The Exceptionally Simple Theory of Sketching

Why do professional sketches look beautiful?

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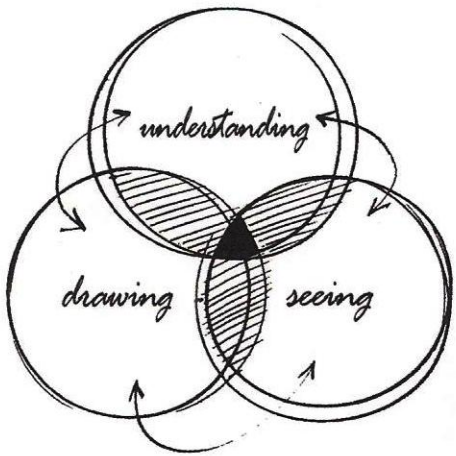
The Why of Sketching

Draw like a professional and you will be a professional.

Some people make rough, fast, nonchalant sketches and they look brilliant. For others, it takes hours of blood, sweat and tears to produce drawings that are accurate yet still look unprofessional. The question is why?

As a lecturer in cognitive ergonomics at the Rotterdam University of Applied Sciences, I consider human reactions to visual information, and I also teach sketching. So I thought that if I could analyze and describe how our mind reacts to different aspects of handmade sketches, I would be able to teach drawing skills much more easily.



Sometimes I meet an 'old school' teacher of sketching whose main aim is to teach people to draw accurately. I am convinced that this traditional way of learning to draw is fundamentally wrong, because even if people learn to draw accurately, their drawings do not convince. That frustrates people and makes them avoid drawing altogether instead of practising their craft. Fear and uncertainty is then visible in all their work, and they fail to improve.

Salvador Dalí, the famous Spanish painter, once said: "If you act like a genius you will be a genius!" This is especially true when it comes to sketching.

I believe that you must first learn how to make your drawings look like they are the work of a professional and leave the matter of accuracy for later. If you do so, then all your drawings will look professional, whether they are accurate or not. You will achieve much more success even after a few drawing sessions, and things can only improve.

People who cannot draw well usually think that professional sketching is a complex and difficult process. But after reading this book you will find out that even the most complex sketches are just a structure of very simple but confidentially drawn segments layered on top of one another.

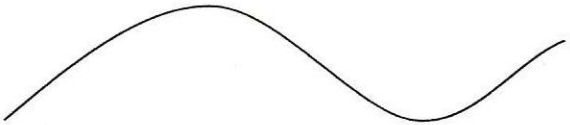
In this book I will simply show which features make drawings look professional, and why. You will learn that sketching is more about understanding human reactions to drawings than about mastering techniques or possessing any special skill or talent.

This book will not discuss themes like perspective or how to construct accurate drawings. Nor will it provide details about applying various techniques. Lots of excellent books about such matters are already available. This book is about the 'the why' of sketching. Why do professional sketches look beautiful?

The line

The line is where it all begins.

The line is the most important element. It's what lends your drawing its fundamental character. Some good lines are all you need to produce a beautiful drawing. By definition, a line is a geometric figure formed by a point moving along a path in a two- or three-dimensional space. It can be straight or curved. Lines have a uniform thickness and variable curvature. The best way to create them is with a computer, as I did here:



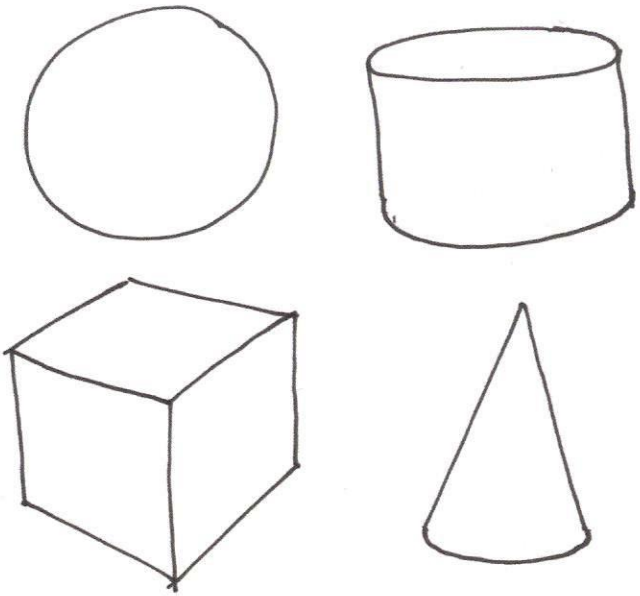
These lines are perfect, but they have fewer characteristics than hand-drawn lines. That is why, despite their perfection, they are quite boring. They don't look like something made by a creative mind or with special skill.

Lines that are drawn by humans have much more character. They have personality and are much more alive. They can express creative skill and craftsmanship, and they have a lot more attributes like variable thickness and accuracy, and dynamic features like smoothness, speediness, easiness, fluency and so on. That is why computer software like SketchBook Pro from Autodesk tries to imitate handmade drawings.

Accuracy versus dynamism

Beginners concentrate on accuracy.

The main problem with learning to sketch is that most beginners focus too much on accuracy. They draw slowly and with concentration. But because humans don't have rulers, compasses and templates built into their hands, their slow lines never look dynamic and confident. Instead, they look crooked and tentative. In addition, lots of tiny inaccuracies become more prominent because of the erroneous desire to draw everything with one single line.



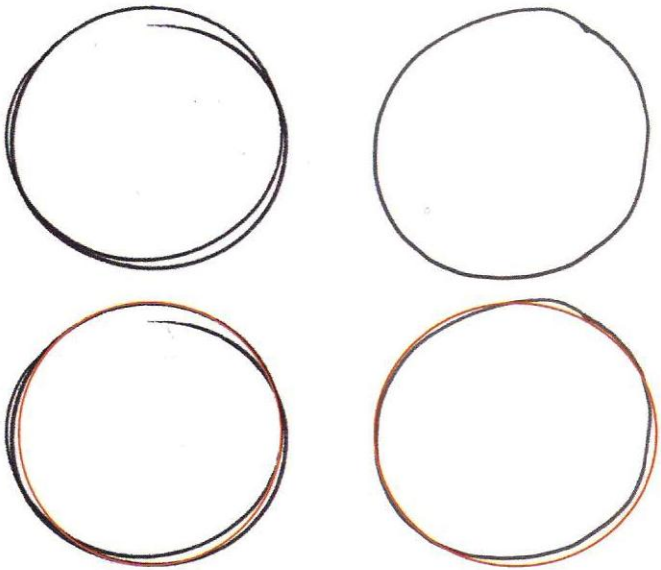
These drawings look unprofessional and uncertain despite the fact that some of them are quite accurate. There is no sign of confidence, ease or dynamism in these drawings, nor any sign of an intelligent creative process.

Accuracy versus dynamism

Concentrate more on dynamism and fluency than on accuracy.

Dynamism is much more important to the human eye than accuracy. We prefer a drawing that looks dynamic yet less accurate to a drawing that is more accurate yet less dynamic.

Look at the following two circles. Our brain judges emotionally. It will prefer the less accurate but dynamically drawn circle on the left to the more accurate one on the right. That is because dynamic lines express confidence and ease, and these features seem more important to humans than accuracy.



Look at the difference with the perfect orange circle. The drawing on the right is twice as accurate as the drawing on the left, yet the left one looks much better.

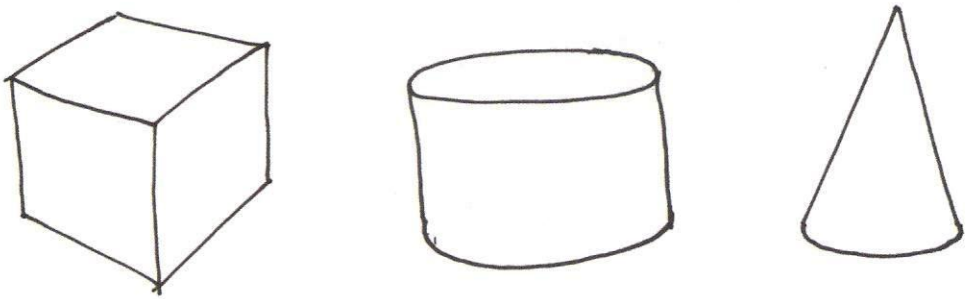
The problem is that when you draw slowly you concentrate a lot. As you draw the line your brain is checking its accuracy, continuously controlling the movement of your hand. The tension in the muscles in your hand changes because of the constant corrections. That is why you always end up with slightly crooked lines. The more you try to draw accurately, the less confident your lines will be.

But if you draw just slightly faster, there will be no time for minor corrections and the lines will look much smoother. They will express dynamism and confidence and look much better even if the lines are not exactly where they should be.

Single versus multiple lines

Your brain can project the perfect line in between.

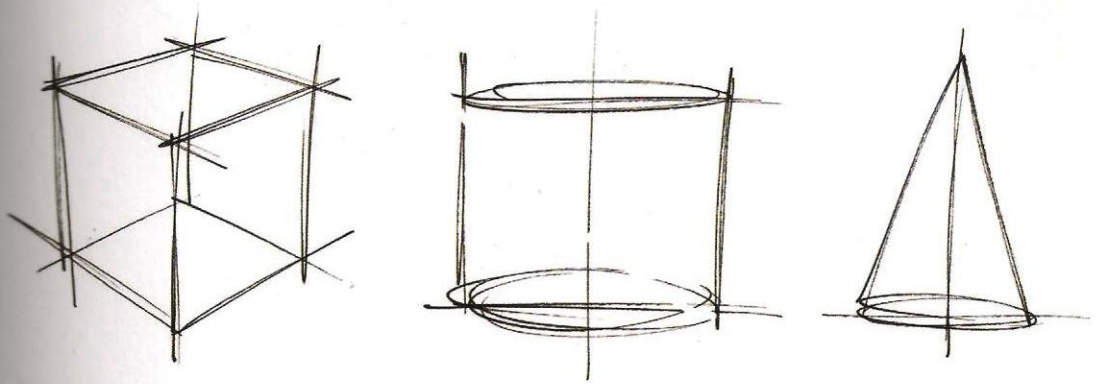
If you look at professional handmade sketches, you will see that there are often multiple lines on top of one another. But if you use just a single line, all inaccuracies become very prominent.



Single lines make the tiniest inaccuracy prominent.

When you use multiple lines, however, your brain will abstractly average the multiple lines and read the perfect one between them, even if it is not there at all.

Just 2 or 3 lines at most are usually enough. More lines will only make your sketch look messy. Another common option is to use multiple thin lines and then highlight the best ones with a thicker pen. It is almost impossible to draw a good circle or ellipse in a freehand manner using only one single line.



With multiple lines, your brain reads the perfect average between them.

Single versus multiple lines

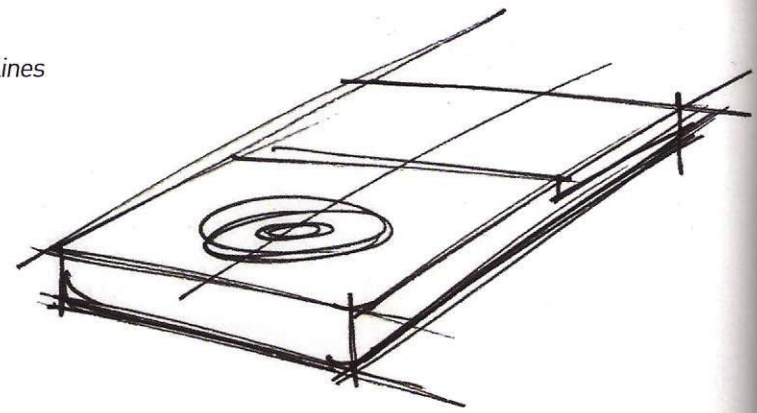
Perfect single lines.

If you sketch very precise and geometrically shaped products like electronic flatscreen devices, there is no space for multiple lines along the fine edges. The sketch has to be executed perfectly with as many single lines as possible.

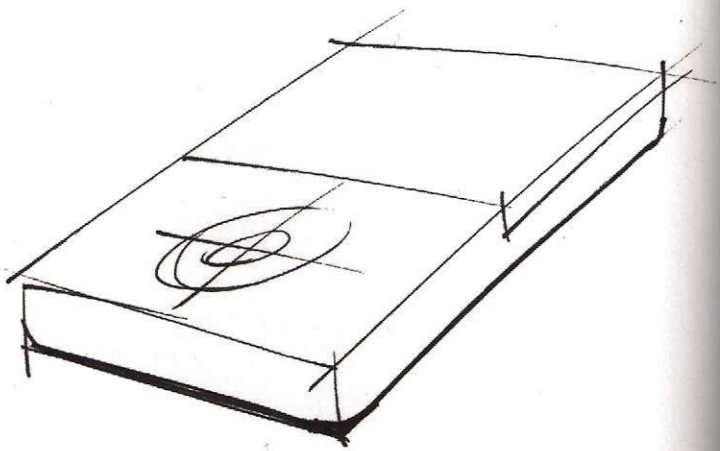
You can choose from the following options:

1. Practice a lot until you are confident you can draw the lines in the right place at once.
2. Try it a number of times and select the best result.
3. Sketch with a light pencil and trace over it with a pen.
4. Use rulers and templates.

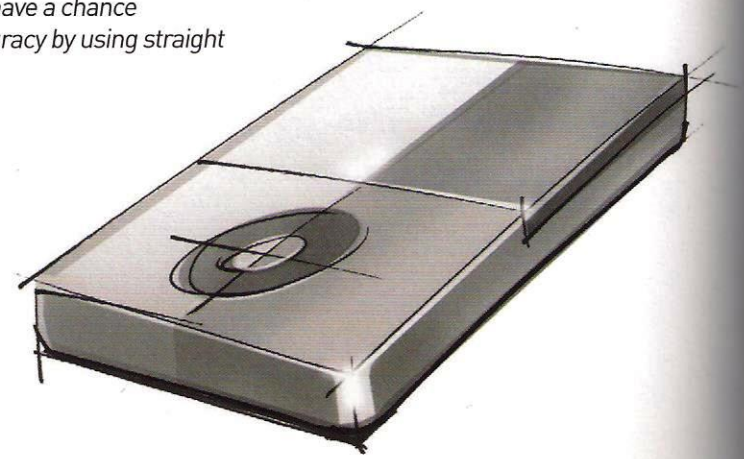
1) There is no place for multiple lines along the fine edges.



2) The drawing must be made with as many single lines as possible.



3) When you colour it in, you still have a chance to increase the perception of accuracy by using straight reflection lines in critical places.



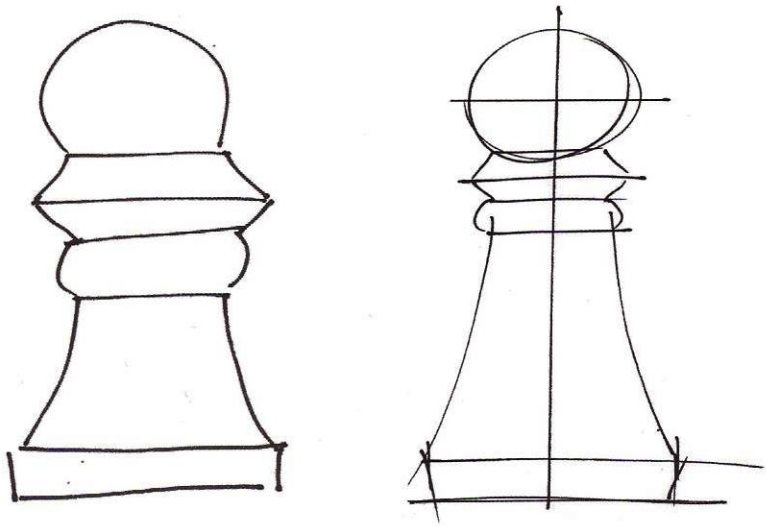
Construction lines

Intelligent design.

Drawing is visual communication. It allows you to communicate important suggestions. Visible construction lines suggest that your sketch is the result of an intelligent creative process.

Construction lines tell the story of how the drawing was created. That is why a sketch with construction lines is much more interesting and meaningful than one without them.

These extra lines also help orientation as you start to draw. They hide minor inaccuracies and strengthen the illusion of accuracy even if your drawing is not perfect.



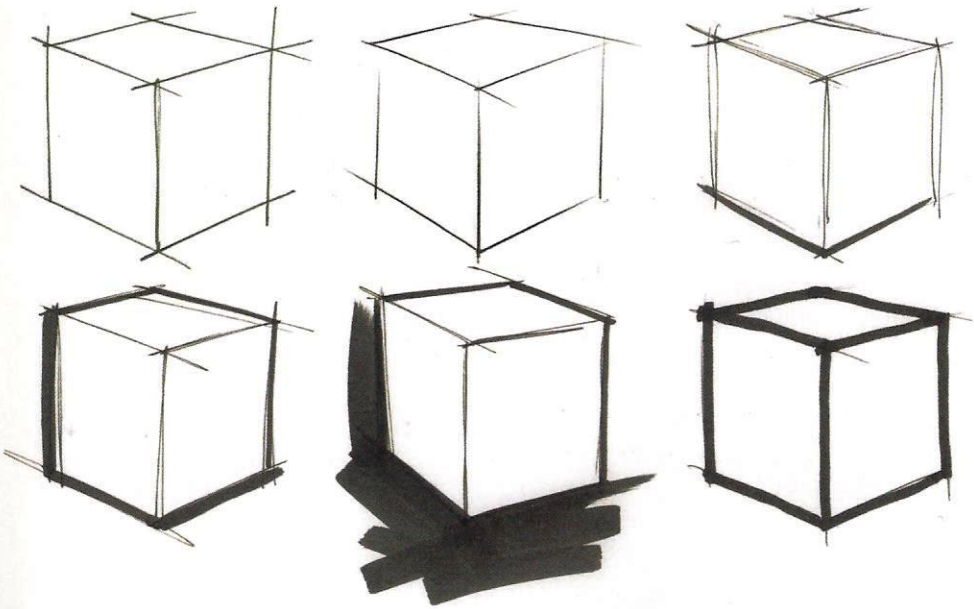
1) The first drawing doesn't communicate anything more than what you see.
2) Construction lines suggest that the second drawing is the result of an intelligent design process.

Variable thickness

One more dimension.

The outer contours of objects, especially the lines on the shadow side, can be accentuated with a thicker line. In this case your drawing will look much more three-dimensional. It is important not to highlight the inner edges, because they turn it back into a flat drawing with ugly thick lines. Inner edges should only be thickened if they indicate an internal contour, such as an opening or the edge of recess.

If you use a ballpoint pen or a thicker felt-tip pen, you can vary the pressure to make lines thicker or thinner. You can push harder at the start of a line and then reduce the pressure as the line gets longer. That increases the dynamism of the result and creates a more three-dimensional look.



1) Uniform thickness. 2) Pen pressure effect. 3) Thick bottom line. 4) Thick line around with double thick bottom and back line. 5) Thick line around with abstract shadow effect. 6) Back to flat. The most common mistake is to make all edges equally thick.

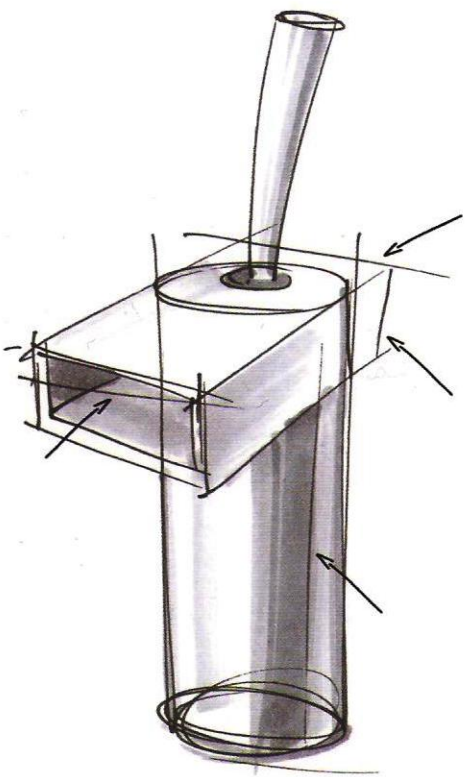
Faulty lines

Just highlight the good one.

It is difficult to begin when the paper is blank because you don't have any references. You will probably make some faulty lines, but don't worry about them. If you try to correct them, there is a big chance you will make the wrong things even more prominent. Start your drawing with some simple reference lines, and if one of them looks wrong, just draw a more accurate line next to it. At the end, you can highlight the good one.

Good sketches can be full of faulty lines. If you don't highlight them, you will not see them as mistakes but more as construction lines. In fact, we shouldn't even call them faulty lines. Instead, they are irregular construction lines that guide us to the correct result.

All the lines indicated with black arrows are faulty, yet none of them distracts us.



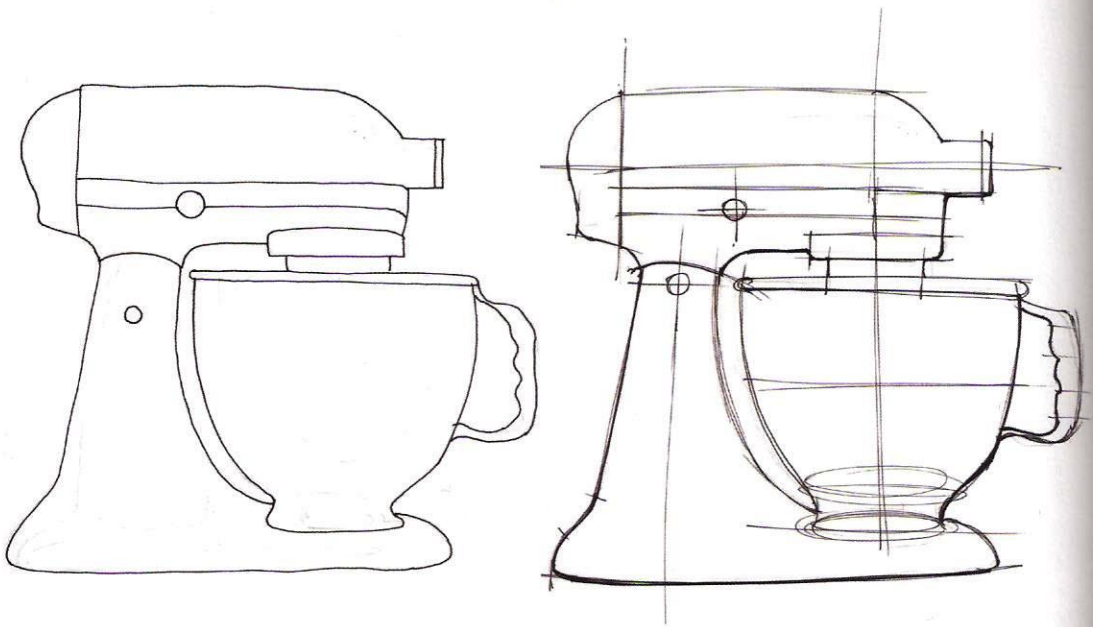
Pre-drawing

When tracing over a drawing, focus on dynamism and not on a perfect overlay.

It is not advisable to use pencil to make an initial outline drawing, or pre-drawing, and then trace over it later. Only drawing directly with a pen will teach you not to be afraid of making mistakes, and not to try to correct mistakes all the time.

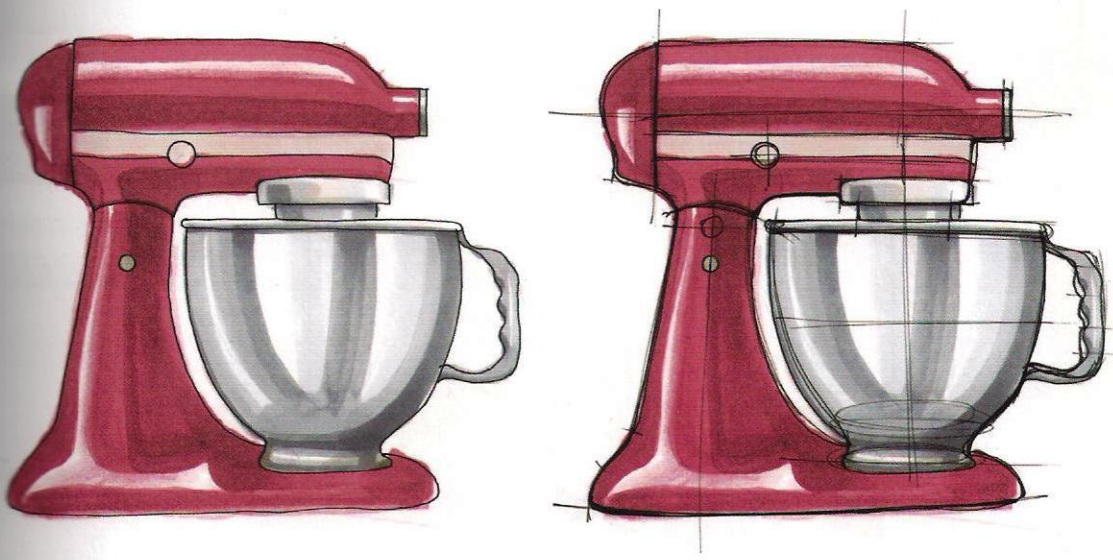
Yet in some cases, when you draw very complex or very fine geometric objects, you cannot avoid using a pencil at first.

If you make a pre-drawing, always use a very thin and light pencil. And when you trace over in with the pen, concentrate more on drawing dynamic lines and less on following the underlying lines accurately. There is usually no problem at all if the trace line has a dynamic and confident character but lies a little off the original.



1) Single line tracing. 2) Sketch line tracing.

If your traced line is drawn too slowly, it will look crooked and express uncertainty, even if it is exactly in the right position. You should also trace over some construction lines and double or triple some lines, because the traced drawing must look like an intelligent sketch rather than a sterile copy that lacks all human character.

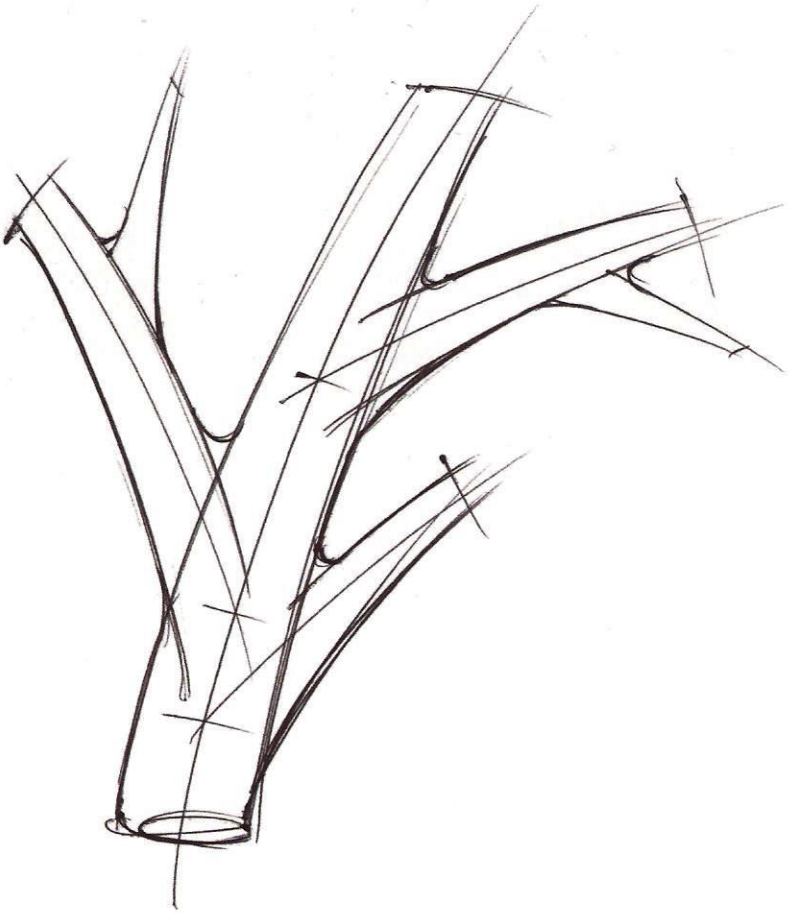


1) With single lines, the drawing looks like part of a comic strip. 2) With 'sketch' lines, the drawing looks more like an intelligent design.

Complex curves

Construction of multiple simple sections.

Of course, you cannot draw very long lines with complex curves as fast as you should to make it look dynamic and smooth. What then? Simply build it up from a set of simple segments that you can draw easily. If all segments are drawn well, the whole line structure will look good. Besides, your drawing will also acquire a beautiful sense of rhythm.



This complex organic contour line of a tree is constructed from a set of very simple elements. It would be impossible to draw it by hand as one single dynamic line.

Drawing slowly yet fluently?

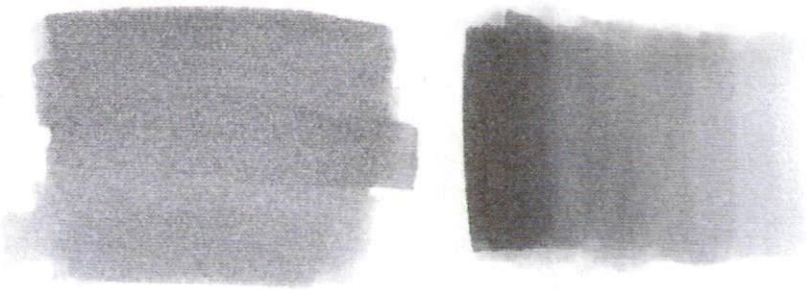
The Zen moment of drawing.

If you look at the work of traditional Japanese artists, you see that they can draw or paint very slowly yet beautifully. With a lot of practice, it is possible to learn how to draw slowly, but still very fluently. It is something that you cannot force. It is more like a meditative activity, when you concentrate on relaxing the muscles in your arm and just let the movement of your hand flow.

Marker techniques

How to use markers.

Marker techniques are the easiest way to 'fill line drawings with material'. There are only a few things you need to know about the techniques.

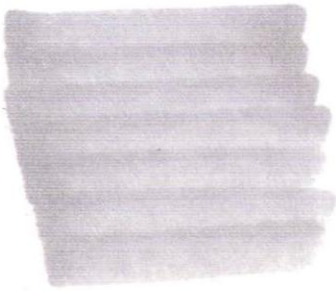


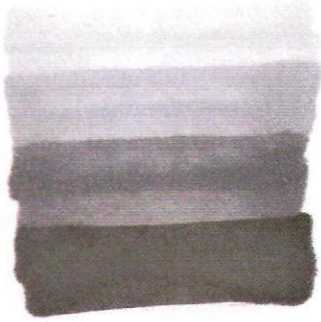
If you want an area with perfectly consistent colour, you have to 'paint' the surface over and over until the ink makes the paper equally wet everywhere. You have to concentrate on keeping the surface wet and go back to places where it has dried until the whole surface is covered. Then you stop and let the paper dry. If you do so, you will get a surface of perfectly consistent colour. It is easier if you use special marker paper because it is impregnated and therefore does not suck the ink out of the marker like conventional paper does. Besides, it dries much faster.

When the paper is wet you can pick a darker tone and make some areas darker if you wish. Then you can pick the lighter tone again and 'paint' back and forth over the line between the light and dark areas. If you keep the paper wet and do it carefully, you can make the transition between light and dark very smooth. When finished, you simply let the paper dry.

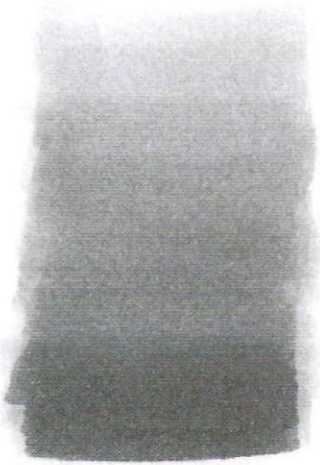
Another technique is to 'draw' with stripes. You just colour without caring about the fact that you see the stripes. If you do this well, your drawing will have a good structure.

When a layer is dry, you can start a second, darker layer. If you use the same colour, it will be just slightly darker, and then you can let it dry again. If you want to make it even darker, a third layer with the same colour usually doesn't have enough effect. You need a slightly darker tone for each following layer until you achieve the desired result.





It is also possible to make more grey layers for the transitions and cover it all in the end with a colour. Then you can make different tones of a colour with only one colour marker.

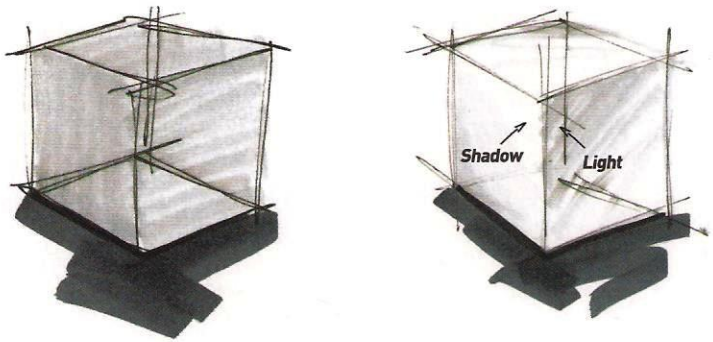


Incidence of light

Think about light and shadow and not about coloured surfaces.

When beginners first use markers, they usually colour their whole drawing consistently between the lines. Then they ask how to continue. I usually say: "Try it again!" But this time, think first about what you want to see in the end. You have to decide which parts of the object will be light and keep those white. Then you decide which surfaces will be somewhere between light and dark, and which sides will be dark.

It is not about colouring between the lines, but about creating contrasts in brightness between different surfaces. It simply means that if, for example, you have one surface perpendicular to another, you will make a significant difference in brightness between these surfaces. The contrast will highlight the form differences in brightness and the sketch will come 'alive'. It will look much more three-dimensional.



1) Without contrast in brightness, the drawing looks flat and boring.
2) The contrast in light and shadow supports the sense of three dimensions.

If you give perpendicular surfaces the exact same tone, the drawing will look flat, even if it is drawn in three dimensions. It is a very bad lighting concept. If I am uncertain about the lighting concept, I usually make some tiny 'sketch plan' first, so that I can try different lighting possibilities before I begin. By doing so, I always know exactly how to colour the sketch, and so I don't have to be afraid of messing things up with the markers.

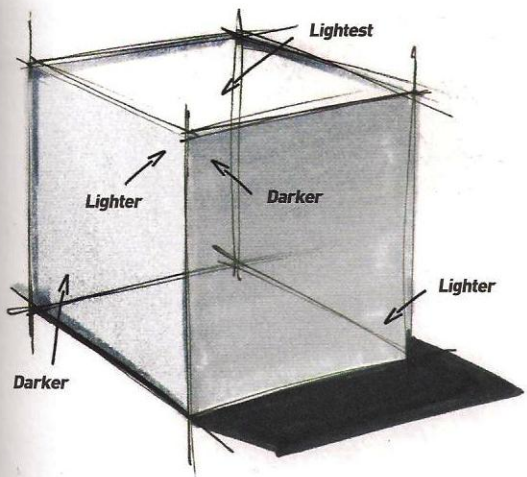
Good lighting concepts

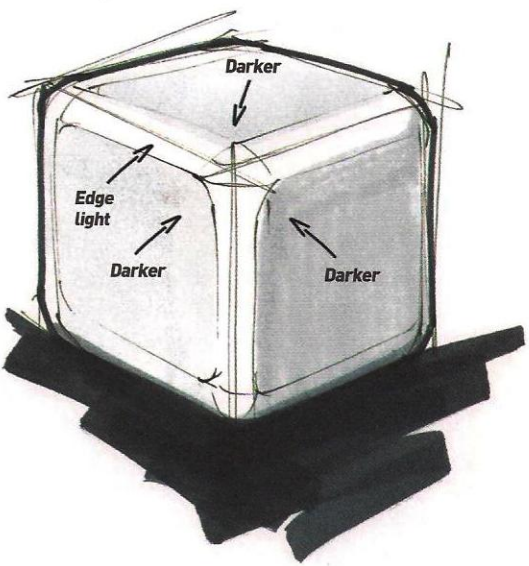
Objects with flat surfaces.

Imagine a cube on a white floor, illuminated by a spotlight positioned above and behind the cube. The light falls on the top front corner of the object so that you see some shadow on the floor in front of the object.

Because the light is reflected by the white floor, the front of the object will also be illuminated, and because the light source is the floor, the object will be brighter at the bottom than at the top. The left surface will receive some direct light from the spotlight and the top surface will be the brightest. There will be a beautiful contrast between the three perpendicular surfaces. Another contrast between the shadow on the floor and the bright front surface below will project the object out of the flatness of the page and into three-dimensional space.

If you have the same object with rounded edges, you need some glowing light to highlight those edges. It is better to aim the spotlight at the back of the top surface so that its front edge will be a little darker. With a second spotlight you can create a similar lighting effect on the left surface. Now the top front corner is dark on all surfaces, so there is 'space' to create the edge brightness.



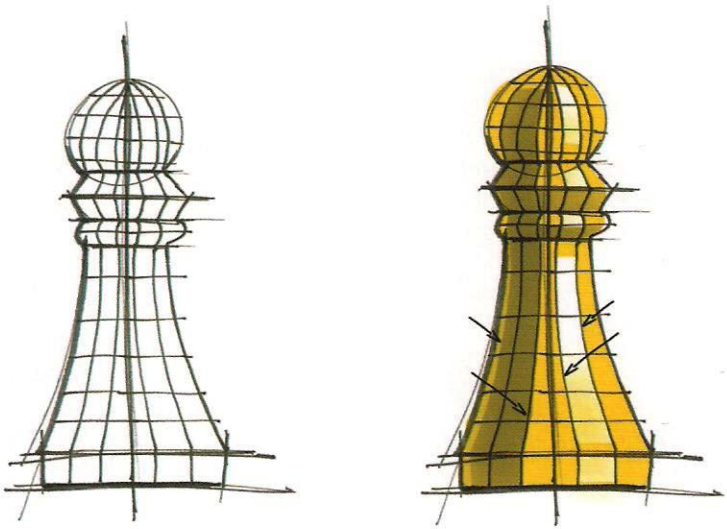


Good lighting concepts

Objects with curved surfaces.

An object with curved surfaces doesn't really have sides. In this case, we use reflections to make the drawing look more three-dimensional. You can use light reflections on dark surfaces and dark reflections on light surfaces. The most important aspect is the reflection line, which marks the 'edge' of the reflections.

Imagine a wire-frame model of an object drawn with 3D computer software. The lines of the wire-frame model communicate the form of the three-dimensional object to your brain at different sections. You get extra information about the three-dimensional form, enhancing your three-dimensional experience.



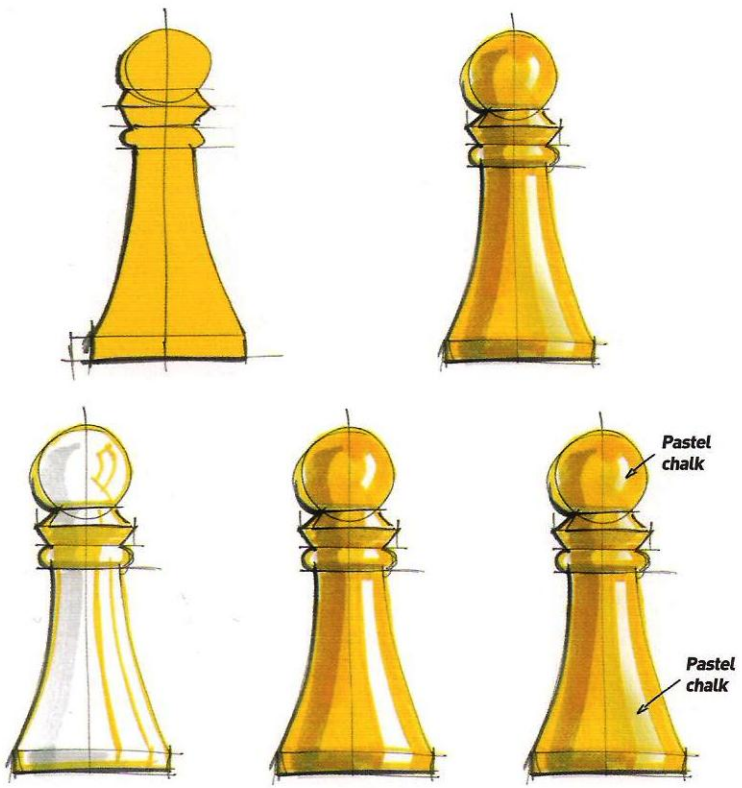
1) The lines of the wire-frame tell your brain the three-dimensional form at different cross sections. 2) The edges of light and dark reflections will more or less follow these wire-frame lines.

In reality, if you place light and dark boards around the object, you will get light and dark reflection lines that broadly follow an imaginary 3D wire-frame. These reflection lines 'tell' your brain the form of the cross section of the object in different places, just as the wire-frame did, only more beautifully.

Good lighting concepts

Three steps to create reflections.

If you show a sketch with reflections and a sketch without reflections to people, they will say that the one with reflections looks more beautiful. This has nothing to do with aesthetics. They find it more beautiful simply because their brain receives more three-dimensional information about the form of the represented object.



1) Without reflections, the drawing is nothing more than a boring flat plane of colour. 2) The reflection of a white object on the right and a dark object on the left is enough to create a sense of three dimensions. 3) Paint the dark reflection with a grey marker on the left, and define the border of the light reflection on the right. 4) Cover everything with the colour of the object, except the white reflection. 5) You can soften the white reflections with some pastel chalk.

Good lighting concepts

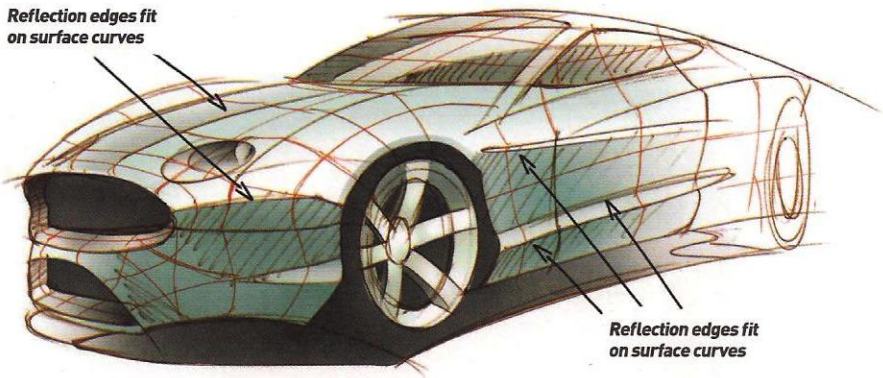
The composition of reflections.

For a good sketch, it is important to determine the right amount and position of reflections. You have to decide how wide the light and dark reflections should be, and where these reflections should begin and end. Light and shadow must be balanced. That means balancing the specific proportions that support the sense of three dimensions in the most effective manner. Here are some good and bad examples.

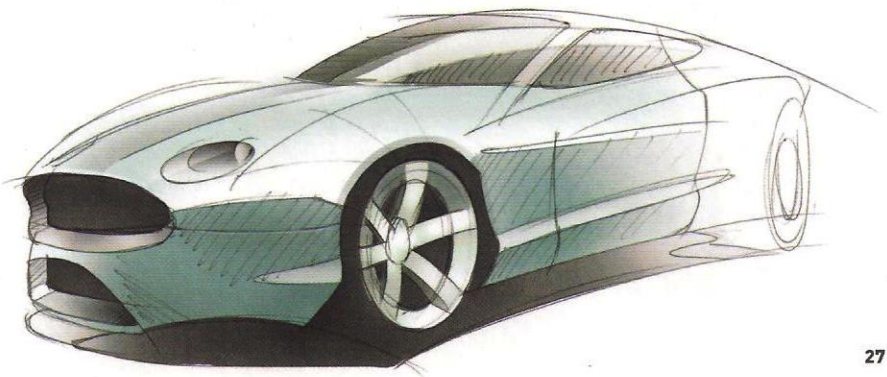
1) This is a good composition of reflections. It is asymmetric, so there is a logical light and shadow side. The widths of the different areas are well balanced. 2) Here you can see large, monotone, grey surfaces with reflections that are much too sharp and much too thin. 3) If the light is in the middle, it is difficult to understand what happens. Both sides are shadow sides, and it is unnaturally symmetric.

Good lighting concepts
Reflections on complex surfaces.

The point is not using the technique, but to figure out where the reflection lines should be. It actually shouldn't be called marker technique but, instead, lighting technique. If you can imagine what a 3D wire-frame would look like, it is easy to 'design' a nice composition of light and dark areas and smooth transitions by following some lines of the wire-frame.

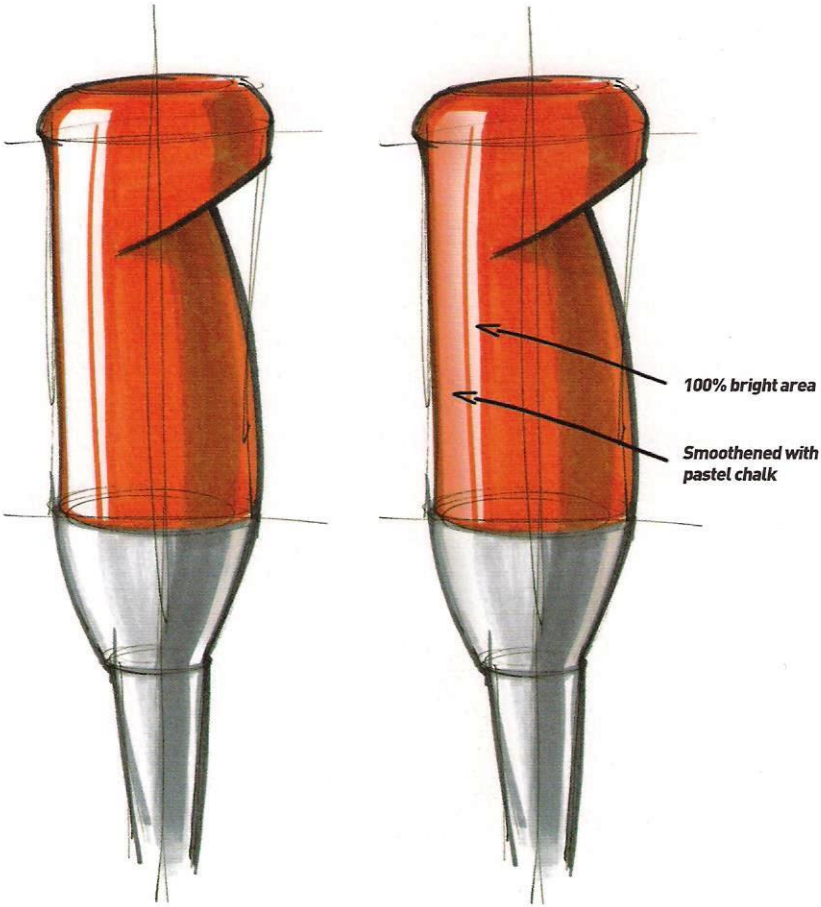


When a photographer wants to take some beautiful shots of a car, he has to build up a whole scene with light and dark boards to create the desired lighting effect on the surface of the car. The advantage of sketching is that you can simply put the lines wherever you need them. From that point of view, sketching is even much better than computer rendering, where you have to model the same surrounding scene that the photographer would use to get the same beautiful reflections.



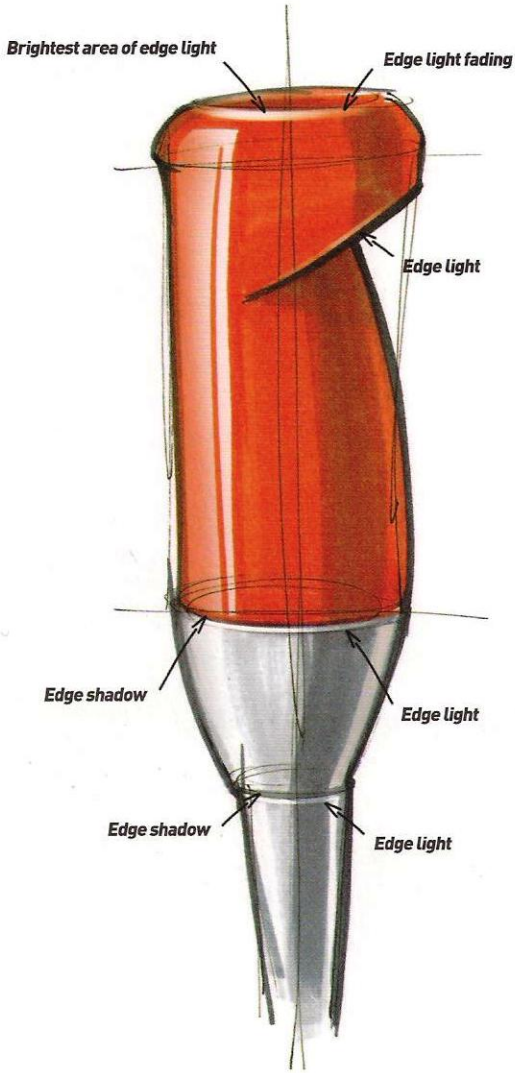
Finishing
Soft transitions

If you want to make really fine sketches, you can use pastel chalk to soften some areas of the light reflections. In reality, only small areas of the white reflections are bright white, and there are always some smooth transitions towards the colour of the object. If you decide to use a transition, it is very important to create space for it, so the white area has to be wide enough. Furthermore, you have to be very careful with the colour of the chalk. It has to be exactly the same tone as the colour of the marker. If you use orange for example, it can be a bit yellowish, or a tone that is closer to red. It's not a big problem if your chalk is a little lighter than the marker, but if, for example, you use a yellowish-orange chalk with a reddish-orange marker, the result will look very bad because you will always see the difference.



Finishing
Fine edges

In reality, finely rounded edges always get some edge light or edge shadow, which can be created with a white pastel pencil or a half-transparent white lacquer pen. These fine roundings also occur where different product parts join together. Usually the top edge of the lower part receives some edge lighting, and the bottom edge of the upper part receives some edge shadow. Edge lighting is always brightest on the side of the light source and fades away slightly towards the side in shadow.



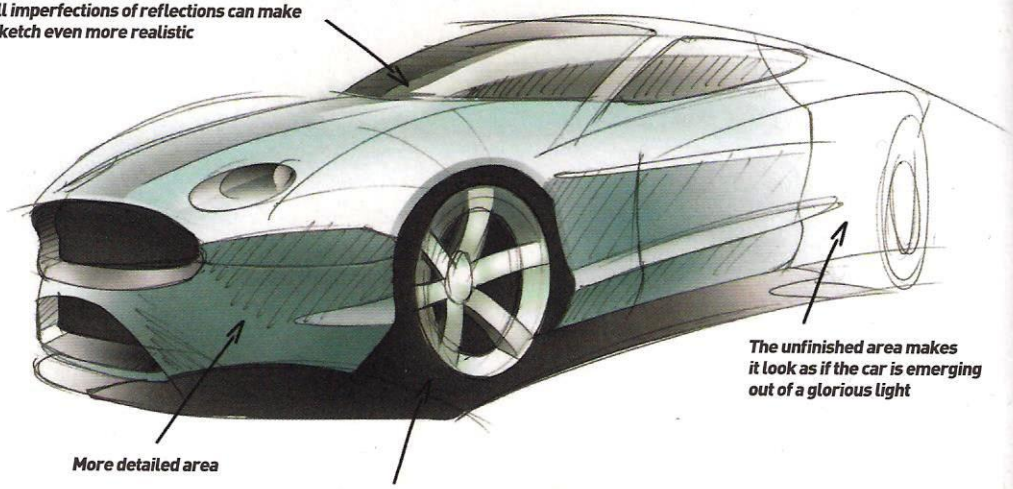
Finishing

Imperfections make your drawing perfect.

The cleaner you try to keep your sketch, the more the smallest imperfection will show up. Making your sketch perfect, detailed and clean will take more and more time, and it will begin to compete with a photograph or computer rendering. It will also lose its human character. Your sketch will no longer express ease, creativity and passion. Instead of detailing and refining it further, you should use some conscious random imperfection to make the drawing more human. In reality, reflections are never perfect. That is why some imperfection will make a sketch more human and, hence, better.

'Unfinishing' is a good technique to save time and make drawings look better. Less is more. It is quite common to detail and colour only the important part of a sketch and let the rest 'fade away' in an unfinished state. If you draw a car, for example, and you leave the wheels abstract and unfinished, your drawing will look much better. All attention will then focus on the body of the car, which is more important. It is the same when a photographer focuses on the important detail in a photo and leaves the rest of the picture slightly blurred.

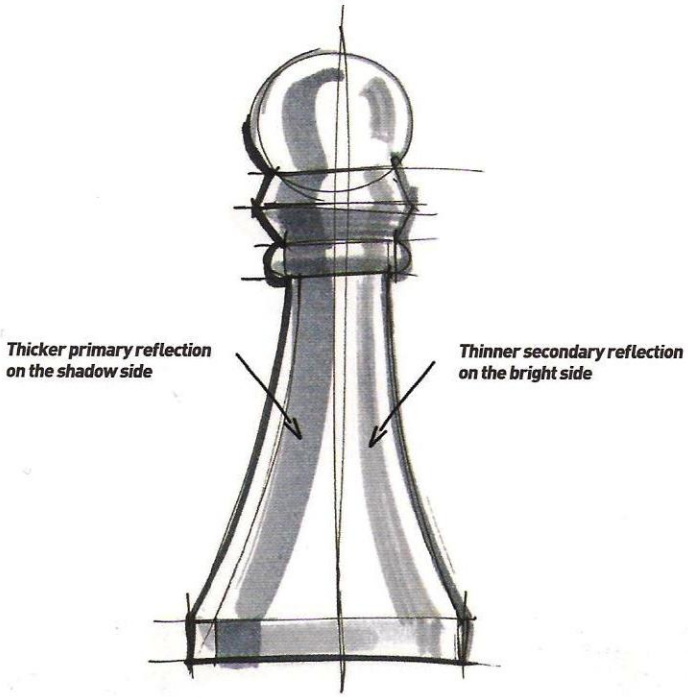
If you detail the wheels too much, the attention of the viewer will be divided between the wheel and the body. In the worst case, the wheel will dominate the body.



Less is more

Sketching versus rendering.

God is in the details, they say. If you look at architectural drawings, for example, you often see beautiful sketches and concepts for future buildings. Later on, when these concepts are built with real materials, real textures and real details, and you look at the result in real light from a real perspective, the results often turn out to be disastrous. That's because the finishing of industrial products is also very important. If you think about high-end products, they are often nothing more than a beautiful form and material composition with a perfect finish. The problem is that these things are impossible to visualize through handmade sketches in a realistic way. To visualize such a thing, you have to make a real prototype or at least a high-quality computer rendering with realistic illumination, realistic materials and realistic surface structures.



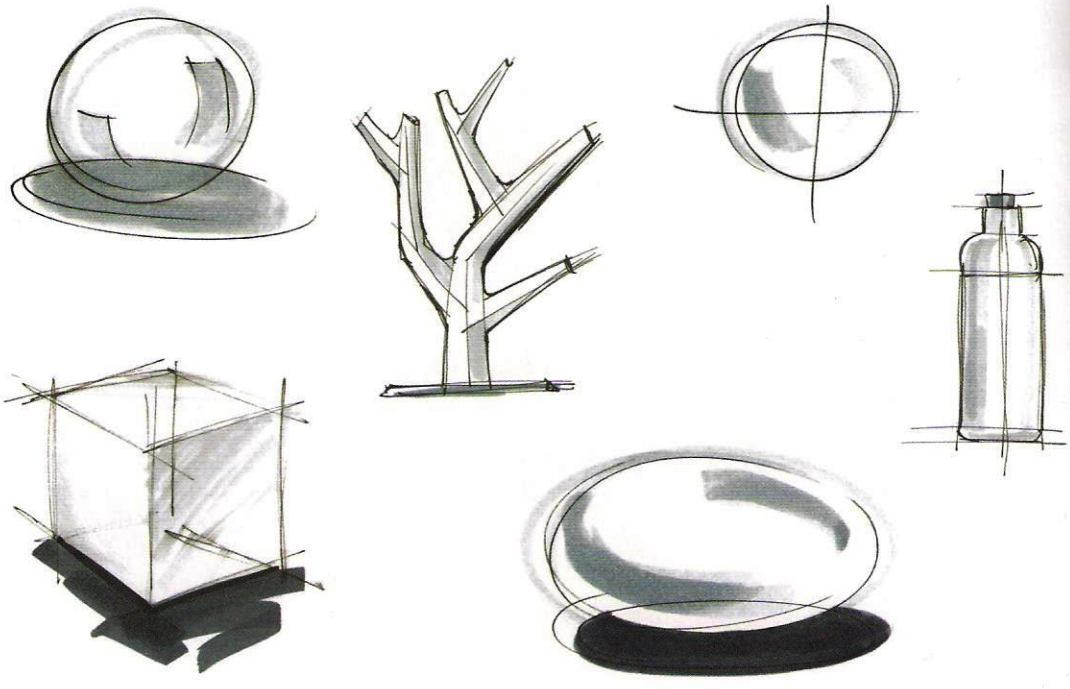
I believe that the purpose of handmade sketches is to visualize fresh and creative ideas in a simple, minimalist, less-is-more way, and not

to create highly detailed photo-realistic handmade renderings. In fact, you can keep sketching and marker techniques extremely simple.

Instead of complicated shading, you can leave most surfaces simply bright white, adding just a little grey tone to the dark areas. This is a great way to make simple and fresh sketches in seconds. You can add a wider band of grey reflection on one side and a slightly thinner one on the other side. That's all. It's like a white product in a white room with dark reflections. If you have a white product, you cannot make light reflections, because you won't see them. The only way to make a white product visible is to use dark reflections.

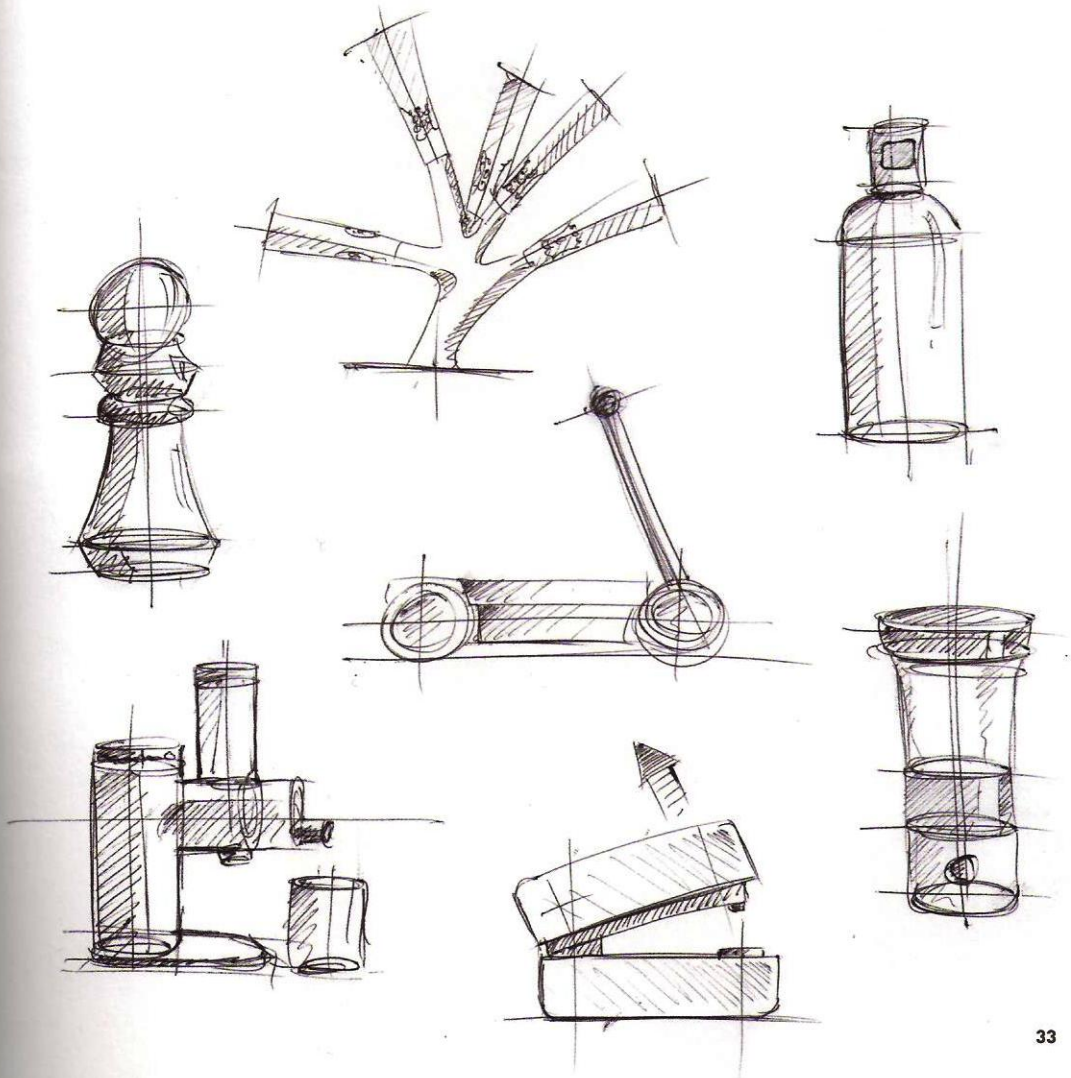
Less is more

Examples of minimalist shading.



Less is more
Without markers.

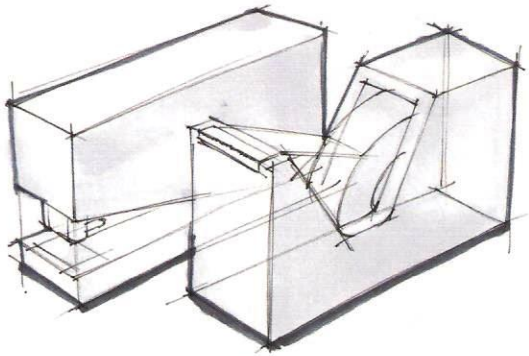
You can even put the marker aside and use some hatch pattern for the shaded sections. By using variable pen pressure, you can even simulate shaded transitions. This works best with a ballpoint pen because it doesn't give a uniform line thickness like a fineliner. You can make very light construction lines and hard edges with the same instrument.



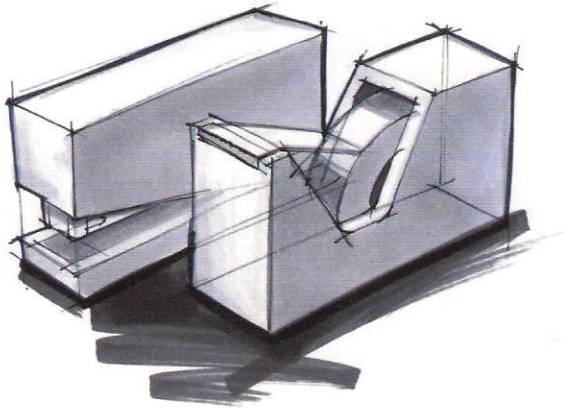
Shading exercises
Step by step guide.

When you finish sketching the lines of an object, it can be scary at first to start working with markers. I usually make some tiny illumination studies to find out which lighting concept works best. If you do so, you will know exactly what tone you need on each surface. The only thing you have to do is apply the best result on the original drawing. Do not forget that your goal is to create lighting contrasts between adjacent surfaces to highlight differences in form.

1) First layer



2) Second layer

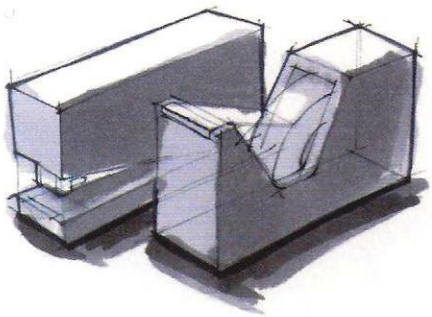


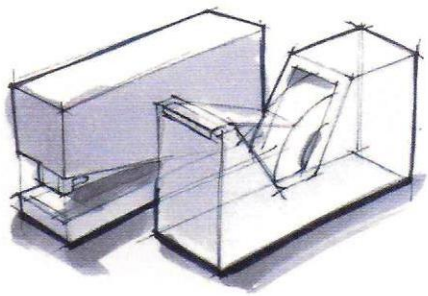
First, add a light grey tone to the shaded surfaces while keeping the lightest areas bright white. Second, apply a darker layer to the darker surfaces. Third, you can apply an even darker tone to the darkest areas. You can also use a dark-grey marker to create some abstract shadow effect.

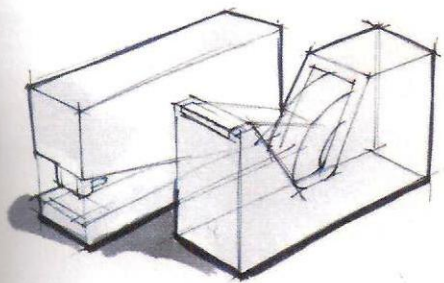
Shading exercises

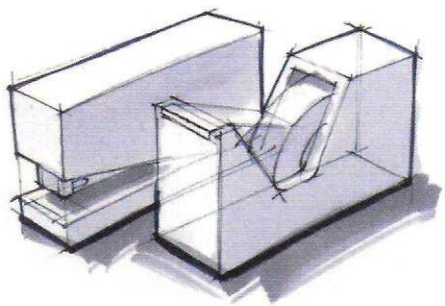
Try to recreate the shading.

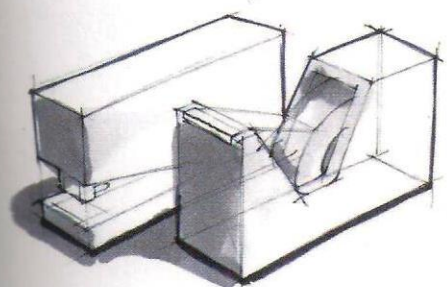
Practice first with tiny studies by copying the shading techniques shown in the following examples and then try to recreate the large versions. Use the paper in the back of the book to copy and exercise.

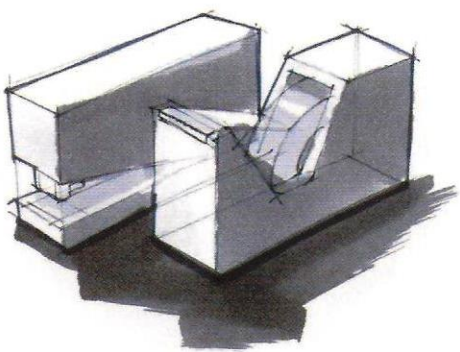




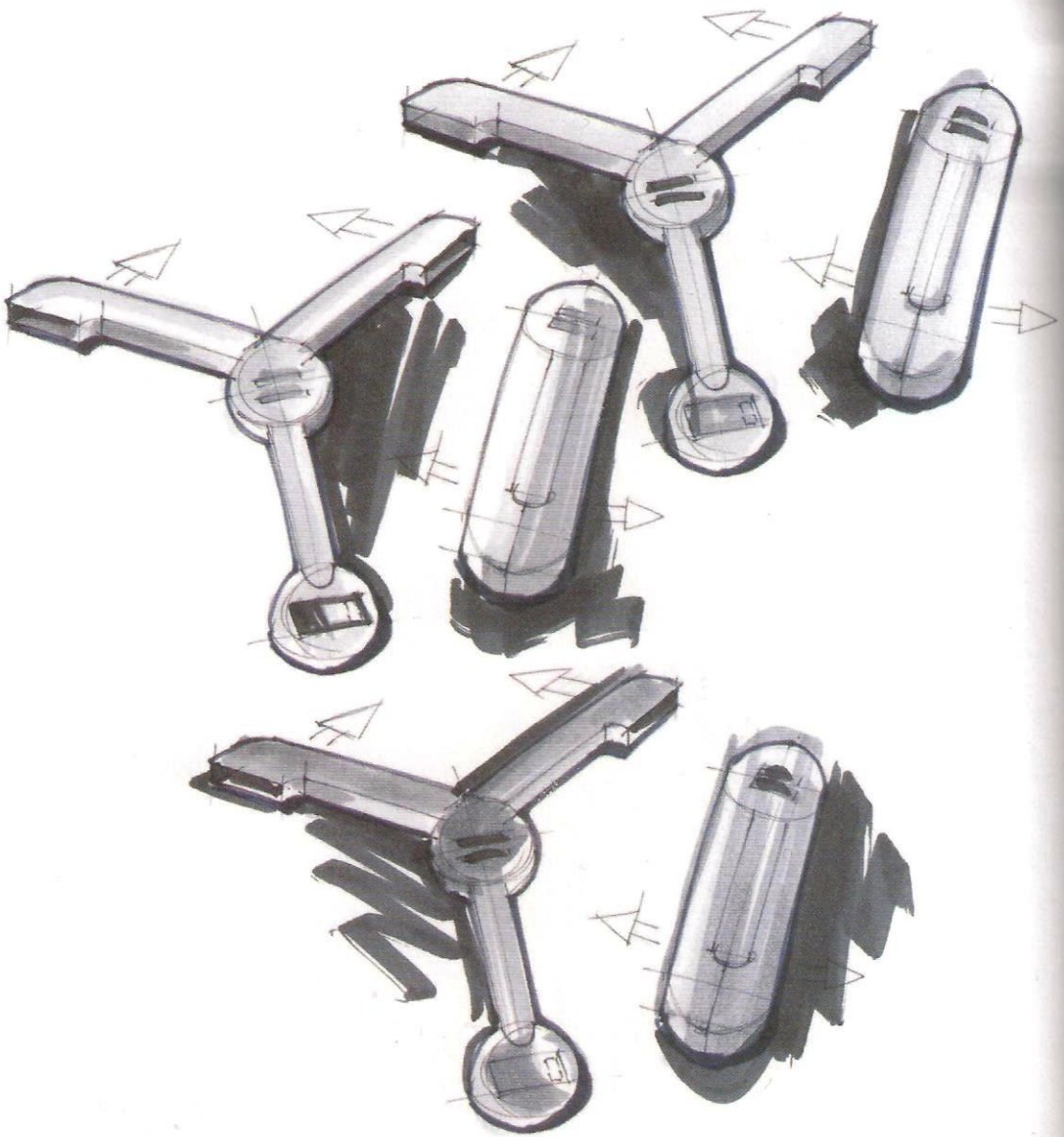




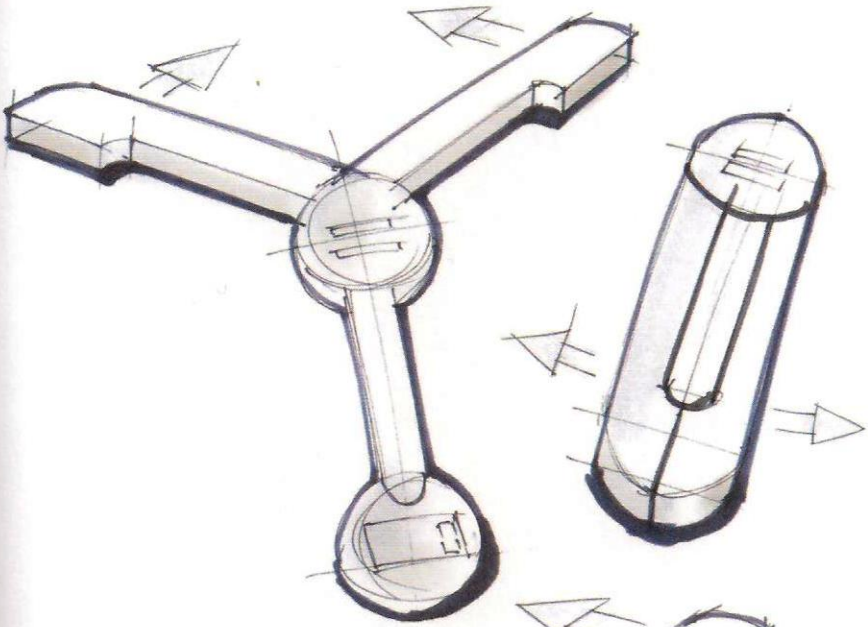




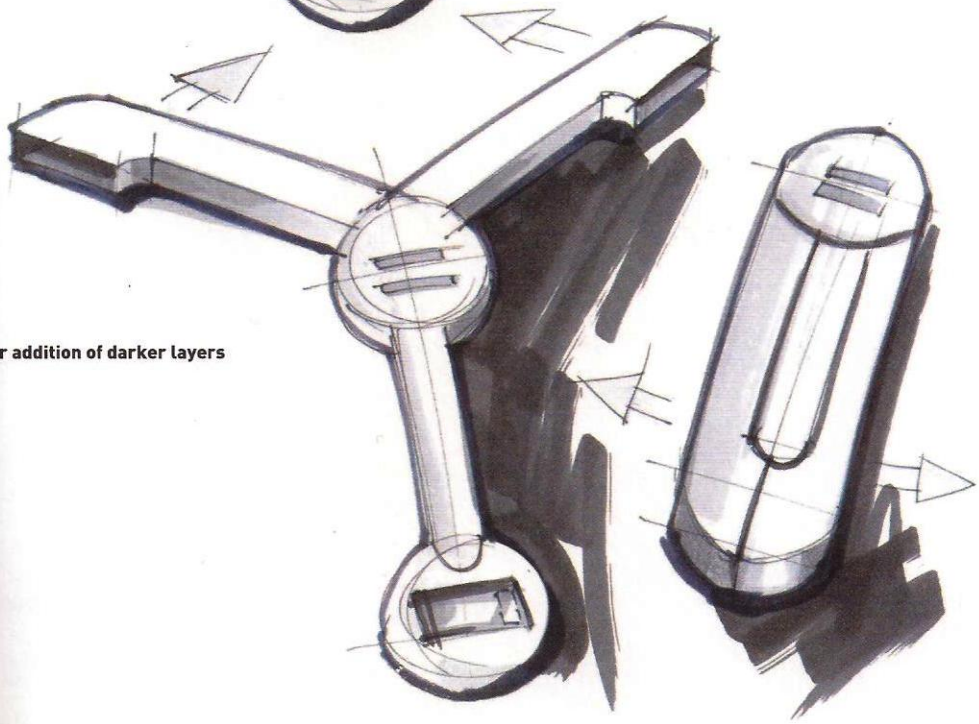
Shading exercise 3



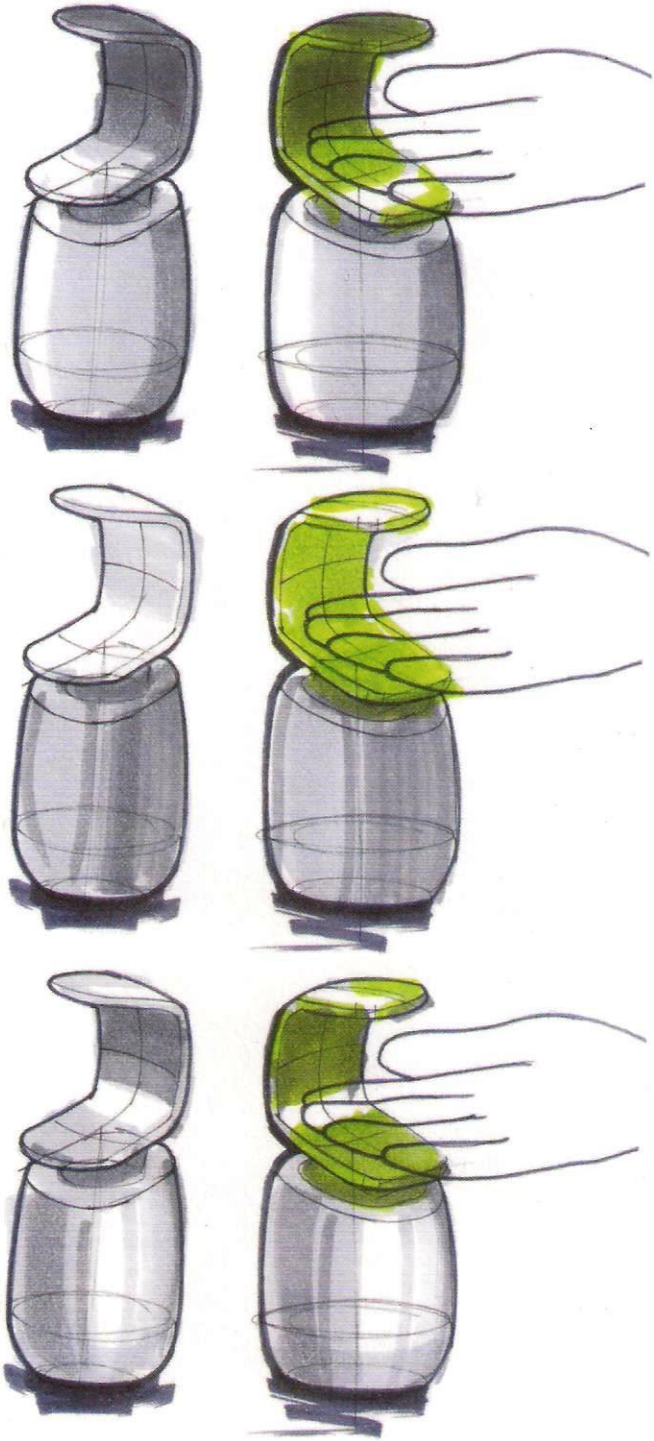
1) Primary soft grey layer

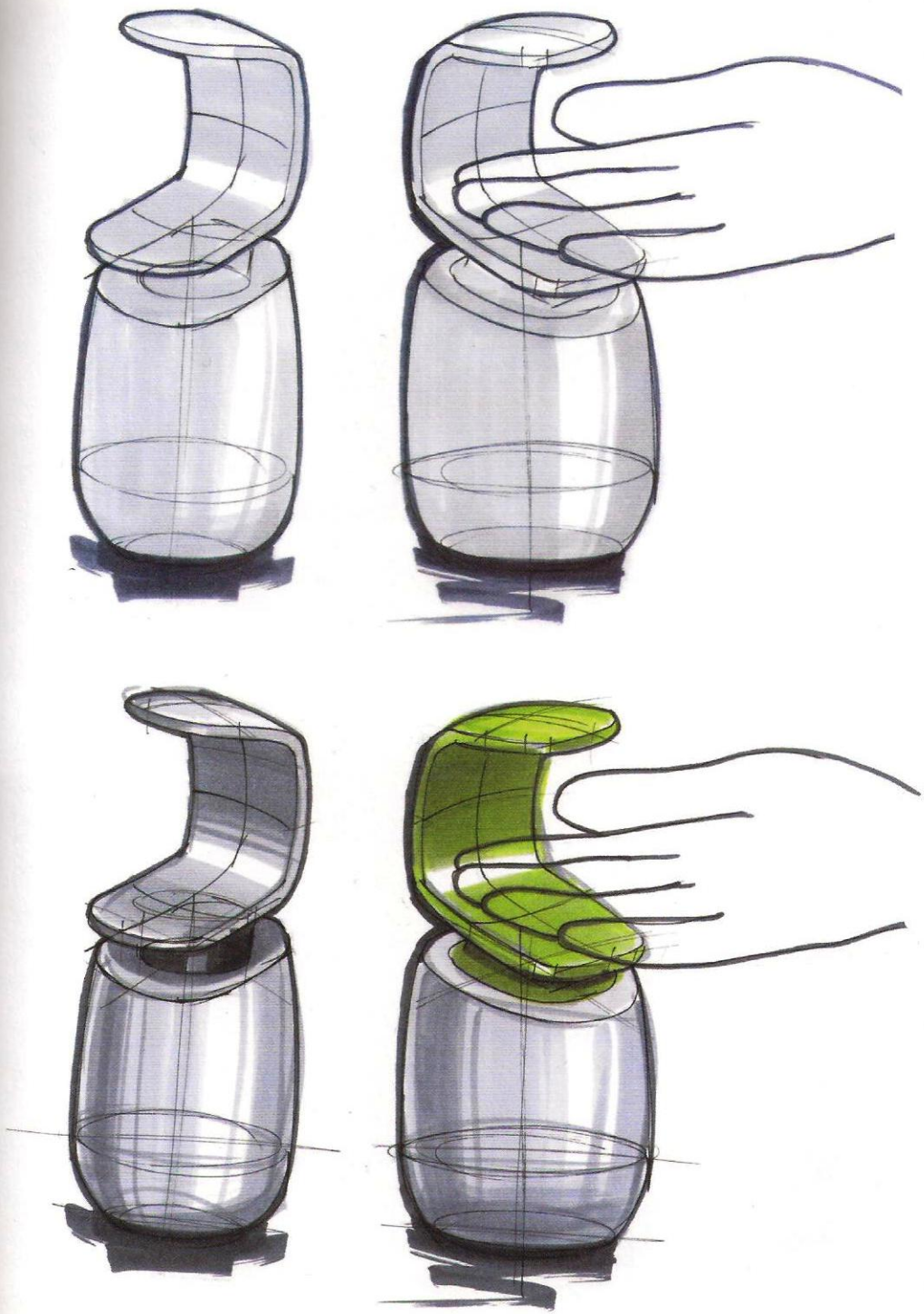


2) After addition of darker layers

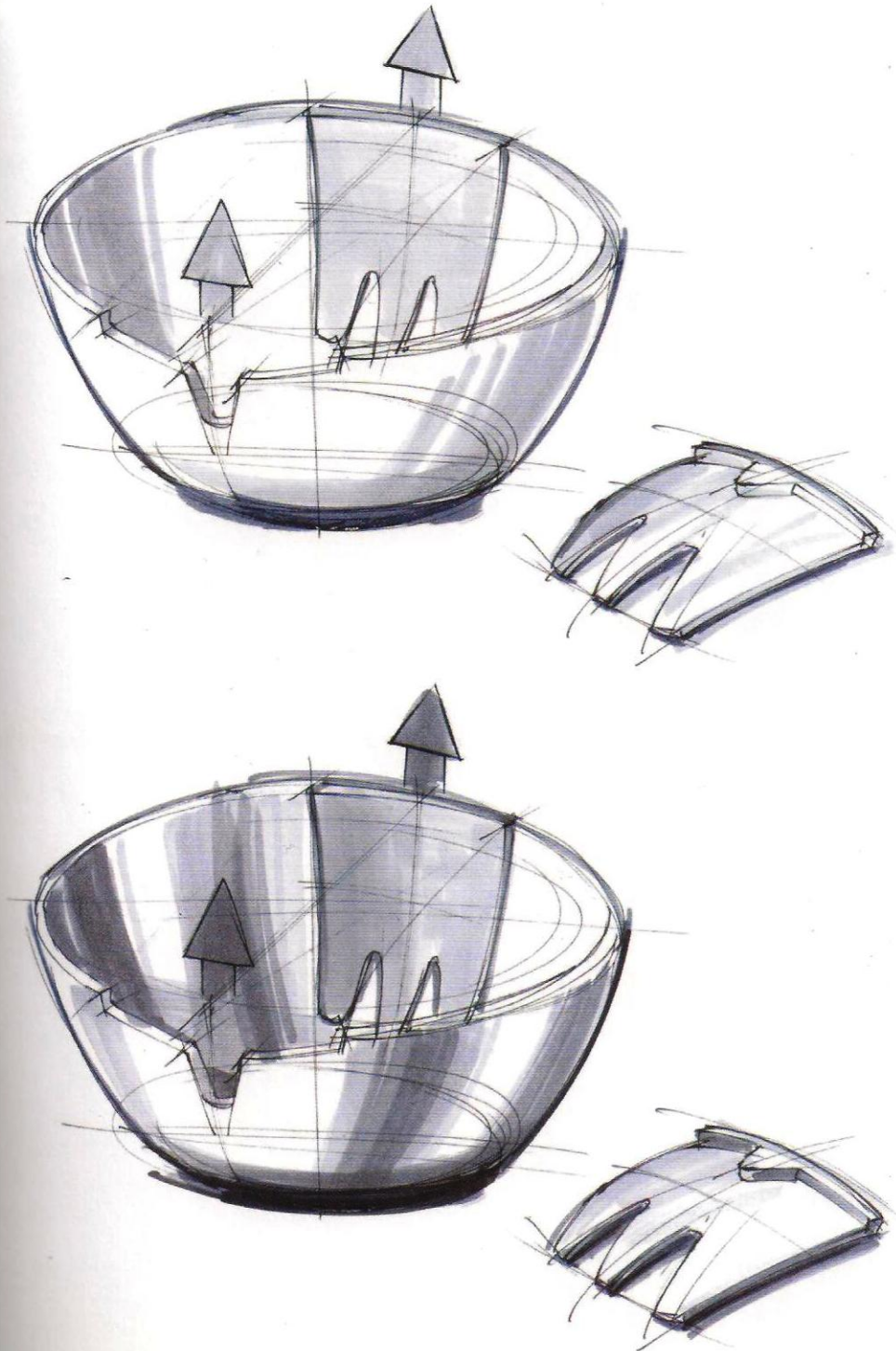


Shading exercise 5



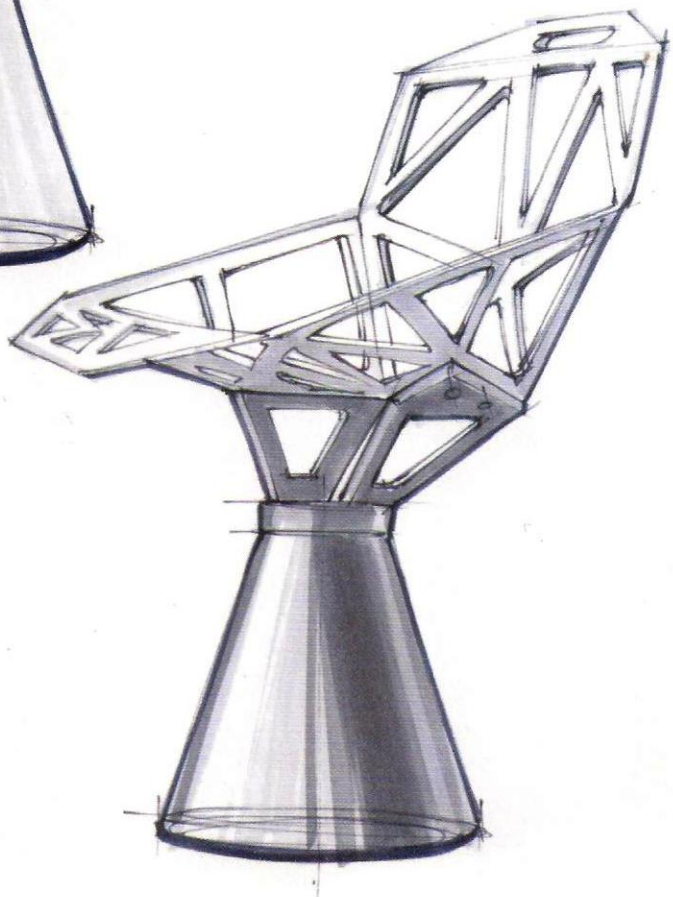


Shading exercise 7



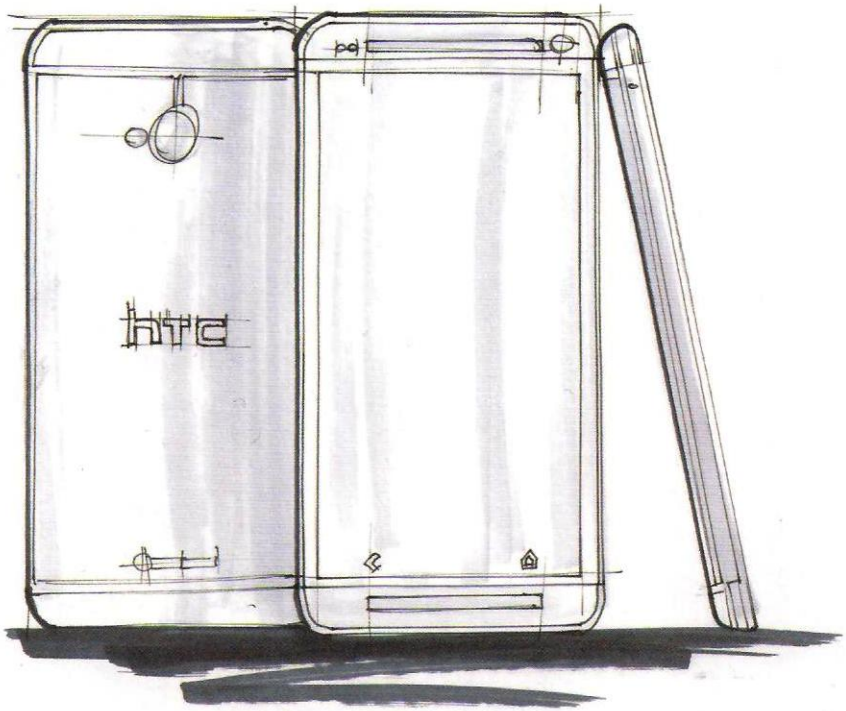
Shading exercise 9

1) First layer



2) Second layer

Shading exercise 11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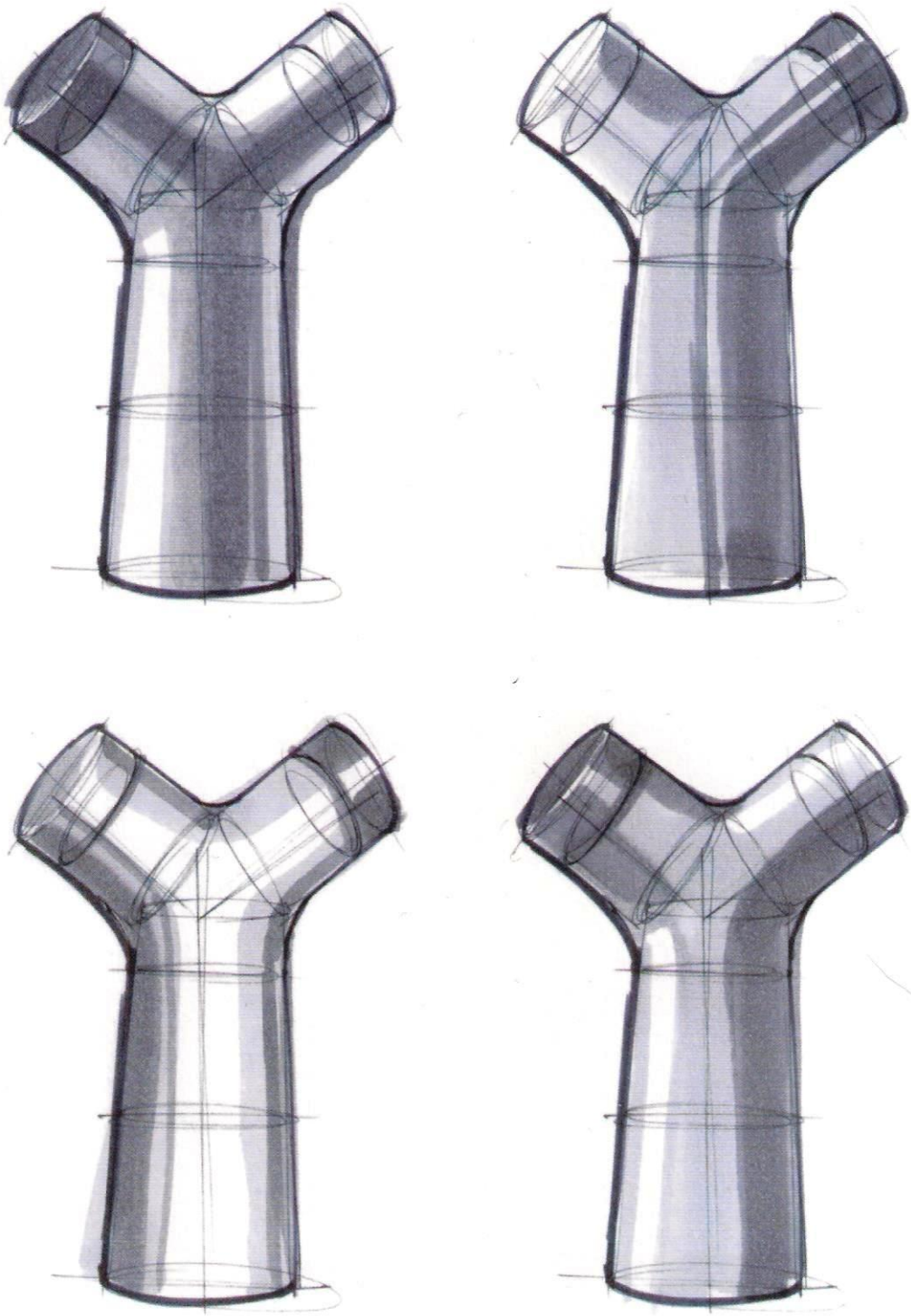
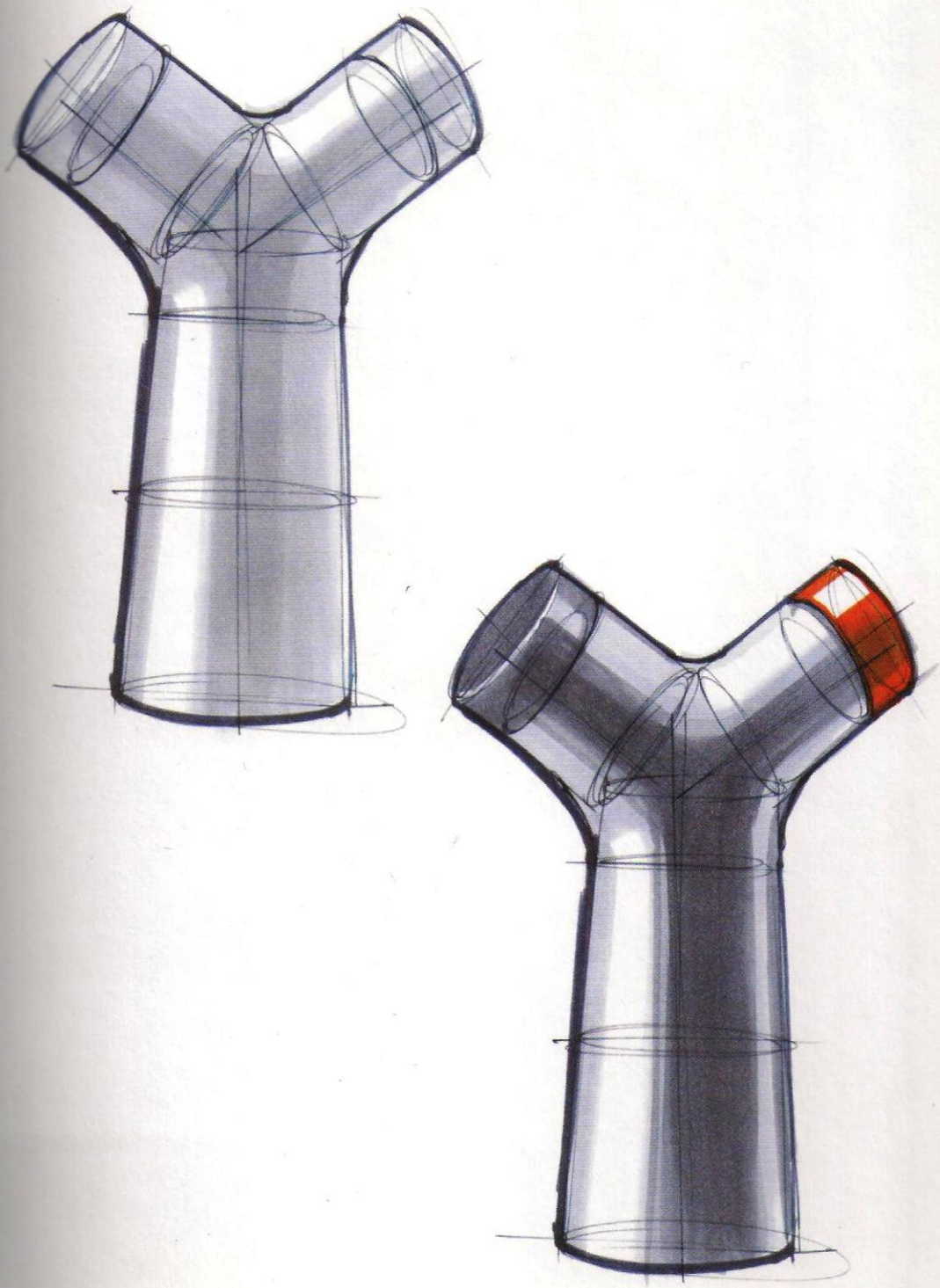
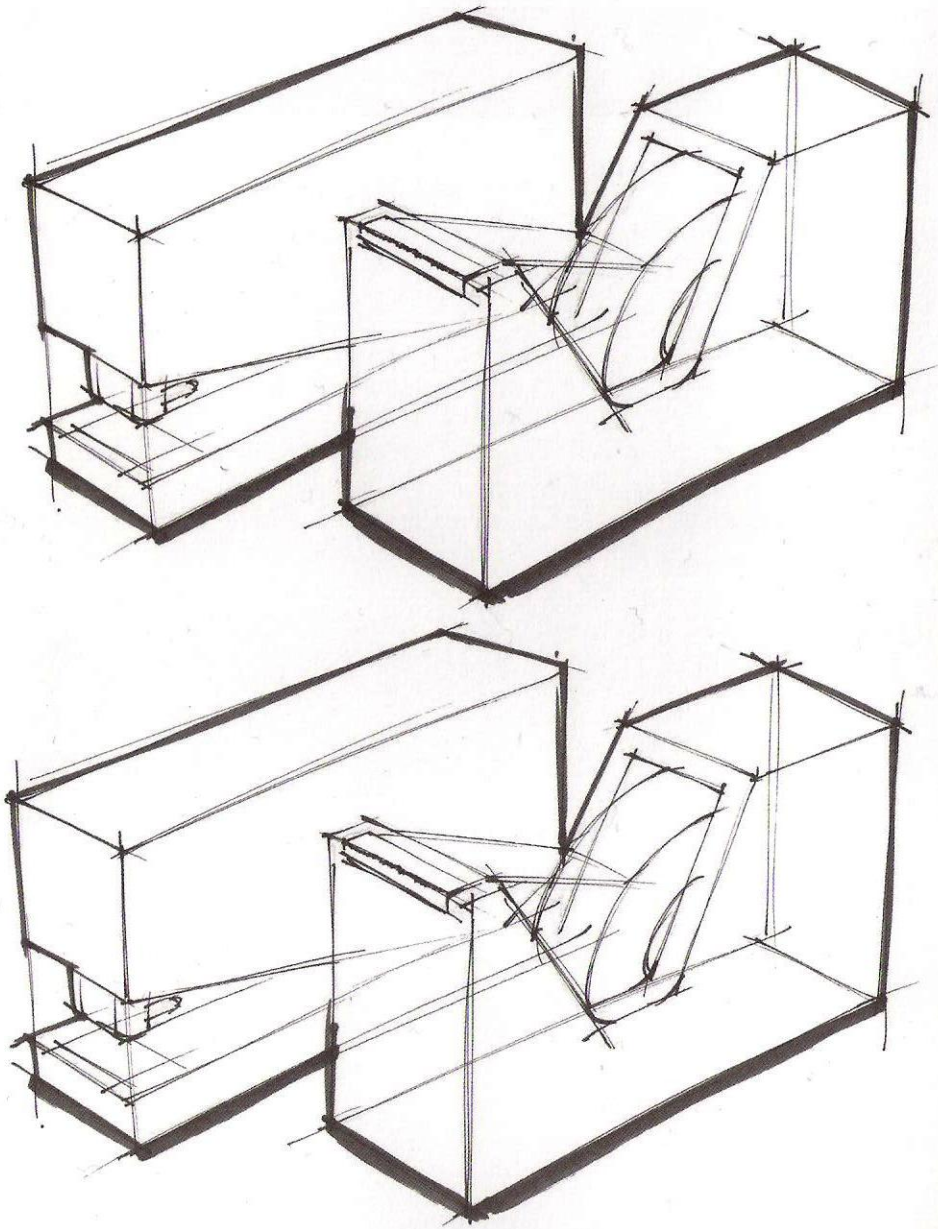
Shading exercise 13

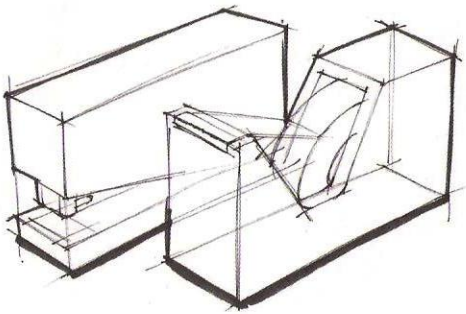


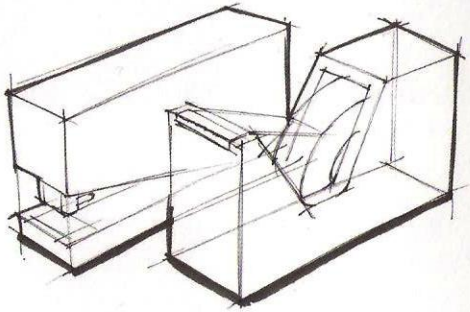


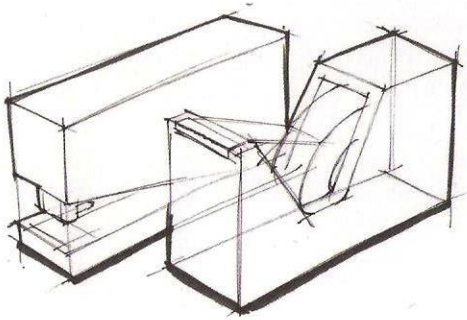
Shading exercise 1

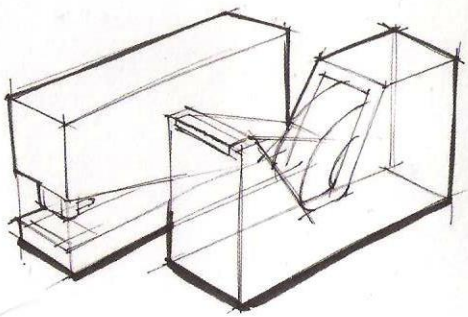


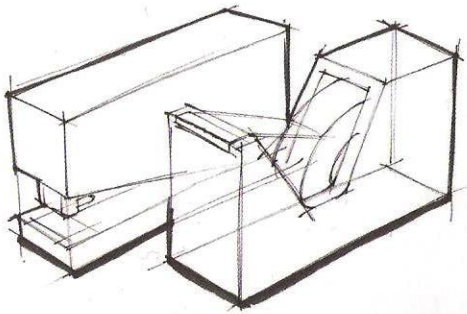
Shading exercise 2

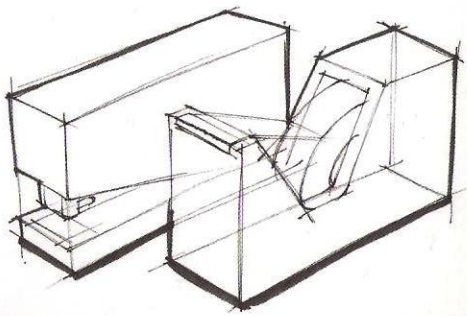












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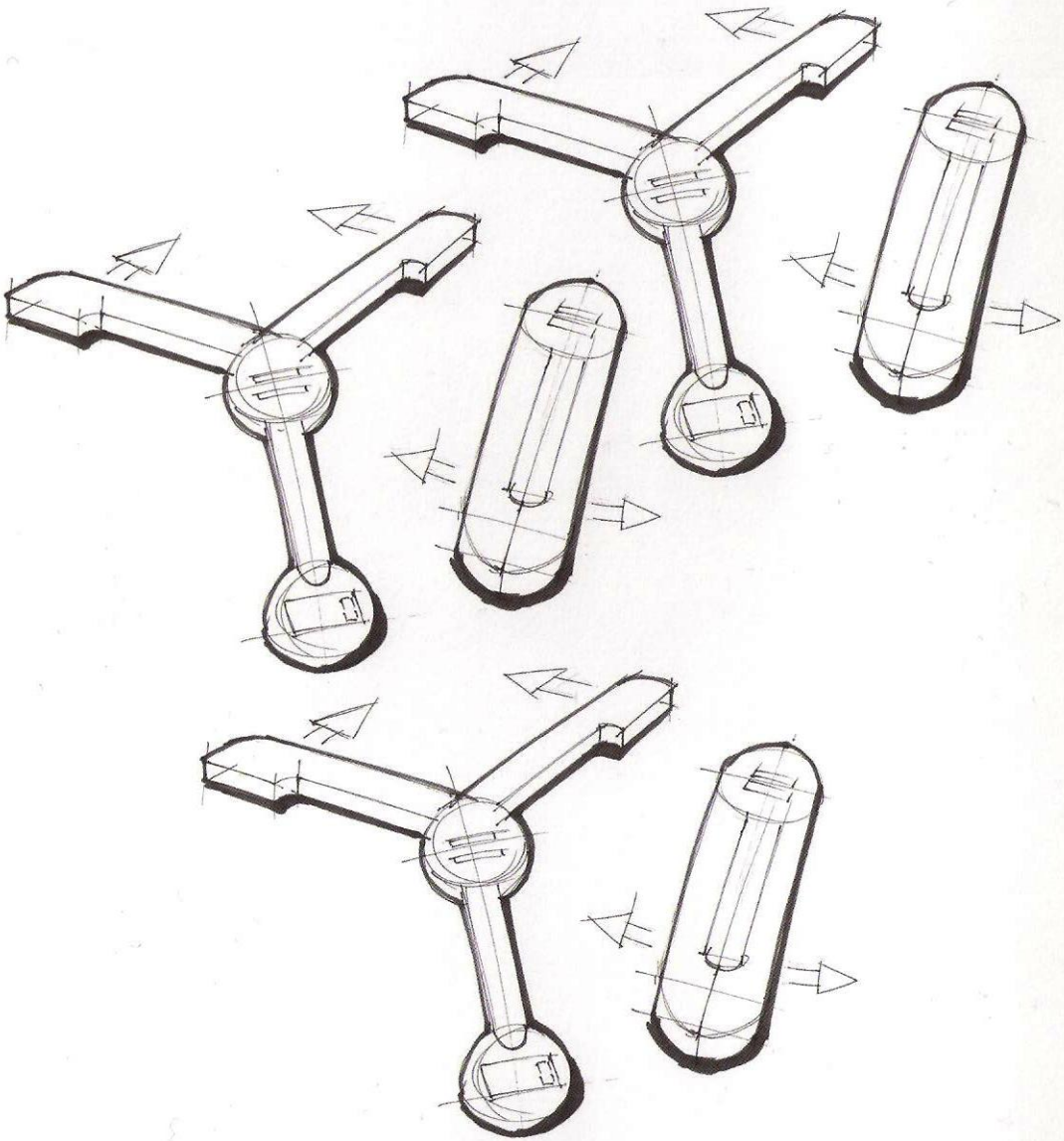

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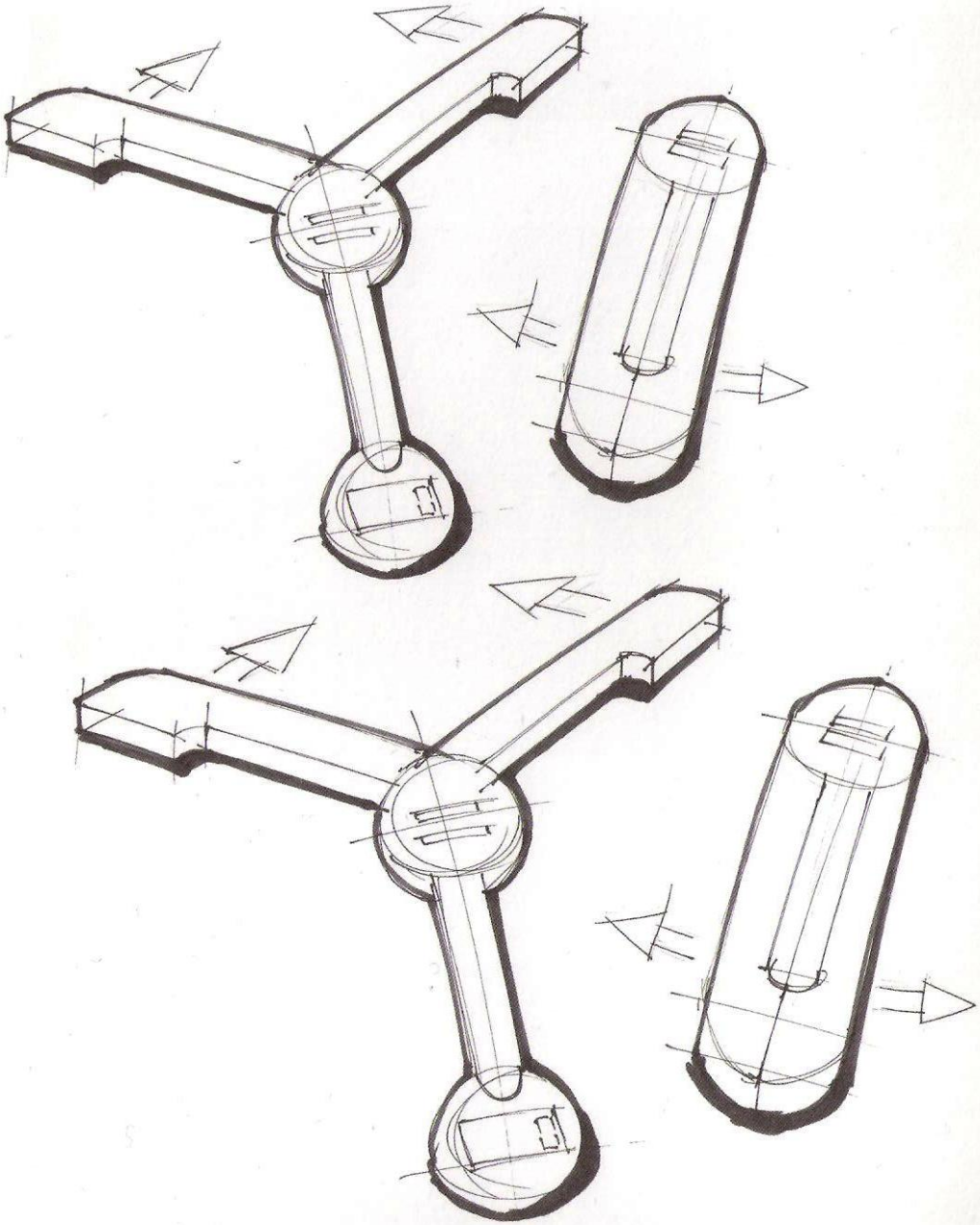

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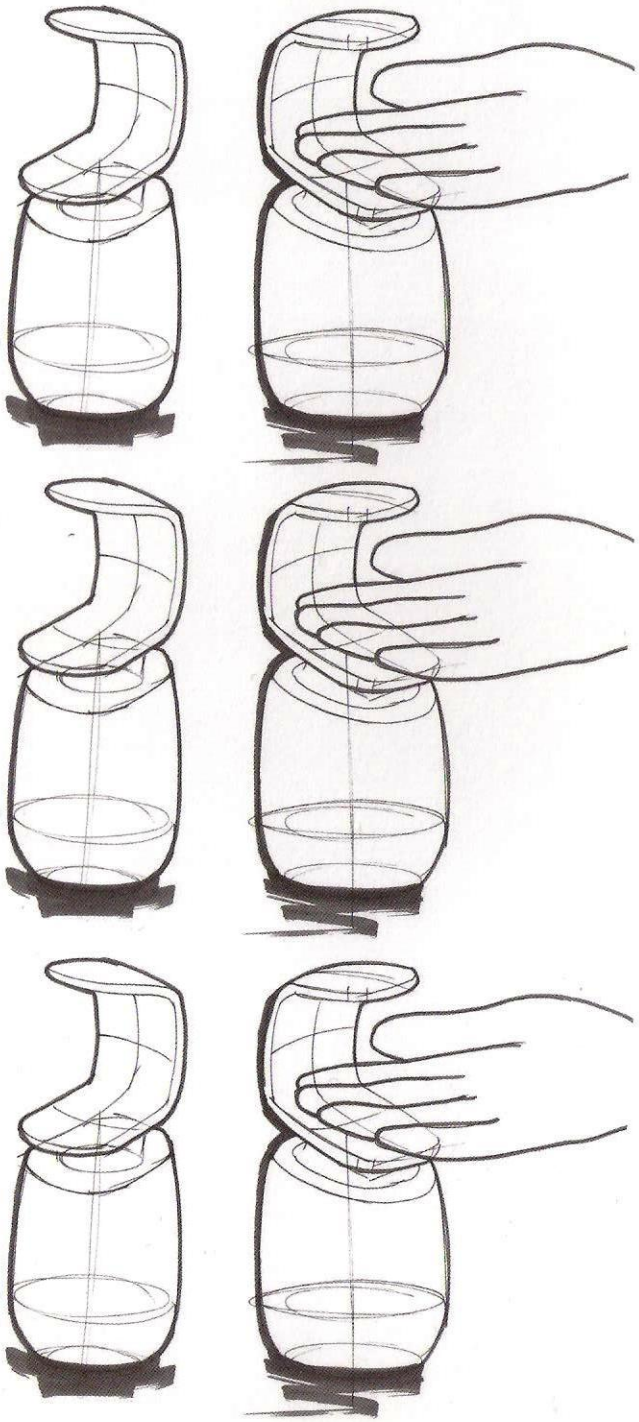
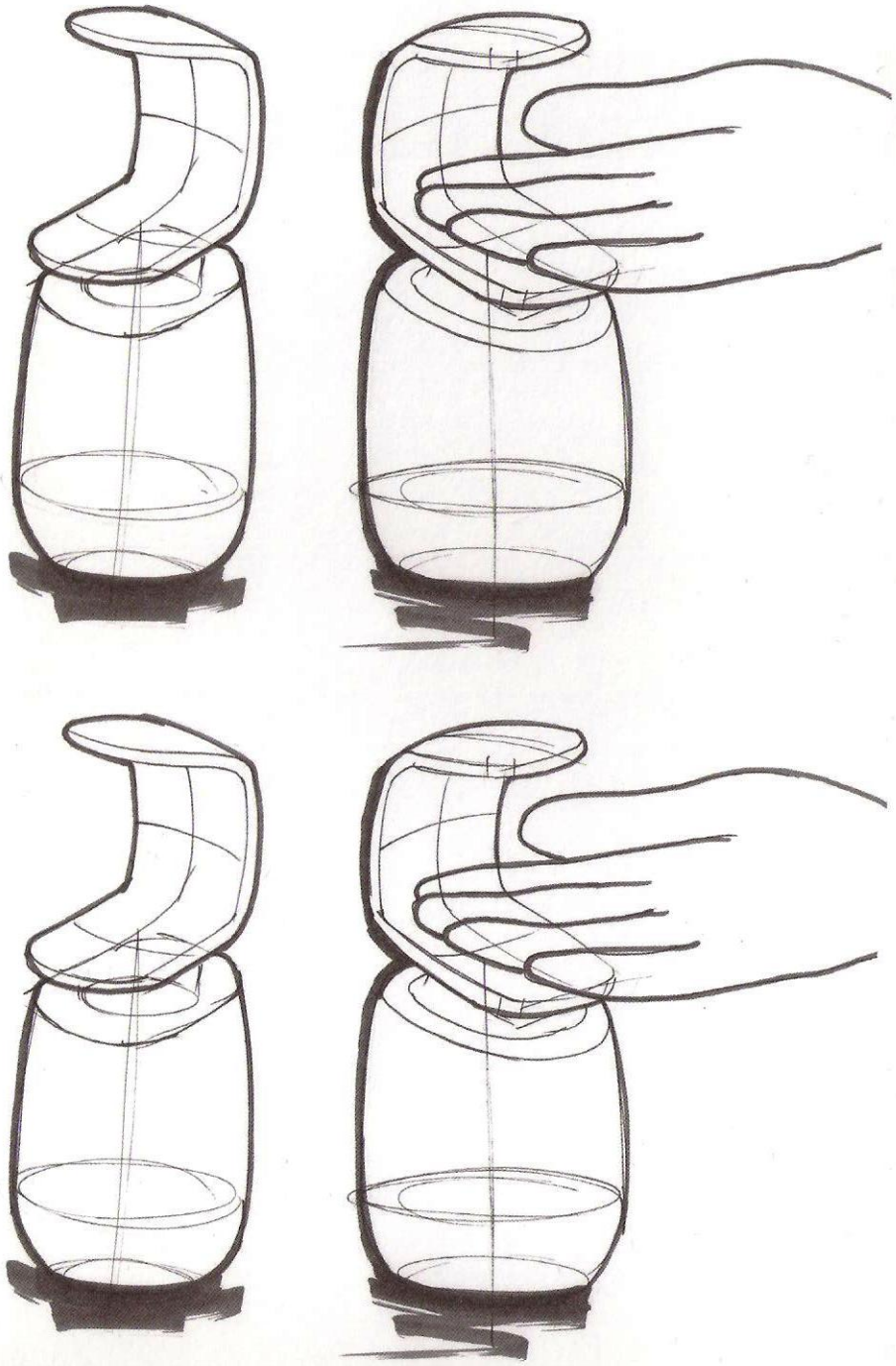
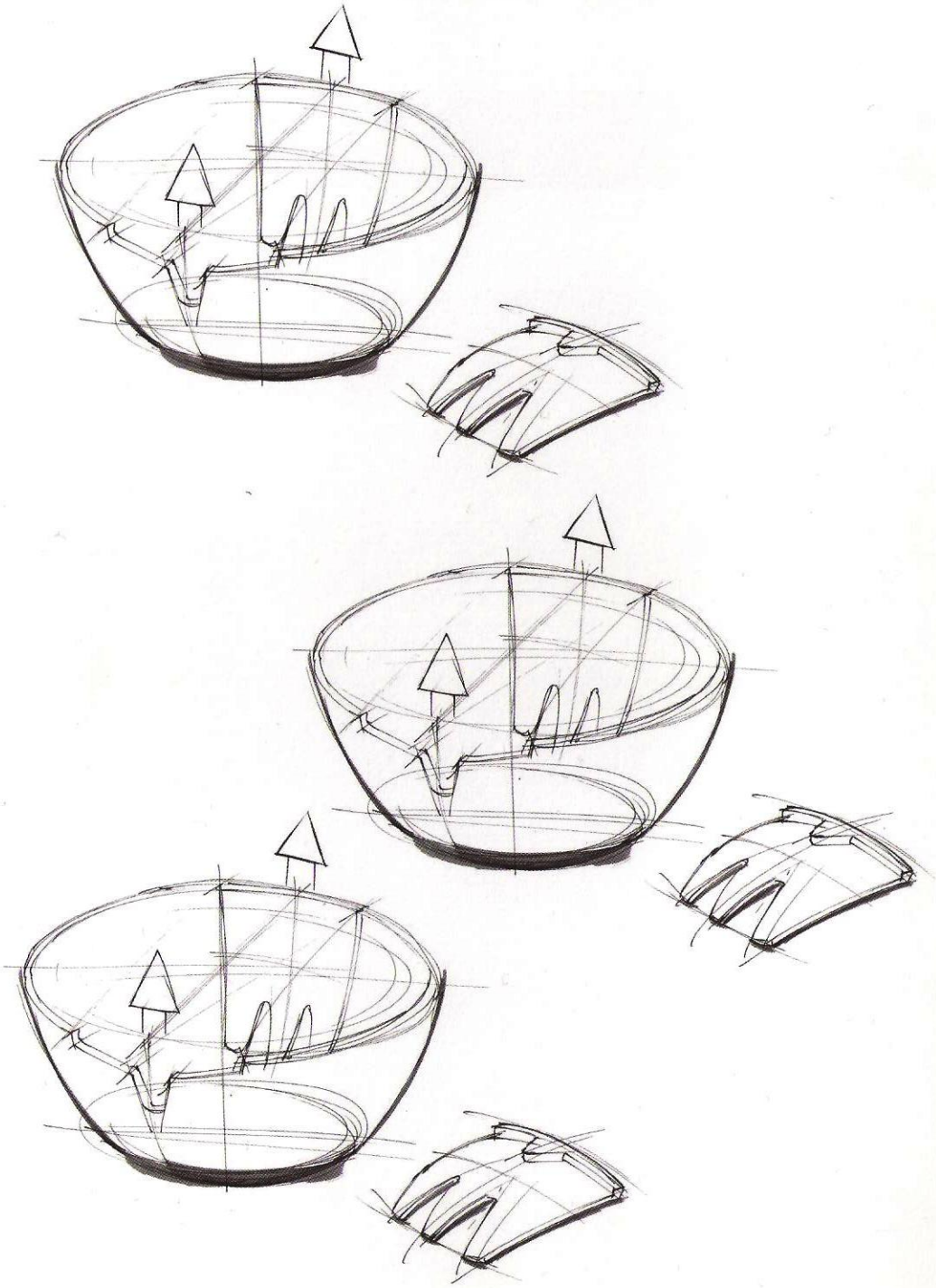


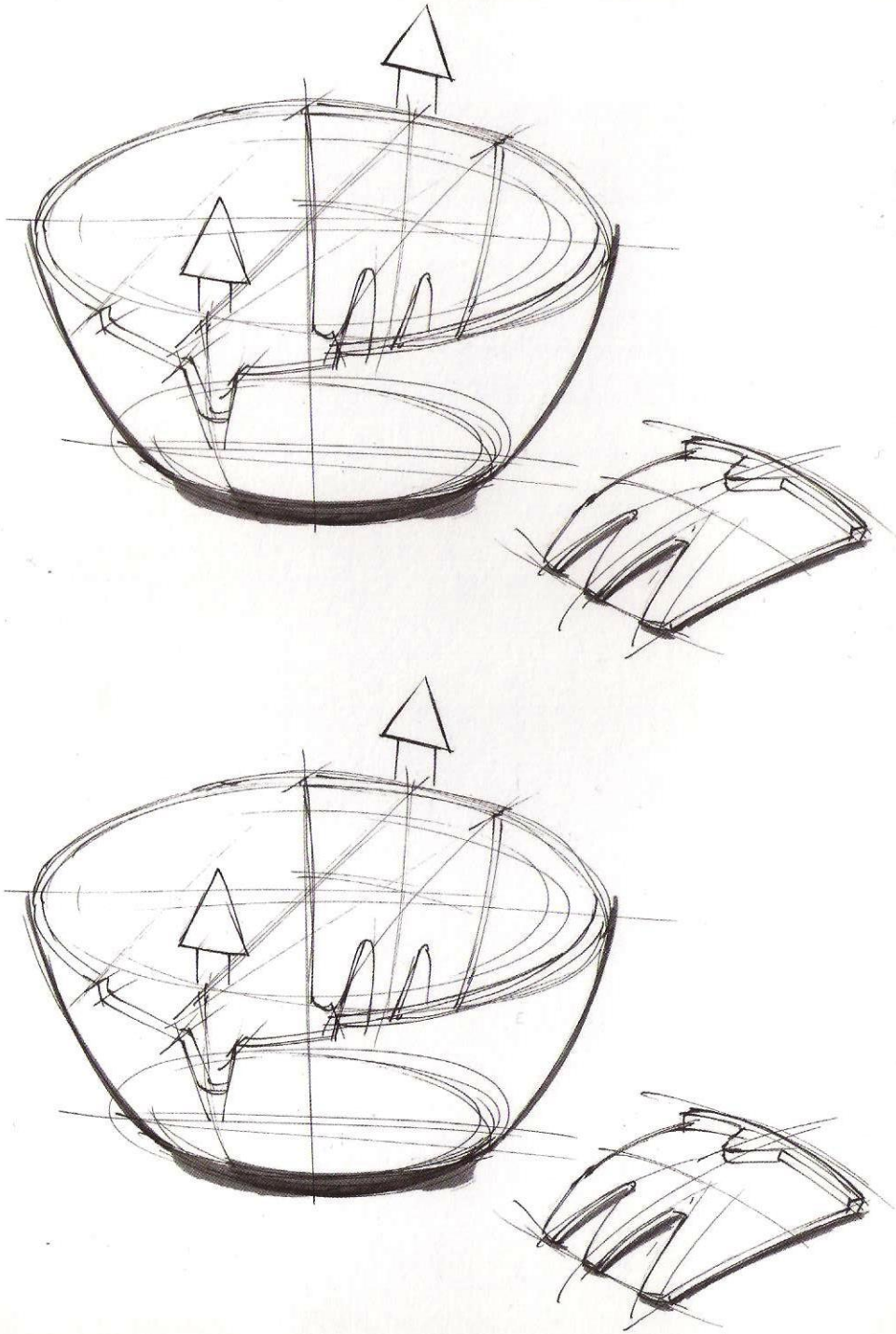
Shading exercise 6



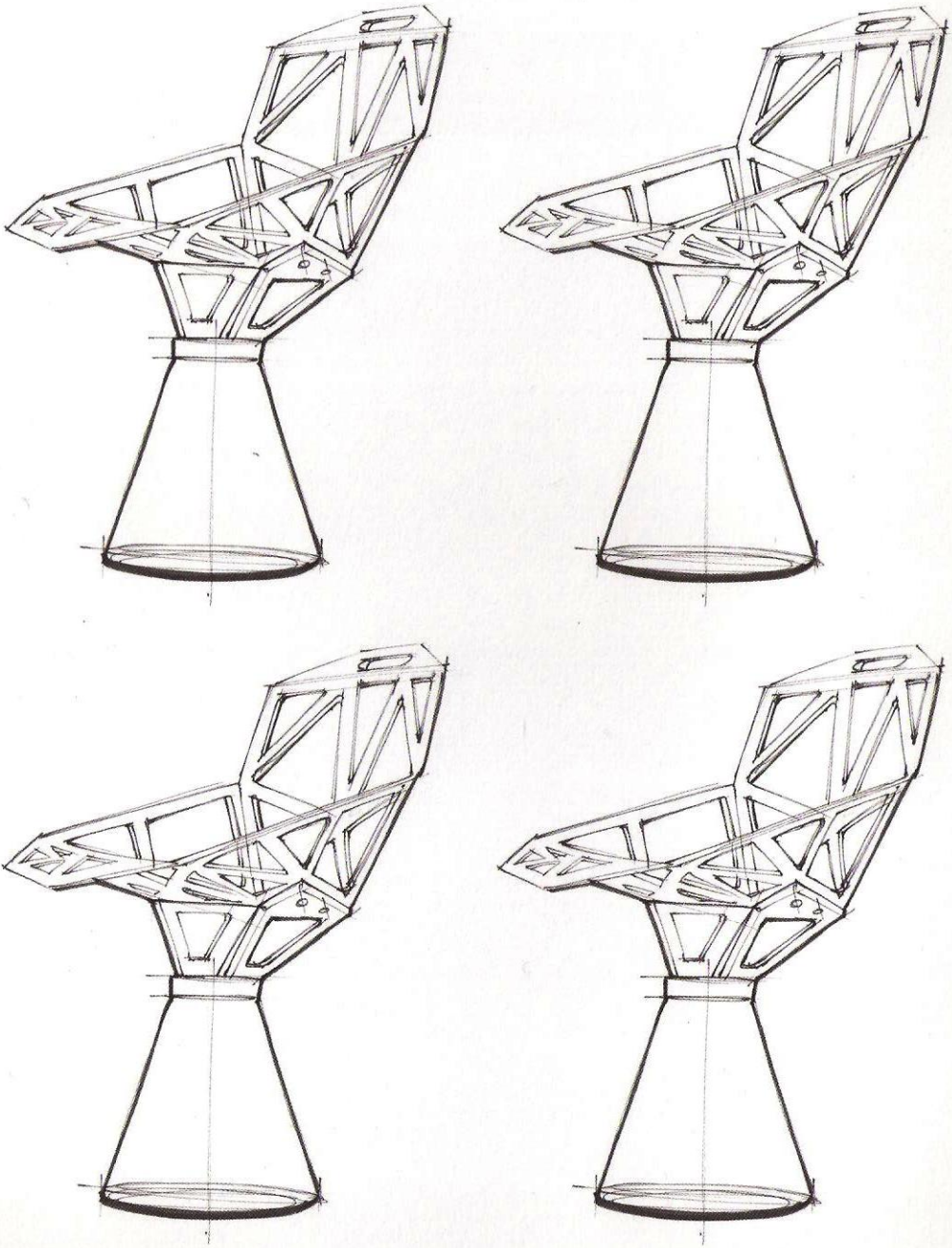
Shading exercise 7



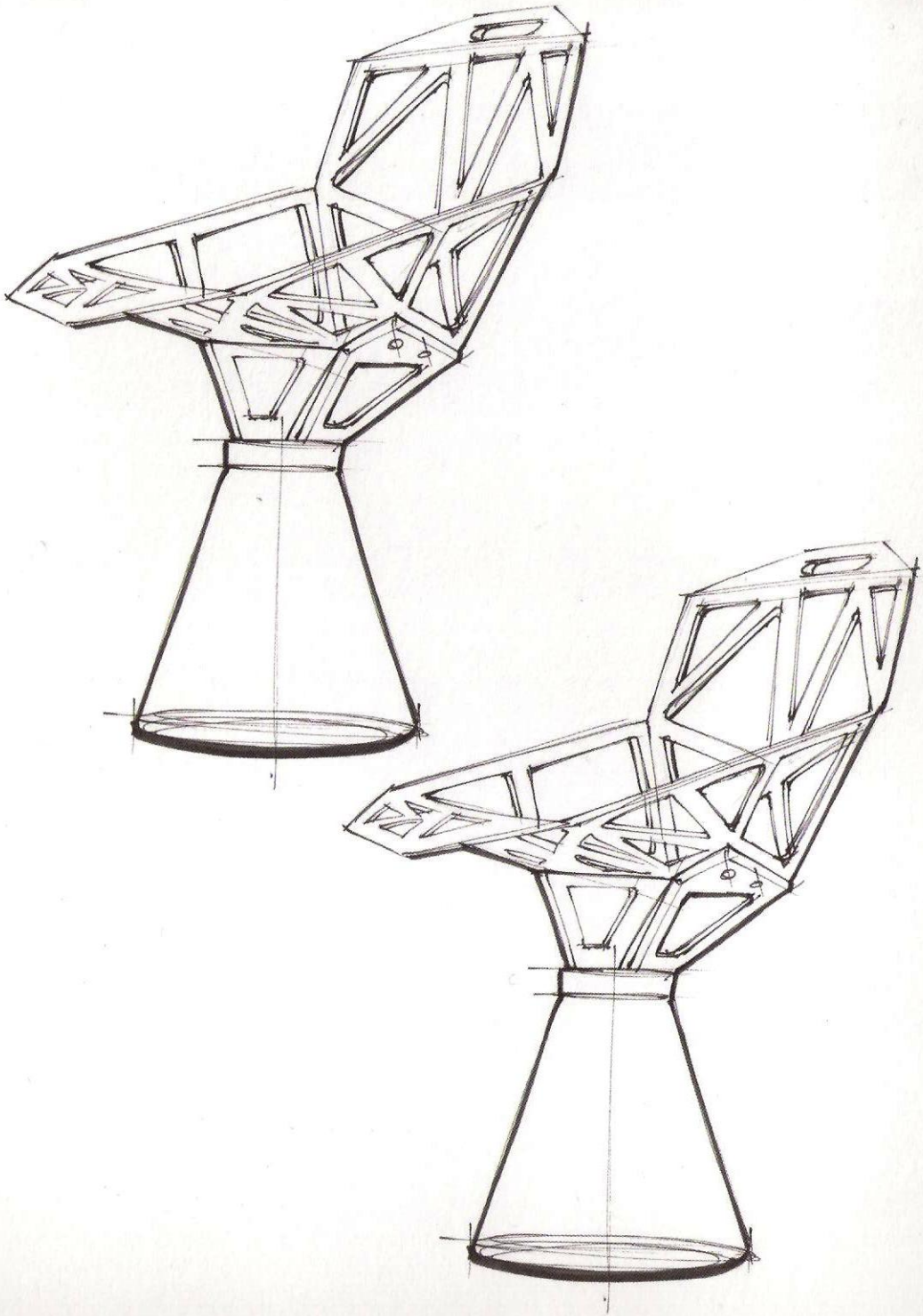
Shading exercise 8



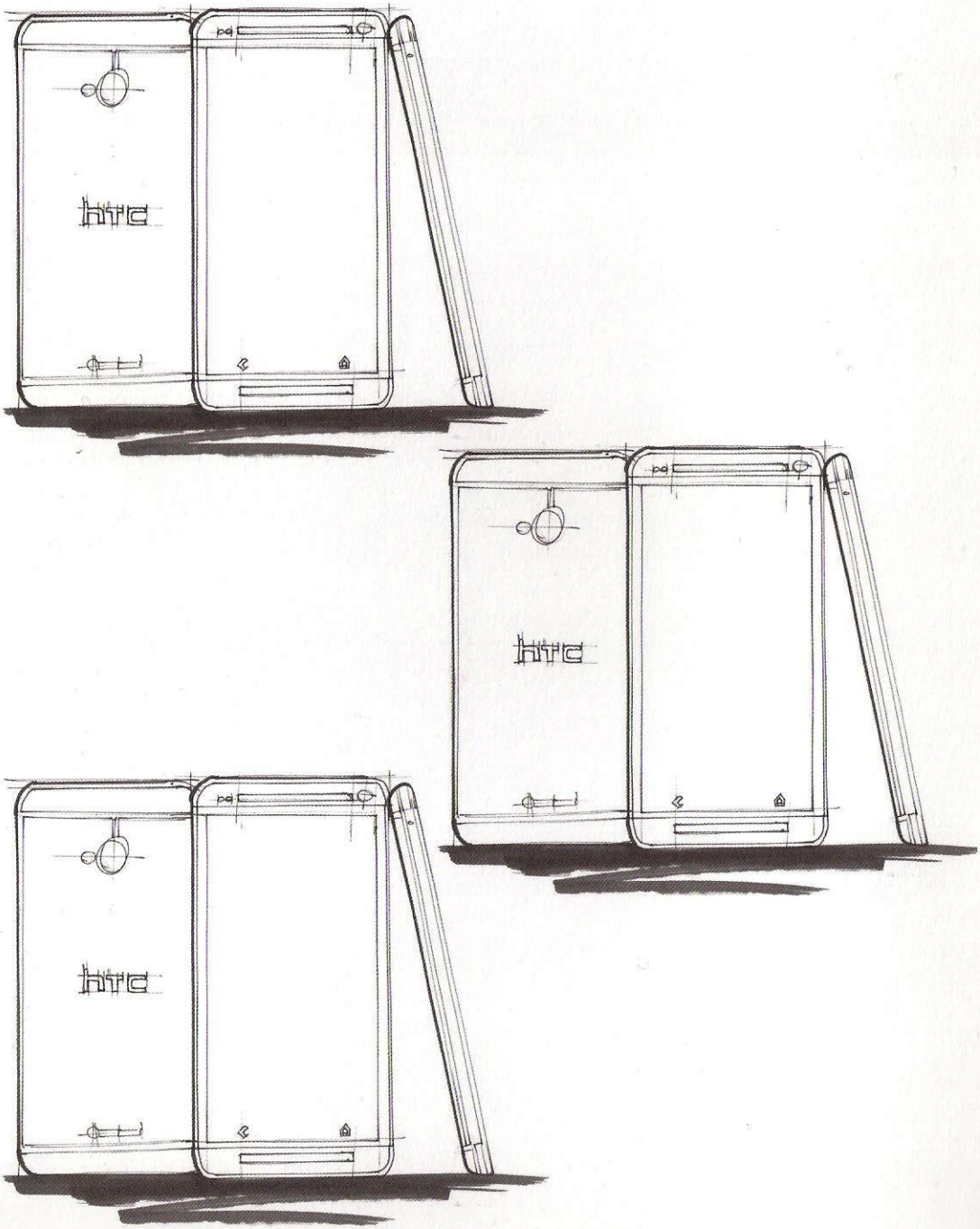
Shading exercise 9



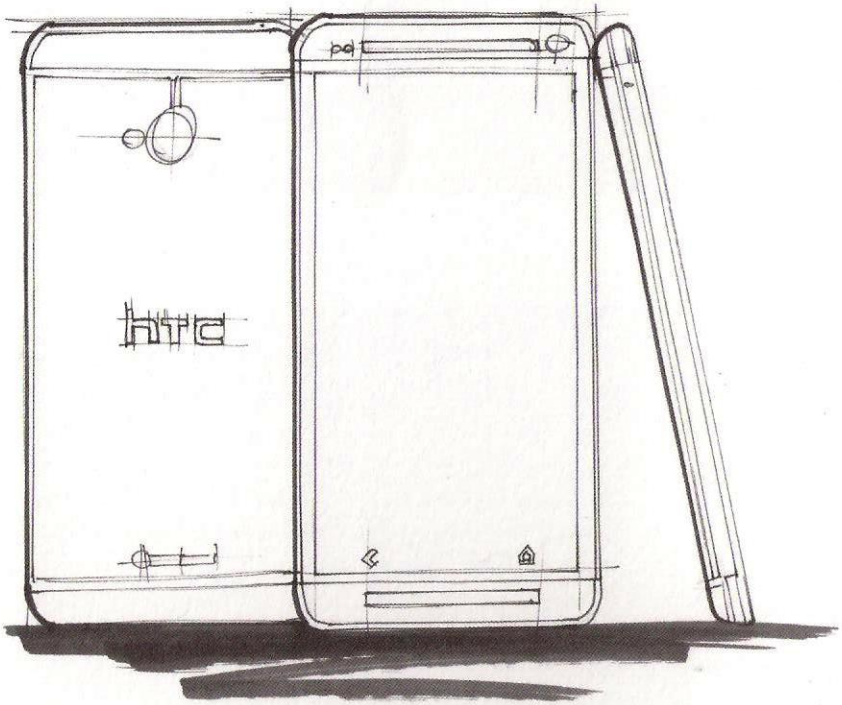
Shading exercise 10

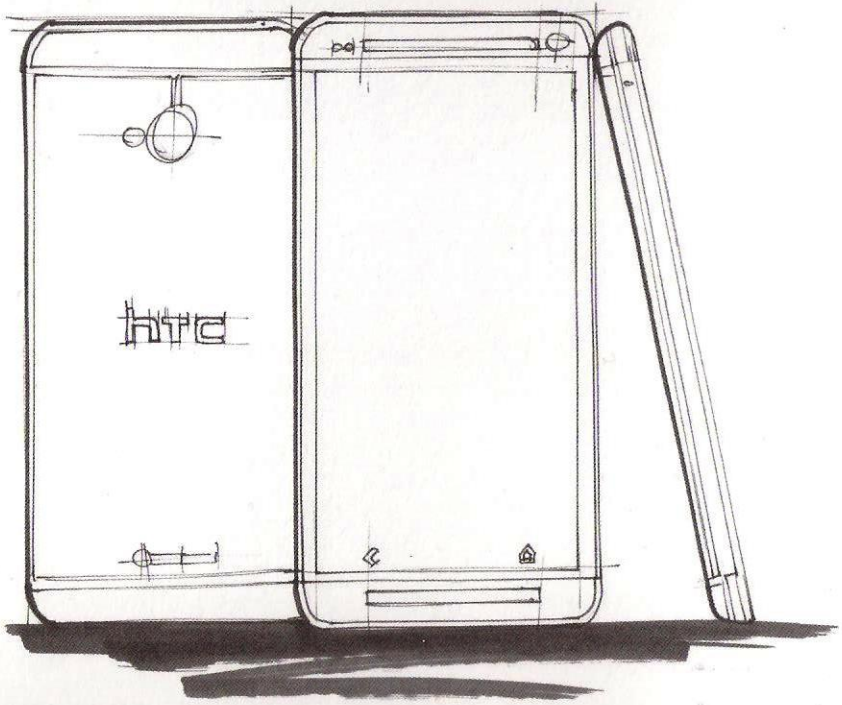


Shading exercise 11

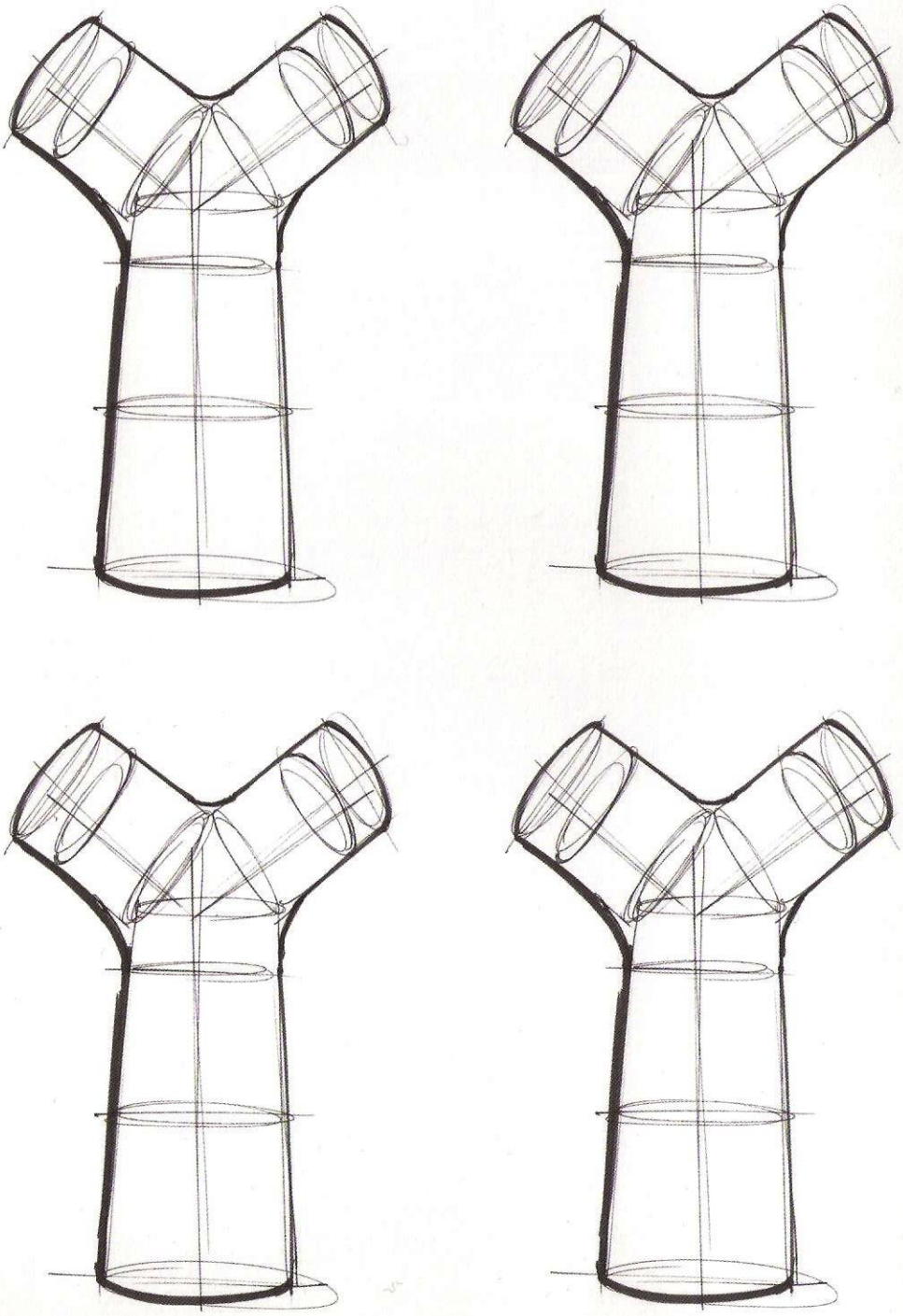


Shading exercise 12





Shading exercise 13



Shading exercise 14