep in mind are:

1. Don't grip the pencil too tightly. You'll hurt yourself, and it won't help.
2. If you hold the pencil closer to the tip, you will have more control over it, which is useful for fine details.
3. If you hold the pencil towards the back of the pencil, you'll have greater range of motion, and allows you to quickly draw larger lines in a single stroke. It also will be looser, which can feel hard to control but can also produce certain line qualities you may want.

(I personally tend to hold my pencil similar to the image above, but closer to the middle of the pencil)

A few examples of a pencil grip in motion:

This man's grip is similar to mine, although the technique he describes isn't something I think you should be worrying about just yet. (I'll be talking about Darrel Tank's website later on - I think he has good tutorials on technical skills, but does not prioritize them based on their low-hanging-fruit-ness.)

This cartoonist switches grips a few times, demonstrating how they can be useful at different stages of drawing. This video is particularly interesting because his "loose" grip is actually closer to the front, which I haven't seen often.

Slow Drawing and the Sunk Cost Fallacy

I've spoken a few times about "slow, small, precise lines," and implied that they are a terrible idea. They often are. You'll be drawing slowly during some initial exercises that develop observational skills. But as soon as possible, you'll want to start developing a form of hand-eye coordination that involves moving quickly using long lines. Until you achieve that, the small, meticulous lines will probably have a choppy quality, and certain compositions will be harder to capture.

Much of the "energy" of your drawing1, and the quality of the composition, will be established within the first one to two minutes. This isn't a hard and fast rule, but holds true most of the time. Yes, you can erase, and rework things. With pure observation, infinite time and brute-force-reworking, you can craft a drawing that perfectly captures reality. But every time you erase and fix a drawing, two things happen:

One is that the paper smudges, tears slightly and otherwise degrades. This might be okay if you're working on a computer tablet, but so long as you're practicing with a real pencil, it's an issue. After erasing 5-10 times, your drawing will have noticeably degraded. It's not game over, but you'll have to work harder to overcome it.2

The other, more important concern, is that the more you've drawn, the more you're attached to the existing sections of the drawing. Say you've drawn an arm bent awkwardly. You can erase it and fix it. But the arm doesn't exist in isolation. It connects to the shoulder, which connects to the torso and neck. Fix the arm, and you have fix the all those other things.

You probably won't *want* to fix them all, because it will feel too sad for you to have to erase large sections of your drawing. And even if you DO fix them all, the result won't be a fluid, graceful image that captures the motion and interconnected muscles of your subject - it'll be a hodge podge of Frankensteinian bodyparts, awkwardly sewn together.

(There's also anchoring involved: once a line exists, you'll have trouble evaluating new lines on their own merits, instead of how they compare to the existing ones.)

Several times over the past year, I've worked on a drawing of a person for 5-10 minutes. By the 1 minute mark, I know something's off about the drawing. By the 2 minute mark, I've started erasing and reworking things. I have a nagging sense that I've done this before, and that the next 8 minutes will involve lots of erasing, and a drawing that still isn't very good.

10 minutes, and lots of erasings later, I have a disappointing drawing.

The nagging sensation that this isn't going to work well... that's what the sunk cost fallacy feels like. You've put in a few minutes of work (sometimes much longer - you can go down this path for hours). Starting over would feel like defeat, like your previous work was a waste.

The correct action is to start over anyway. It's true when you've only been working for a minute and have just noticed the feeling. It's still true 10 minutes later. It's still true if you've spent 4 hours painstakingly erasing and doublechecking against reality, adding lots of nuanced shading. It's an oddly near-universal truism, not just in drawing but in many projects, that the thing you just spent 4 hours working on, which would take another 4 hours to finish, could be done in 10-30 minutes if you started over.3

There are reasons to spend 4 hours on a drawing. Those reasons will not be relevant to you in the near future. All the most important elements of a drawing should take you no more than a few minutes. After that, you're getting distracted by details, which might make the drawing more interesting, but won't actually fix the existing problems with it.

Most importantly, it won't help you learn to avoid those problems in the first place.

Fast, Confident Lines

So, you need to capture the most important elements of a drawing, quickly:

- You need to capture how different body parts connect together, as a seamless whole.
- You need to establish a good composition, so that the details you work in later aren't just reinforcing a bad design.
- I haven't elaborated on it yet, but you're going to want an energetic, interesting drawing, which is simply hard to compose without working quickly.

To do all this, you need to develop a particular kind of hand-eye coordination, which is probably different than what you're used to. *You need to be able to draw large sections of the body, using a single line.* That line can change direction. But it needs to be done in one fluid motion.

This artist demonstrates what I mean by "confident lines." She blocks out large chunks of body with long curves, without second guessing. She doesn't bother drawing the arms or feet, but she does end those lines AFTER they've curved in a new direction, so if/when she continues them she's set herself to continue them gracefully.

No Erasing

You need to work quickly, and fluidly. Stopping to erase will interrupt your flow. So you need to learn to draw without erasing. There are two ways of doing that:

1) Don't make mistakes ever.

This actually is not as unreasonable as it sounds. In the first 30 seconds, identify the most important lines of the drawing, and draw them. It's what the artist in the previous video did. Obviously, this is... essentially impossible for a beginner. You're going to make mistakes. But what you CAN do is draw boldly, confidently, let the mistakes happen, and then rather than trying to fix them, move on to the next drawing after 30 seconds. Over time you'll get better.

I haven't watched new students try to learn with JUST this philosophy, and I have no idea how long it'd take to develop from scratch. But if you DO have some previous drawing experience, I think this may be a good approach, at least to try out. If your goal is to produce something like the woman in the video, drawing 5 drawings in 30 seconds with simple, bold lines will probably produce at least one drawing that's better than the one you'd do in two and a half minutes.

2) Be okay with your drawing being messy.

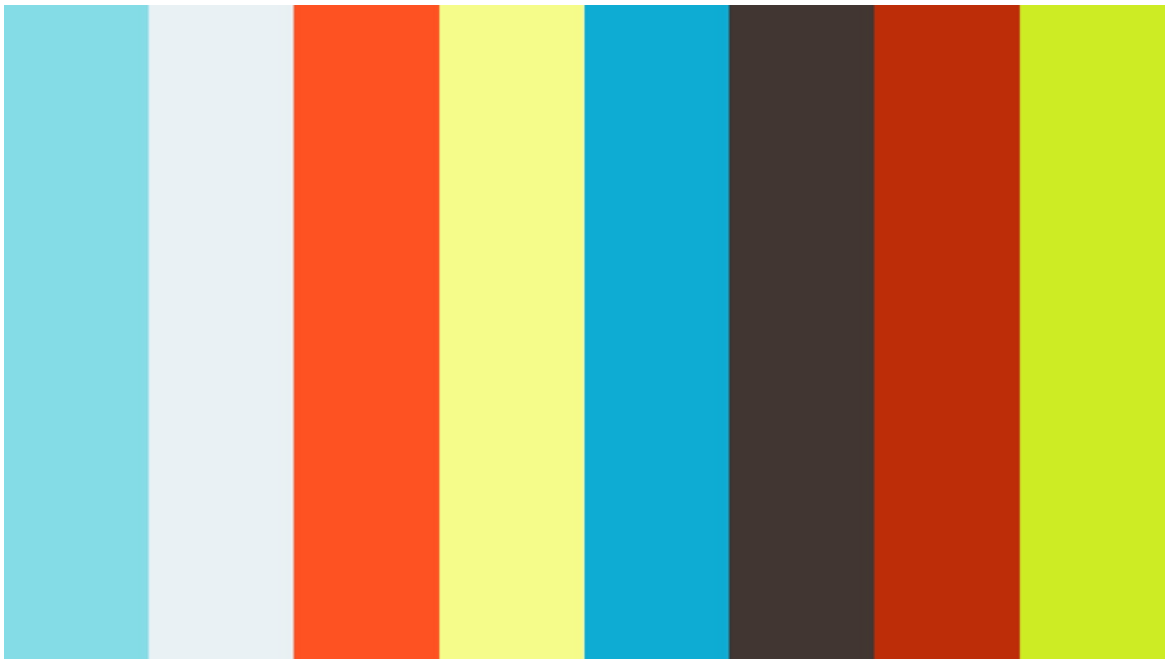
This is what I actually recommend for beginners.

A big hurdle young artists have, when they're transitioning onto the path of a "professional", is they feel that "messy is bad." They're drawing like this:

[2017 Note: this used to be a link to a perfectly bad high school Dragonball Z fan-art, which was really useful for highlighting the sort of error modes I was pointing at, but a) it was sort of mean to use it, b) in 2017 the link is apparently dead, c) I was unable to find another example that illustrated the exact qualities I want to point to]

*[Followup: Someone volunteered this old high school art, which doesn't **quite** hit on the same set of issues but works well enough to illustrate the basic concept]*

When they should be drawing like this:



They're looking at the former, and seeing it as a fairly clean drawing that just needs to be fixed a little.

A college professor looks at Example A, cringes, and thinks "man this person is going to need to systematically broken down over the course of two semesters until they're ready to begin learning, and it's going to be painful for the both of us." They look at Example B and think "This person knows exactly what to do already, they just need to do it for another 10,000 hours."

The problem with Example A is that the artist is copying superficial elements of a particular style, without understanding the underlying principles that make good a good figure drawing. Example B has lots of overlapping lines, and vague messy shapes. But the figures there communicate a good understanding of anatomy, a grasp of weight, decent composition.

As an aspiring artist, don't ask if your drawing is better than A. Ask if it's at least as good as Example B. If you want to draw truly good Manga art, you must first learn things OTHER than the superficial characteristics of Manga. And while it may look like a mess at first, as you learn to draw that way, you'll understand that there's actually a lot of information there that Example A has missed.

(No offense to those of you out there currently drawing Example A. I've been there. It's a rite of passage. In particular, no offense to the blog I took Example A from. The blogger identifies it as one of their old, middle school works and gives other examples that show a lot of improvement. I tried to draw my own version of Example A, but it's actually really hard for me to draw that particular way now, and I can't find any older examples).

Begin Light, Emphasize with Darks

One important part of technical skill is being able to draw lines in the location you want them. Another important part is being able to adjust the lightness or darkness of those lines (as well as thick and thin-ness)

Your drawings are going to be messy. But you want a particular kind of mess. If you look at the right-most figure in Example B, you'll see that all the lines are the same thickness. This is okay - the artist has enough skill that they're all approximately correct, and the ones that are off have been repurposed - instead of being pure mess, they end up representing the volume of the figure.

The cluster of scribbles in the face suggest its roundness, and having a bunch of them devalues the importance of each individual line, so that even if none of them end *perfect*, your brain doesn't really care - it sees that they're all sort of fuzzy and accepts the average position in a sort of "Wisdom of Crowds" way.

It's okay that all the lines are the same thickness, because none of them are *completely* off. There's no giant leg that accidentally stuck out way too far and ruined the image. If it had, it'd be really hard to repair the drawing. Especially since you're trying to work quickly, without erasing.

You're going to be making significant mistakes, and you won't want to start over *every* single time.

The solution is to do your early work *lightly,* and then, once you've identified the parts you like, use dark lines to emphasize those areas. This tutorial demonstrates how to draw like this. Notice that within 30 seconds, he's established a framework, without worrying about making any "clean" shapes. Over the course of 2 minutes, he builds on that framework, filling in the mass of his subject matter, and eventually adding much darker lines to emphasize the final shape.

To do this, you need to be able to adjust the "value" of your lines (how light or dark they are). This takes some practice. A good exercise is to create a sequence of value-swatches like this:

Begin with the swatches on the far sides - make the darkest dark and lightest light you can possibly do. Then try and fill in the rest, gradually darkening.

Begin your drawing with something close to the second-lightest swatch. For now, try not to get much darker - it's easy to accidentally get too dark too quickly, and then are your lines are uniformly black and you can't emphasize the parts you want.

So... Recap:

These are only some of the skills you'll need to acquire, but they're the most important in the immediate future. So in summary:

- Hold the pencil with three fingers, not too tightly.
- Don't be afraid to start over.
- Work quickly, without stopping to erase.
- Draw strong, confident lines.
- Be okay with your drawing being messy - let extra lines help define the form.
- Start with light lines, make your mistakes, then emphasize the good parts with dark lines.

[0] There's something akin to anchoring bias here as well - once part of the drawing exists, even if you're trying to completely ignore it, it'll be warping your perception of what's actually going on.

[1] I promise I'll explain what I mean by "energy" soon.

[2] Each drawing tool has separate rules that need mastering. This includes pencils, charcoal, fountain pens... and computer tablets. I'll be specifically talking about the pencil

here. Information here WILL still generalize to tablets, but I'll warn you that you'll experience some awkwardness transitioning to or from them.

[3] *Why* starting over saves time is a complex question. Part of it has to do with you already having studied the problem. Part of it is that a fresh canvas frees you from bias towards your old solutions. Part of it is that your existing work is suboptimal, and you'd need to spend extra time fixing it.

[Final 2017 note: We are now at the abrupt ending I warned you about. Sorry!]