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Exploration of Drawing on the Right Side of the Brain

An Interactive Qualifying Project Report

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by

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1. Drawing
2. Teaching
3. Learning

Abstract

This project explored the teaching techniques of the book Drawing on the Right Side of the Brain by Betty Edwards. To accomplish this goal, several lessons from the book were taught to students at WPI and their work was analyzed.

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Chapter 1

Background

1.1 Introduction

This project was an evaluation of the methods of the book Drawing on the Right Side of the Brain, by Betty Edwards. The book is geared toward teaching the art of drawing to people without any demonstrated artistic abilities. It uses a somewhat different twist on classical teaching methods, involving psychology. To evaluate the proposed teaching method, a series of classes highlighting the lessons from the book were taught to students who could be typically characterized as analytically minded, since this is the audience to whom the book is directed. The supposition was that the analytically minded students, exhibiting the general attributes of left brain thinking (discussed below), would provide the best measure of the technique's success. Students at Worcester Polytechnic Institute represent an appropriate population for this study.

The idea was to evaluate the products of the subject's efforts, and see how they progressed from one lesson to the next. If the majority of the students made significant progress, then we could infer that the method described in the book was successful. On the other hand, if few students progressed, or progress was limited, then the innovative teaching method being evaluated could not be considered effective.

This paper describes the theory behind Drawing on the Right Side of the Brain as well as other methods of drawing, the experiment performed, and the analysis of the data gathered.

1.2 Drawing on the Right Side of the Brain

One of the suppositions Betty Edwards makes in her book is that the major stumbling block to learning how to draw is the manner in which we perceive the world around us. By shifting the way we perceive an object from an analytical, or left-brained viewpoint, to a more creative and less structured right-brained mode, learning how to draw, or so the author claims, becomes possible for even those who have been frustrated in the past. The author cites Roger Sperry's split-brained research as exemplary of the left and right brained approach to psychology.[1] She goes on to say that, as shown by Sperry's research, the left side of the brain is dominant in our culture since it controls language.[2] She describes two modes in which the brain can operate - the L-mode, our normal logical mode, and the R-mode, in which the brain is more able to conceive the big picture and perform spatial analysis. Quoting Sperry's research, her basic strategy is "to present the brain with a job that the verbal, analytic L-mode will turn down"[2] so that the non-dominant R-mode will surface. The R-mode is the submissive mode, responsible for perception and visualization, necessary for proper perception in drawing.[2]

In the lessons that follow, Edwards attempts to bind several basic concepts of perception with the steps of learning to draw. These concepts of perception are the ability to perceive edges, spaces, relationships, light and shadow (or positive and negative space), and the perception of the whole.[2] Rather than trying to reproduce the object directly, Edwards feels the reader should disassemble an object into simple lines and their relations to each other. She effectively demonstrates this in a lesson where the reader is asked to reproduce a Picasso sketch upside-down (see figure 3.3). By viewing the sketch upside-down and concentrating on not identifying the particular parts of the man, the drawing appears more abstract. In this position, she states that it becomes much easier to view the sketch as disjointed lines, rather than complex shapes and patterns. By viewing an object as its smallest components and then gradually increasing the relative scale of the field of view, the brain is tricked into not over-analyzing the object, therefore avoiding

engaging the L-mode of thinking. These lessons are designed to fool the brain into R-mode while moving through the steps of perception in art, and gradually increasing the complexities of the assignments in a way that the student may develop his or her skills.[2]

In order to help the student achieve this type of perception, Edwards chooses exercises that include several classical techniques. One of these is contour drawing, often used in basic art classes such as the required high school art class "The Art of Seeing" taught at Berwick Academy.[3] Contour drawing is the technique of drawing the curves of an object rather than drawing the object itself. By making the student draw an object as it is seen without looking at the paper, the student is kept from over-analyzing what is on the page. Another important technique is adding shading to a drawing. This gives the drawing artificial light and shadow, which are both intermediate steps in the hierarchy of perception, and allows the student to better reproduce the object he/she sees in front of them. Use of shading means envisioning the object on paper as a three-dimensional object to see where both the positive and negative space lie, and then using that vision to shade the two-dimensional object. Visualization and spatialization, qualities exemplified by both of these exercises, are thought of by Edwards as R-mode abilities. Ultimately, Edwards' goal is to teach the reader how to freely choose between L-mode and R-mode thinking, allowing them to visualize more clearly and to draw upon their submissive R-mode.

1.3 The Different Hemispheres of the Brain

The brain has two halves, separated by a set of connecting fibers called the corpus callosum. Each half tends to be slightly asymmetrical, the division from front to back of the brain is such that the left side is slightly wider in the back, and the right side is slightly larger in the front. Each half of the brain controls half of the human body, and are largely equal in their capabilities.[4] "The left cerebral hemisphere is supposed to be

the coldly logical, verbal and dominant half of the brain, while the right developed a reputation as the imaginative side, emotional, spatially aware but suppressed."[4] It has been said that the concept of the left hemisphere of the brain being the seat of logic and reason, and the right being where spatialization and artistic ability are "notions [that] are seen as simplistic at best and nonsense at worst."[4] Tests have proven that there is some difference between the functions of the two hemispheres[5], both through the use of anesthetics and through the analysis of split-brained patients.[1] By injecting sodium amitol[2] into one side of the brain, it will quickly become apparent if this side contains the person's language abilities or not. If indeed the injected side houses the patient's language capabilities, the patient's speech will slow and eventually stop. This division is not as simple as the often thought division of the analytical to left, and creative to the right.

A large part of the contributing research for the theory that each half our brain is responsible for a different type of thought is attributed to the Nobel-prize winning work of Roger Sperry.[1, 5, 6] Sperry began his research as a way to control severe epileptic seizures, under the supposition that if the connections between the two hemispheres of the brain were severed, the electrical charge that causes seizures could not build up. As a consequence of this surgery, Sperry came to the realization that the patient suffered some side effects. Although this treatment is no longer common, it is used occasionally in cases of severe epilepsy.[3] Patients had their *corpus callosum*, the connecting fibers between the left and right hemispheres, severed, and up until the last 20 years or so, it was severed completely in this operation. This membrane provides communication between the two hemispheres, but without it, "their right hand doesn't always approve of what their left hand is doing."[7]

"What the researchers found with the split brain patients . . . was that information

[1]People who have had the connection between their hemispheres of their brains cut surgically.
[2]Better known as a type of truth serum, it paralyzes local nerve function in small doses
[3]Where medication is ineffective

in one hemisphere was not available to the other."[8] This creates interesting problems, although generally they are not noticeable unless the patient is under examination. The left half of each eye reports back what light it sees reflected to the right hemisphere of the brain, and the right half of each eye returns information to the left hemisphere.[9] By using a device called a tachistoscope, words or images can be flashed to one side of the eye, and thus in split-brained patients, one side of the brain. If the word "heart" was flashed to a patient with the connections between their hemispheres severed and that patient was asked to point out what he saw with his right hand, he would point to "art". If the patient was asked to point out what he saw with his left hand (and right side of the brain), he would point to "he".[9] "The right hand and eye could name an object, such as a pencil, but the patient could not explain what it was used for. When shown to the left hand and eye, the patient could explain and demonstrate its use, but could not name it."[6] This is quite interesting and indicates that there may be at least some truth to the idea that the two hemispheres have separated functions.

"In one test, researchers flashed an image, say a picture of an apple, to the left hemisphere, and then the right hand (which connects to the left hemisphere) was always able to point out from a series of pictures on 3x5 cards the correct image. The same occurred with the right hemisphere and left hand. This was true regardless of the stimulus - geometric symbol, single words, letters, numerals, or other objects. It was also true that the hand on the same side as the hemisphere that had received the stimulus could not point to the flashed images."[8] This demonstrates that the hemispheres share some basic functions. If the two hemispheres have some overlapping capabilities, the split-brained patient would be unable to complete the exercise in both configurations.

Unfortunately, this does little to prove the logical/creative split to be true. Indeed, it instead shows that "the only demonstrated processing difference between them was the verbal-nonverbal dichotomy."[8][4] Calvin even suggests that the split-brain experiments

[4]This term refers to the relegation of verbal language to one hemisphere of the brain, and not the other

have nothing to do with the normal functioning of a whole brain at all, stating that "split-brain patients may be excellent candidates for studying the ability of functions to migrate from one hemisphere to the other during early childhood, rather than excellent candidates for inferring the separate abilities of the two hemispheres."[7] This is due to the fact that abilities can no longer migrate from one hemisphere to another without the corpus callosum.

Robert Ornstein, president of the Institute for the Study of Human Knowledge and author of 20 books on the workings of the brain, speaks of the differences and similarities between the hemispheres in his book, The Right Mind. Ornstein does not believe the differences between the hemispheres to be black and white. He acknowledges that there are differences, but that instead of one side or the other being capable of certain tasks, the left and right hemispheres may just be better at performing particular tasks. Logically, this would not change the results of other research, because if the one side of the brain is only slightly better than the other at a particular task, such as speech, a human will always use that side if it is available. Even though 90% of the right-handed population and 60% of left-handers have their language center in their left hemisphere, the fact that the opposite also occurs means that the hemispheres are not fundamentally very different from each other. It also follows that for the 40% of left-handed people and the 10% of right-handed people whose language center is in the right side of the brain, the right side was better at performing those tasks. Sometimes, if one side of the brain is damaged, the other can take over that side's normal duties, exemplifying at the same time the resilience and the flexibility of the brain. Rather than one side being incapable of language tasks, we simply become accustomed to using the left hemisphere of our brain for language. [9]

This brings one to the conclusion that although split-brained patients show starker separation between the hemispheres, this is most likely because they have lost that ability to communicate between them.[7, 9] A split-brained patient would most likely be less able to recover from trauma resulting to one side of the brain than someone with their corpus

callosum intact, because there would be no way to transfer the knowledge left in the damaged hemisphere to the intact one. These results are not exemplary of an intact brain, and considering the lack of conclusive evidence in normal patients (those with intact brains), and that sometimes the more common ordering of brain functionality is reversed in particular individuals, this suggests that there is uncertainty in the validity of the psychological claims that Edwards' book is based upon. However, even if the psychological foundation for the book is completely invalid, the classical teaching methods that Edwards uses should be no less successful than in traditional contexts.

1.4 Classical Methods of Teaching how to Draw

The definition of drawing is "to produce a likeness or representation of by making lines on a surface"[10] Drawing requires a solid foundation of technical skill in the medium, whether this skill comes through formal training, or naturally. It has been said that a beginning artist must "be content [being] merely a copyist" until their technical skill is perfected.[11] The techniques that introductory drawing books cover can range from the use of drawing instruments, to selecting the right kind of surface material, to the transcription of proportion. Of the books reviewed for this project, each focuses on techniques of perceiving the subject of a drawing.

A primary difference between Drawing on the Right Side of the Brain and other introductory drawing books is the focus on creativity, rather than on merely techniques for creating a drawing. The other texts describe formulas for drawing, or step by step methods for creating the image, or techniques for determining size ratios, but none made any significant reference to creativity. Peter C. Marzio, in his book, The Art Crusade: An Analysis of American Drawing Manuals, categorizes many early American books on drawing instruction with phrases like "Drawing by Formula", and "Learning to See".[11] He also has a section entitled "Can Anyone Learn to Draw?". This section describes books

that claim to be able to teach anyone how to draw arguing that they put the "Laws of perspective" into terms the beginning artist can understand. As an example, he describes a method written by John Gadsby Chapman which says "hold a thread, with a slight weight attached to it, at arms length, between him and [the object] and he will at once see all the perpendicular lines he desires, drawn, as it were, against the [object] by the thread." This is an example of a simplified technique for determining angles.[11] This is a strong contrast to theoretical basis of Drawing on the Right Side of the Brain which focuses mainly on freeing the creative half of your brain.

By studying a number of drawing instruction books[11-17], it can be observed that the standard technique for teaching how to draw can be summed up in three basic parts: learning to see as an artist, learning techniques for creating a drawing, and studying the properties of the subject.

Learning to see as an artist, whether this be through the use of perspective, ratios, or thinking differently, involves learning to ignore the extra information that the brain fills in when one looks at an object or scene. To create a realistic drawing, one must capture the scene as it looks before their brain processes what it is seeing. When the brain processes an image, the image is a composition of information from both eyes. Each eye sees a slightly different image, yet only one image can be recorded on the paper. Also, when one views an object, their brain can fill in additional details derived from an understanding of the object. Many books describe how untrained artists often fail because they are trying to capture these extra details in their image; since these details are not in the actual scene, they can only get in the way of an accurate drawing.[2,11-15]

There are a few ways books discuss learning the techniques of creating an image with the media of choice. All of the books examined here describe methods for creating distinctive levels of shading or color blending or both. Some even describe how to apply the appropriate amount of pressure throughout a stroke of the drawing instrument. Other media related discussion involves the choice of paper, or instrument.[2, 12, 13, 14]

Studying the properties of the type of subject of the drawing is the realm of advanced art books. This type of discussion leaves the realm of drawing instruction, which includes drafting and descriptive illustration, and enters that of artistic instruction. Studying the properties of different objects is an exercise that is designed to help an artist draw scenes from their own imagination. Introductory books typically talk about drawing an object that you can look at, or drawing a pattern[11-15]. Only after this skill is perfected does any book begin to talk about perceiving objects in your mind (Drawing on the Right Side of the Brain doesn't specifically mention this at all).[15, 16]

Most drawing books observed choose to specialize one of these three categories. The reason for this may be that different authors have different opinions as to which part is most important. There are many books on drawing using a particular media.[14] Other books concentrate on drawing either landscapes, objects, or figures.[12, 13] Yet other books will give general drawing advice but then concentrate on the characteristics of a particular type of subject such as the female body, or types of flowers.[17] The books that claim to be generalist in all of these areas ([15, 18]) tend to have many short sections about each area or be aimed at younger students and focus on creating drawings without perceived depth. Even Betty Edwards' book is a series of exercises first on learning to see as an artist, and then on learning how to use the pencil and paper media. Even in the early exercises, where the focus is on thinking with the creative half of your brain, the exercises closely resemble the techniques described in many older instruction manuals. By the end of the book, the focus on creativity over logic is lost completely.[2]

1.5 Technique and Learning to Draw

Having "learned to draw" is a short way of saying that one is proficient in each of the *necessary* techniques to translate a visual concept into two-dimensional physical form.[2, 11, 17] The bulk of each introductory drawing tutorial concentrates on the techniques

of creating the image.[2, 12, 13, 14] Only in more advanced art texts does the study of forms get equal representation as technique.[17] This is the case with all of the books reviewed including the Betty Edwards book. There are techniques for perception of the subject, and mechanical techniques for creation the image on the media.

The subject of mechanical drawing techniques has no limits. The limits of artistic media are dictated solely by human ingenuity, providing a seemingly endless supply of new artistic media. The number of techniques for perception of *real* objects, however, appear to be finite. There are two techniques that are common amongst the books reviewed. These books include descriptions of one or both of perspective and what can be called "de-objectification". To "de-objectify" is to view an object as part of the whole picture, and not single it out and classify it. A common way for a book to describe this method is to view the "apparent" features of the subject.[13][5] The Betty Edwards book describes this as thinking in R-mode.[2] Using perspective is a way of generalizing the way that objects appear in relation to the distance they are from the viewer. Various techniques involving perspective have been described including single or multi "point" perspective, where there are one or more "vanishing points." A vanishing point is a point in an image where parallel lines become so far away that they appear to meet.[11] Another way to create a perspective drawing is to compare the sizes of objects that are far away to the length of an object being viewed up close. A common way one could do this is to hold a pencil as far from the eye as the paper is, and measure the length of pencil that relates to the size of a distant object. The length of the pencil that matches the edge in the scene can then be translated directly onto the paper by laying the pencil on the drawing.[2, 11, 14] Betty Edwards claims that because the artist is relating abstract lines to each other that this is an R-mode way of viewing the scene. Another technique that is common to perspective exercises is to compare all angles to vertical lines in the scene since vertical is always the same throughout a perspective drawing. A variation of this

[5]For a description of a method of viewing apparent features of an object see section 4.2.5.

involves using a pencil as a vertical to determine angles that are far from actual vertical lines in the scene.

Usually the perceptive technique a particular method teaches is tied to a gimmick to keep the student interested in continuing the lessons.[2, 11, 12] The Betty Edwards book claims to work because it takes advantage of modern scientific research.[2] Earlier books' gimmicks were along similar lines. Some examples from the Marzio book include sugar coating the names of techniques to make them sound easier (such as "practical perspective" or "progressive drawing"), "summing up" the technique in a small number of broad rules, and providing fool proof detailed technical procedures for drawing a scene.[11] An example of detailed technical procedures accompanied the template in figure 1.1. The template shows the relationship between lines and points the author described in his formula. The formula itself was 43 pages of detailed step by step instructions which, when followed precisely, would supposedly allow anybody to create a perfect drawing.[11] This particular figure shows the drawing as the section within the dark outline on the top labeled "The Picture." The dotted lines within this section are a translation of the angles in the "geometrical plan" below. The geometrical plan is a top down view of the scene, and the instructions describe how to use the "point of sight" and the "line of the horizon" to translate angles in the scene into angles in the drawing.[11]

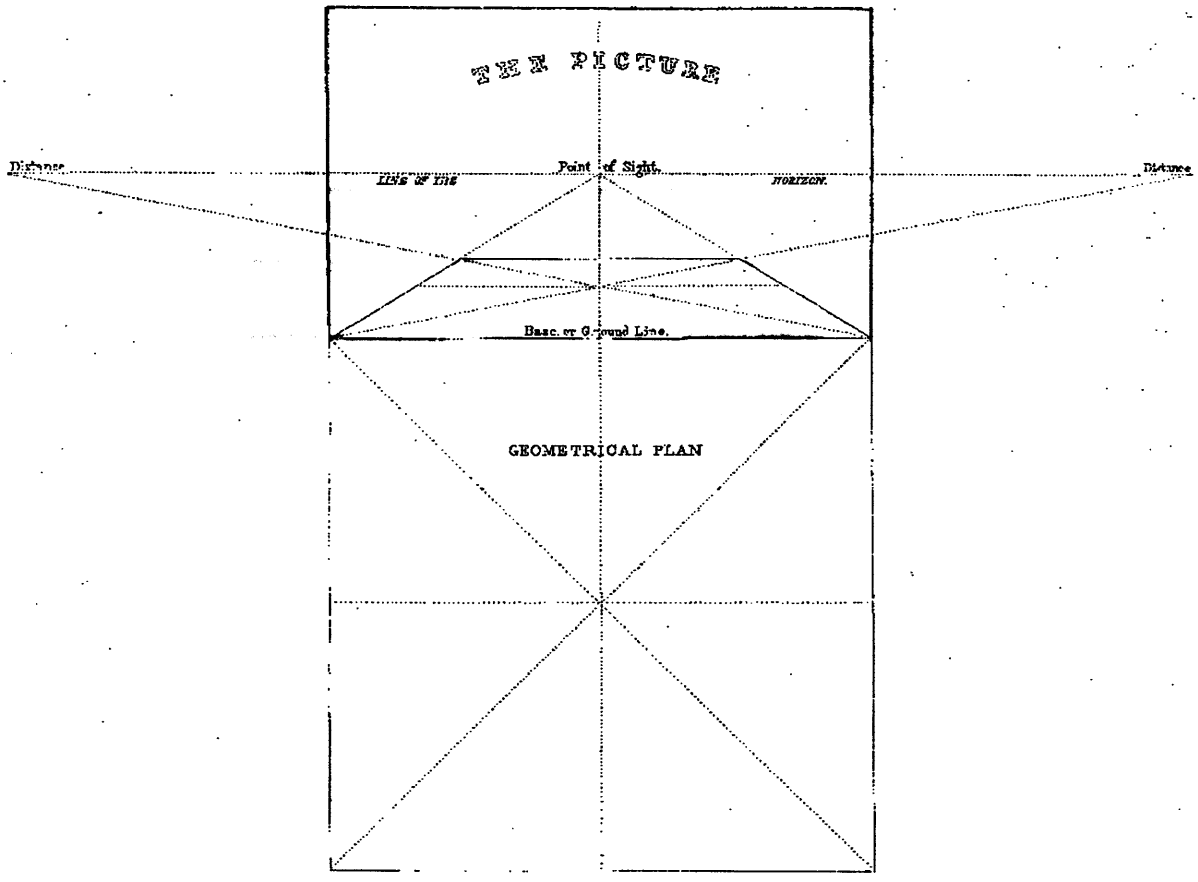

Figure 1.1: An example of a formula template used in an early American drawing manual for beginners.

Chapter 2

Goals

The book "Drawing on the Right Side of the Brain" is a bestselling[1] artistic instruction manual. The concept of using a different part of the brain to improve the ability to draw provides initial appeal to the book, but are its claims true? Does the book actually facilitate the use a different part of the brain, or is this claim just a gimmick to gain student's interest in the book? In order to accomplish the overall goal of evaluating the claims of the book, several tasks needed to be completed.

2.1 Designing the Experiment

In order to test the claims of the book, a controlled population was exposed to the book's technique. Not all of the lessons contained within the book relate to thinking with the right hemisphere of the brain. Some discuss general artistic techniques or other perceptive exercises. To deal with time constraints, it was necessary to evaluate which exercises in the book were directly related to thinking with the right side of the brain. If the claim that using the "right side" of the brain improves drawing skill is justified, then these exercises alone should show noticeable improvement in ability. This is the same approach that Betty Edwards takes when teaching three day seminars on drawing where

[1] According to the publisher, over 2,500,000 copies have been sold

time is limited. She says these particular exercises are useful "to present the perceptual strategies emphasized in the book and to demonstrate each participant's potential artistic capabilities."[19]

Betty Edwards describes the need to keep student's attention while teaching drawing seminars mandated in a corporate environment.[19] In the same way, this experiment also had to be able nourish our volunteers interest in the project such that they would continue to willingly participate. Since the students were volunteers, the classes had to gather the data we needed from the students without being so intrusive into the student's life that they stopped attending. Much in the same way that the sponsor of a seminar would expect to see results, accurate data is necessary for a successful experiment. Cooperation with the exercises precise instructions is necessary for success. Failure to show improvement could easily have become a cause for students loss of interest, so exercises that have the most potential for showing each student's ability are essential.

2.2 Collection of Data

A variety of data was collected from each student for analysis. Each of the student's drawings from the given exercises were needed in order to evaluate their improvement. Any time one of the exercises called for reflection on a particular section, the student's reflection needed to be collected in writing. Drawings of a similar nature from before the exercises started and from after the exercises completed were required for evaluation of individual improvement. Demographic data about the group of students was collected in hopes that a statistical analysis of the results would reveal patterns. Also, each of the student's work needed to be kept organized such that each drawing could be easily associated with a particular student and exercise, yet marked in such a way that an unbiased analysis of each drawing could be made.

Chapter 3

Methodology

3.1 The Experiment

Lessons were conducted once a week for five weeks. This schedule was chosen based on the time required to complete the exercises, and how much time volunteers were willing to devote to the task. The exercises chosen were those which are most pertinent to the claims of the book. A majority of the book deals with the techniques of using the pencil and paper media to create an image. These techniques are above and beyond the basic subset of skills required to be able to draw in the general case. Only a small subset of the book deals with thinking in the R-mode. Since thinking in the R-mode provides all of the perceptive skills Betty Edwards says are necessary to be able to draw[19], these exercises were the focus of our experiment.

Near the start of this project, a new edition of Drawing on the Right Side of the Brain came out[19]. Since the project was started with the original book, the exercises used for the classes also came from the original book. This should not be significant, however, since the the exercises used changed very little in the new edition. Where they were changed it was only in wording. Where additional background information was added, it was passed on to the students. Also, the information contained in the new introduction

confirmed our plans for which exercises to use.[2, 19]

Before the classes began, each exercise was scheduled and the necessary materials were gathered. Initially, the plan was to have an exercise associated with each class, however, it was occasionally necessary to have particular students complete an exercise between classes, or to complete two exercises in the same class. Also, three smaller exercises were given to the students to complete before the classes started. The classroom was set up so that every student had easy access to the background information from each exercise.

Demographic data, including the students name, age, major, sex, and information about their previous experience, was collected during the first class. As a more subjective measure, students were also asked about their level of previous artistic experience, personal confidence in their abilities, and the students confidence in the project methods.

The product of the student's efforts was collected and labeled.

3.2 Lessons

The five classes were divided up into eight exercises adapted from the first seven chapters of Drawing on the Right Side of the Brain. Three exercises were to be done outside of class, and the ninth exercise was to be completed in a sixth class that never took place. Each exercise was kept as similar to the original as possible without having done *all* of the exercises. The only changes that were made involved the "viewfinder" which is described later. A less elaborate method was chosen that required less time and materials while still having the same effect. Copies of the book were given to the students as reference for the instructions. Figures that needed to be viewed by every student simultaneously were distributed on individual sheets of paper. During each of the exercises members of the project group were available to answer any procedural questions, as well as to give an initial presentation on the instructions and background.

The lessons emphasize looking at the subject as a group of lines and curves. The

reasoning for this is that the symbol system of the brain (the part that has names for everything) operates in L-mode. In order to get out of L-mode one must avoid these names entirely. Similarly, abstract and nameless data is supposedly not interesting to the L-mode because it cannot name or analyze it. Therefore when viewing nameless and abstract data one's R-mode is left to do the processing.[2]

3.2.1 Exercises 1, 2, and 3

The first three exercises were given to the students for completion before the first class (see e-mail, figure 3.1). These exercise were intended as a reference to use later in evaluating student progress. The three exercises were to draw a self portrait, to draw a picture of someone else from memory, and to draw their hand. The instructions for these exercises were sent to the students in a preliminary e-mail. Interestingly, none of the students completed the drawing of someone else, making the ninth exercise of repeating this drawing useless. Since exercises two and nine were not completed, our analysis focused to the drawings of the hand rather than on those of another person.

3.2.2 Exercise 4 (First Class):

Vases and Faces

The fourth exercise was the "Vases and Faces" exercise. The exercise involves copying a drawing that looks both like a vase and like the profile of two faces looking at each other. (See Figure 3.2) This exercise is supposed to introduce the student to the shift from using the "dominant left-hemisphere mode to [the] sub-dominant R-mode"[2] Looking at the drawing, the students were asked to copy onto their paper the side of the "Vases/Faces" drawing opposite from the hand they were going to use to draw the exercise. For example, a left handed student would draw the vertical line that represents the right side of the vase. They were instructed to think of the drawing as simply a curved line as they copied

```
To: rsotb-list@wpi.edu
From:
Subject: Welcome to "Drawing On the Right Side of the Brain"

Welcome to "Drawing On the Right Side of the Brain"

This class is an investigation of methods for teaching people who
are more technically inclined how to draw. Before classes begin we
would like to have you draw some things on your own. This is so we
can track your progress and so that you can see your own improvement.

The drawings we would like you to bring with you to the first class
are:

- A "Self portrait"
- A picture of someone else from memory
- A drawing of your hand

You don't need to spend too long on these drawings. Also, only do as
much as you're comfortable with. If what you can draw is just a stick
figure, that's fine.

Thanks for participating, and we look forward to seeing you at the first
class.

--
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Figure 3.1: The preliminary e-mail

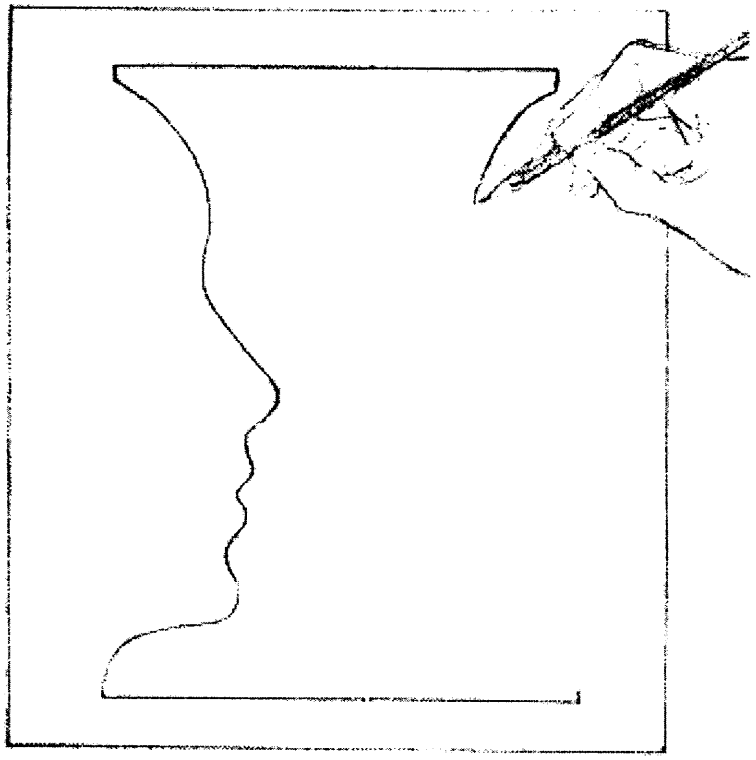


Figure 3.2: How a right handed student would begin the Vases and Faces exercise.

the original. Then they were to look away from the original drawing and copy a "mirror image" of the line they had already drawn on the opposite side of the paper. As the students drew the second line, they were to name each part of the face it represented. If and when the student felt mental conflict they were supposed to make a note of it on the paper. The point of this was to insure that the student was in L-mode when doing this drawing. Explicitly thinking about this gives the student a clear idea of how L-mode can impede one's drawing ability.

3.2.3 Exercise 5

Upside down Picasso

The fifth exercise was to copy the upside down Picasso drawing shown in figure 3.3. While there is no explanation for the choice of this particular drawing, Betty Edwards does mention that this drawing contains some perspective that students typically find

difficult to recreate.[19] The drawing is also a line drawing rather then a shaded and detailed drawing. Copying the drawing upside down is supposed to aid the student in thinking of the drawing as a series of lines and curves, rather than a picture of a man.[2] The students were asked to try not to think of sections of the drawing as the object they represented. The book mentions that during this exercise the student should notice their thought switch into R-mode. The students were asked to write down when this happened. After completion of the copying, the students were allowed the turn their drawing around so that they could view the image was right side up. This was to allow them to see whether the exercise was successful.

3.2.4 Exercise 6

Pure Contour Drawing

Exercise six involved "pure contour drawing." A pure contour drawing does not end up looking at all like the object being drawn. Pure contour drawing is an exercise in focusing on details. The artist does not look at the paper while making a pure contour drawing, instead the artist concentrates on the smallest details of an object. While concentrating on the details the artist is supposed to draw just the lines that makes up the detail on which they are focusing. Each line is completely unrelated to the others except that the pencil is never lifted from the paper. The reason for this is that the student should be learning how to concentrate on details, rather than thinking about the relationship of the details to each other. The students were asked to make a pure contour drawing of their hand. Drawing was to be continued for at least a full five minutes. According to the book, contour drawing is supposed to cause confusion when thinking in L-mode, but feel completely natural in R-mode. The students were asked to note whether this was the case.

Figure 3.3: Picasso's drawing of Igor Stravinsky upside-down.

3.2.5 Exercise 7

Modified Contour Drawing

A modified contour drawing is created with the same technique as a pure contour drawing, except that the subject is viewed *through* the drawing surface. For this reason, the collection of details should look almost exactly like the object being drawn. To accomplish this, the students were instructed to create a "viewfinder." Each student was given a cutting tool, a piece of paperboard, and a clear sheet of plastic. A square hole was cut in the center of the piece of paperboard, and the clear piece of plastic was taped over the hole. The students were instructed to rest the viewfinder on their hand, and close one eye. Closing one eye is necessary simply because at a close range different parts of the student's hand are visible to each eye. This is called *disparity.* Each student was asked to draw the detail of their hand on the clear plastic, thinking of each detail as simply a line or a curve. If the R-mode training from the previous exercises had worked then thinking this way should be easy for the students. When the students felt they had drawn every detail, the plastic sheet was removed from the frame and taped over a clean sheet of white paper for viewing.

3.2.6 Exercise 8

Negative Space Drawing

The final exercise was to copy the modified contour drawing as a "negative space drawing" Negative space drawing creates the same edge lines on the paper as drawing the outline of an object, however when you create a negative space drawing you think of these edges as the edges of the space where the object *isn't.* "[B]y focusing on information that does not suit the style of the left brain, [the dominant L-mode to turns off] and the job is passed over to the hemisphere that is appropriate for drawing."[2] The information that the L-mode rejects is the negative space outside the object. Once a negative space drawing

is completed it should be easier to fill in the details of the drawing, as the difficult task of drawing the correct proportions is already complete. To fill in the details, the contour drawing technique can be used.

For this exercise, the students were to make a negative space copy of their modified contour hand. After the outline was completed the students were to fill in the details of the hand looking at their actual hand as a reference. If the student was able to successfully reproduce the modified contour drawing of their hand by using negative space drawing to copy the outline and contour drawing techniques to recreate the details, then they should be able to draw any object they choose using this same technique. Since these techniques are simply tools for thinking in the R-mode, this should demonstrate that R-mode thinking enhances one's ability to draw. Of course, a completely different experiment would be needed to prove that these experiments actually help one to use the right side of one's brain, the term R-mode can be used to define this style of thinking about drawing. Hence if the student can now draw by using this negative space + contour method, R-mode thinking is a success.

3.3 Recruiting Volunteers

The target audience for Betty Edwards' book is analytically minded (L-mode) adults with little or no previous artistic experience. WPI was thought to be an excellent environment in which to recruit suitable participants.

To attract the attention of potential students, posters were created and hung in numerous locations across campus. Posters were also hung at Clark University and Worcester State College, but no response from either school was received. Messages were posted on the WPI video bulletin board, which is displayed on all WPI cable channels that don't carry a regular network. Messages were also posted to the `wpi.students` news group on the WPI news server.

When plans for recruiting volunteers was initially discussed, the plan was to teach lessons to two separate groups. One of the groups was to be taught using a traditional method, while the other group would be taught using the method from "Drawing on the Right Side of the Brain." After researching traditional drawing instruction, it was decided that the project group members did not have the skill required to teach a traditional drawing class and that the data from such a class would not be representative of traditional drawing instruction. Instead of teaching two separate groups, it was decided that it would be better have comparisons be made by a professional drawing instructor.

Chapter 4

Analysis

Upon finishing the classes, three scholars (two from WPI and one recommended by Assumption College) were asked to evaluate the available data. The first person to evaluate the drawings was a WPI chemistry professor, Stephen Weininger (stevejw@wpi.edu), who had obtained his B.A. from Brooklyn College and his Ph.D. from University of Pennsylvania. Professor Weininger teaches "Light, Vision, and Understanding" at WPI with Professor David Samson (samson@wpi.edu), professor of art history. This class discusses the progression of perception through history. Professor Weininger was not familiar with the Betty Edwards' drawing technique. Professor Samson, who had obtained degrees from University of Chicago and Harvard University, was the second person to evaluate the drawings. Although Professor Samson was familiar with Betty Edwards and Drawing on the Right Side of the Brain, he was rather skeptical of her ideas. The final evaluator was Winslow Myers (wmyers@bancroft.pvt.k12.ma.us), who posses degrees from Princeton, Boston University and Queens College and has been teaching art for thirty-two years. He is a full-time art teacher at Bancroft School and also teaches part-time at Assumption College and the Rhode Island School of Design.

Professor Myers is very familiar with Betty Edwards' Drawing on the Right Side of the Brain. He uses the book and the exercises in it to aide his students in becoming better

artists, however he admits that it does not always work. He examined the drawings from each student and then evaluated the first drawing (self-portrait) and the last drawing.(the hand)[1] For the most part he thought that the students showed some sign of improvement but suggested that the best possible way to research Betty Edwards techniques would be to teach a class with mandatory attendance to minimize any sources of error when it came time to evaluating the data.

All three professors were asked to compare the first drawing (self-portrait), which was done at the beginning of the experiment, to the last drawing (hand), which was done at the end of the experiment. The results of those evaluations are listed in the table in figure 4.1. When comparing all three evaluations, it is clear that Professor Myers, the art teacher, was the most giving. He saw some level of improvement in all but two of the nine students evaluated. One possible explanation for this could be the fact that Professor Myers is constantly exposed to students of different artistic abilities and personally witnesses their progress, whereas Professor Weininger and Professor Samson are critics of art. Regardless of their backgrounds, all three evaluators thought that the majority of the students showed a level of improvement.

Another reason that could explain why Professor Weininger did not see a great deal of improvement among the students, when compared to Professor Samson and Professor Myers, could be the fact that he was the not familiar with Betty Edwards' book. It could be possible that the simple knowledge of Betty Edwards' book and her different drawing techniques could have changed the expectations of the evaluators. Art is a very difficult subject to evaluate. It would be interesting to learn the opinions of the volunteer students.

When looking at the drawings of students that showed the most improvement, like student number one and four, (see figures A.1 through A.5 and A.15 through A.18) it can

[1]The original hand was not used in this analysis because not every student completed the initial hand drawing. Since the hand drawings were not meant for comparison, the initial hand drawings were not in the same style or position as the second hand drawing. For this reason there should be no additional error from comparing the self portrait to the final hand instead of comparing the two hands.

	Prof. Weininger Evaluation 1			Prof. Samson Evaluation 2			Prof. Myers Evaluation 3		
Student	Portrait	Hand	Result	Portrait	Hand	Result	Portrait	Hand	Result
1	4	5	+1	6	5	-1	2	7	+5
2	1	4	+3	3	3	0	2	3	+1
3	5	6	+1	5	5	0	4	7	+3
4	2	7	+5	2	5	+3	3	7	+4
5	4	4	0	6	5	-1	4	8	+4
6	2	4	+2	5	7	+2	2	4	+2
7	2	3	+1	3	6	+3	2	2	0
8	not enough data for evaluation								
9	3	2	-1	4	8	+4	3	3	0
10	5	2	-3	8	7	-1	4	7	+3
11	not enough data for evaluation								

Figure 4.1: Data analysis

be clearly stated that their drawings became "alive" towards the end of the experiment. By alive, meaning they began to look realistic, three-dimensional, and showed great improvement in envisioning space, something that the project aimed to accomplish.

In two of the exercises, the students were asked to write down a description of their thinking at a certain point in the exercise. These exercises were the Vases and Faces exercise and the Picasso exercise. These comments themselves are not what were to be interesting, however. Betty Edwards describes that it is difficult to use verbal or cognitive abilities when in the R-mode. From this one can assume that during an R-mode exercise the students would forget to describe their thoughts in the middle of the exercise, but during an L-mode exercise the students should have no trouble making these notes. As you can see from the Vases and Faces drawings and Picasso drawings in appendix A, seven of the students stopped to take note of their thoughts in the Vases and Faces drawing and *none* of the students made notes during their Picasso drawing. The Vases and Faces exercise was specifically meant to be done in the L-mode, while the Picasso drawing was an R-mode exercise, so it would seem that Betty Edwards' conjecture is correct in this case.

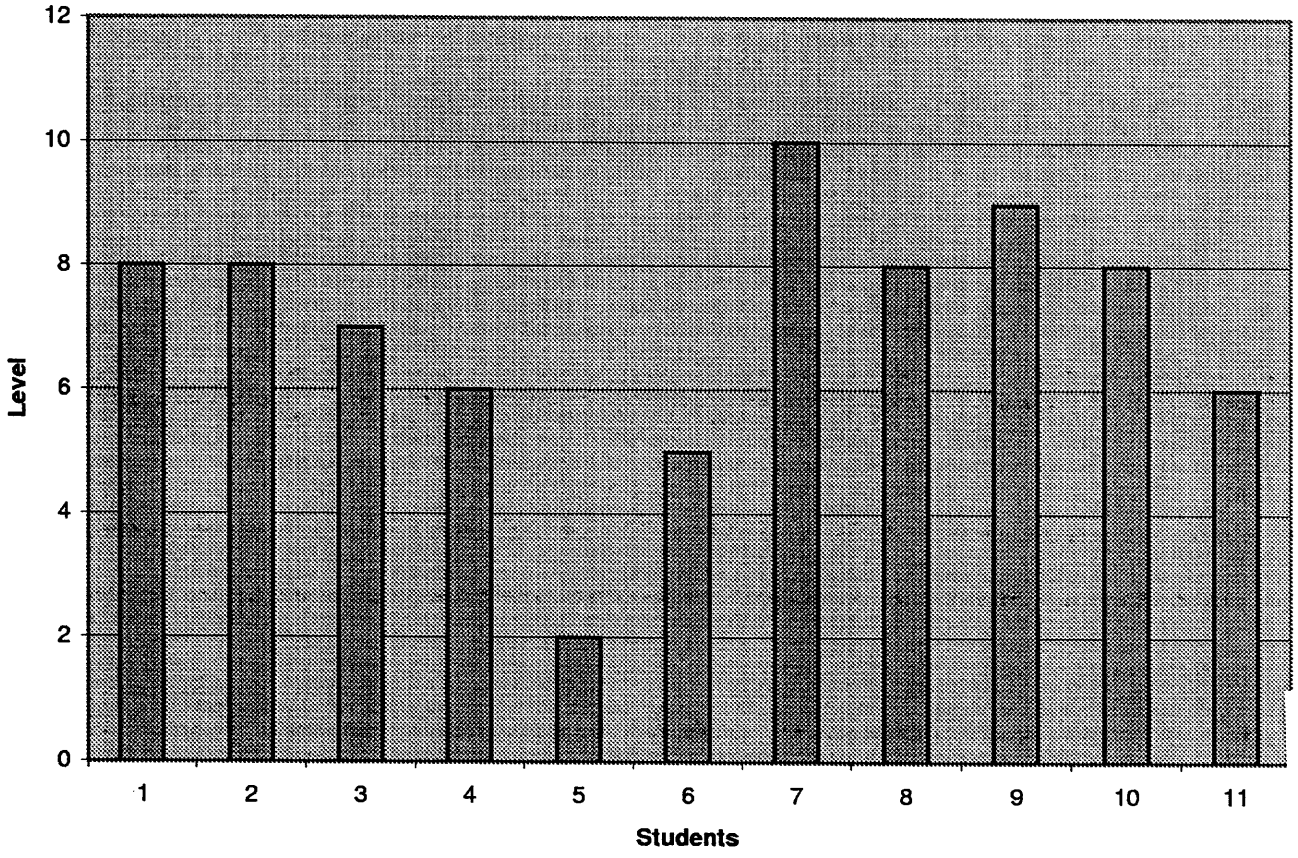


Figure 4.2: Student's self rating of technical orientation

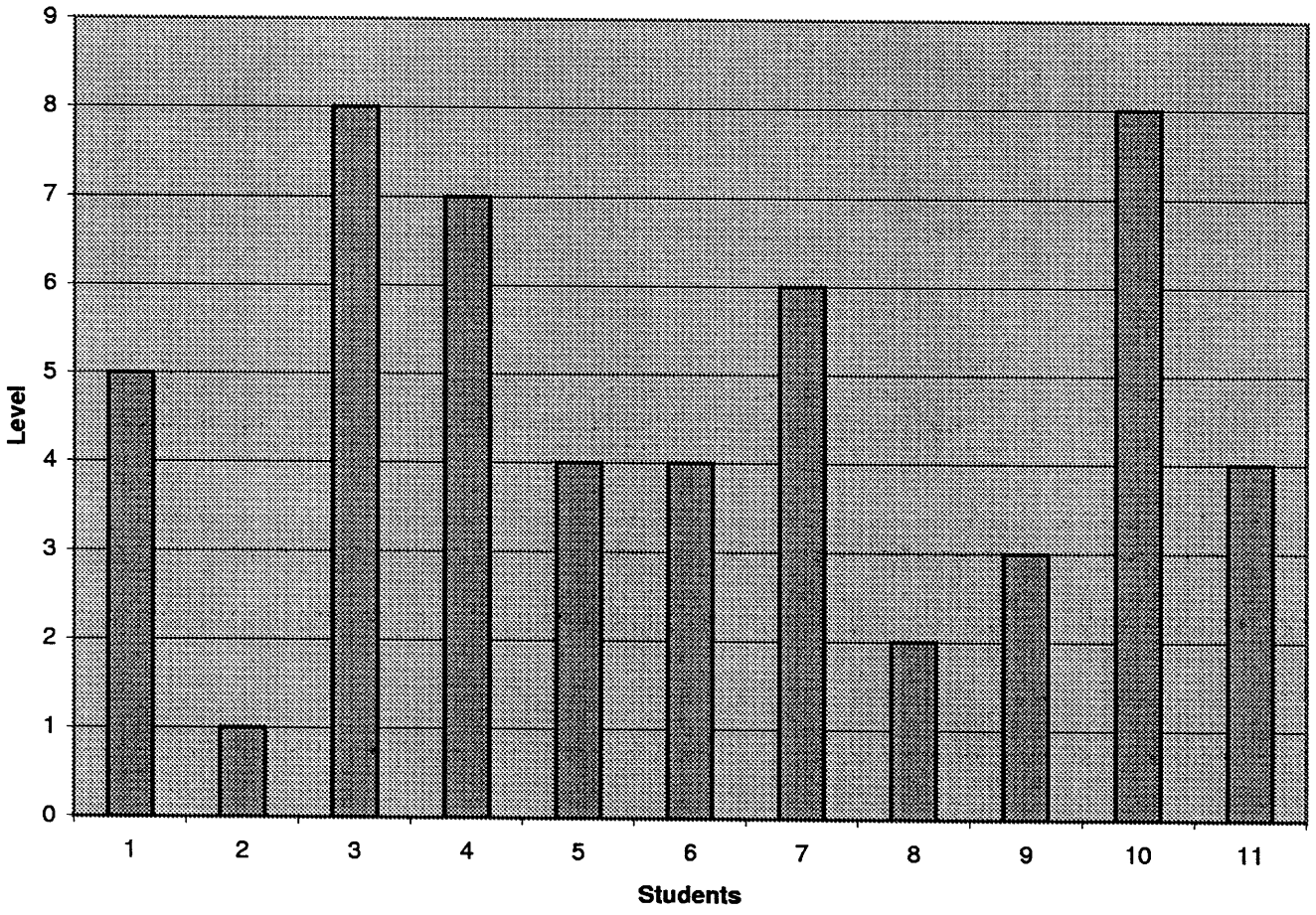


Figure 4.3: Student's initial level of artistic ability

At the beginning of the experiment the students answered a survey in which they rated, on a scale of one through ten, their technical orientation and artistic ability. The results of those surveys are shown by the graphs in figures 4.2 and 4.3. Examining those results, it is clear to state that the obtained group of volunteers considered themselves as being technically oriented and possessed a wide range of artistic ability. The volunteer students were then administered the Betty Edwards drawing lessons, however these lessons were never fully completed due to a lack of participation among the volunteers. The table in figure 4.4 identifies the drawings, which were completed by the students before they lost interest in the experiment. This created a major source of error because we were unable to compare a self-portrait at the initial start of the classes to another self-portrait at the end of the research. An attempt was made to contact the students by email and setup a possible last lesson, which would include another self-portrait and an opportunity for the students to list any comments and suggestions. No feedback was received. Nevertheless, the available data was evaluated by several professors, who had mixed feelings about Betty Edwards' drawing techniques, and from those evaluations it can be concluded that the project was successful to some degree.

Student	Drawing 1	Drawing 2	Drawing 3	Drawing 4	Drawing 5	Drawing 6	Completed
1	yes	yes	yes	yes	yes	yes	100%
2	yes	yes	yes			yes	67%
3	yes	yes	yes	yes	yes	yes	100%
4	yes	yes	yes			yes	67%
5	yes	yes		yes	yes	yes	83%
6	yes	yes	yes	yes	yes	yes	100%
7	yes	yes	yes	yes		yes	83%
8	yes	yes					33%
9	yes		yes		yes	yes	67%
10	yes	yes	yes	yes	yes	yes	100%
11					yes		17%

Drawing 1...self-portrait at the beginning of the experiment
Drawing 2...vases and faces
Drawing 3...upside-down Picasso
Drawing 4...palm-hand (wrinkles)
Drawing 5...picture plane (hand)
Drawing 6...modified picture plane (freehand)

Figure 4.4: Drawings completed by the students

Chapter 5

Conclusion

This experiment shows that the book was indeed effective to varying degrees on the subjects. However, through the background, it is also clear that the psychological basis for the book is questionable. Since the methods Edwards uses in her lessons are similar to those of classical drawing books, it can be assumed that her book would be at least as effective as a book that taught drawing without psychological theory behind it. Results much like those received from the Edwards lessons would most likely be prevalent in a traditional drawing class as well - where some students would improve greatly, some would improve to some small degree, and a few would not gain any drawing skill at all. The data gathered is entirely subjective, no matter how skilled the art historian or teacher, a measure of the quality of a piece of art or a drawing is an opinion. This study did not lead to any concrete conclusions.

Bibliography

[1] Roger W. Sperry. *Cerebral regulationo of motor coorfination in monkeys following multiple transection of sensorimotor cortex.* J. Neurophysiol, 10:275–294, 1947.

[2] Betty Edwards. Drawing on the Right Side of the Brain. J.P. Tarcher, New York, 1979.

[3] Berwick Academy. Berwick academy online course catalog. http://www.berwickacademy.org/.

[4] John McCrone. *Left Brain, Right Brain.* New Scientist, 163(2193):http://www.newscientist.com/ns/19990703/leftbrainr.html, July 1999.

[5] Roger W. Sperry. *Neurology and the Mind-Brain Problem.* American Scientist, (40):291–312, 1952.

[6] Dan Eden. Left brain : Right brain. Viewzone e-Zine - http://www.viewzone.com/bicam.html.

[7] William H. Calvin. Throwing Madonna - Essays on the Brain. University of Washington, 1983, 1991.

[8] John Woods. The parable of the hemispheres. A well written and cited article available at http://www.execpc.com/cwlpubent/brain.htm.

[9] Richard Ornstein. The Right Mind. Harcourt Brace and Co., 1997.

[10] Noah Webster. Merriam-Webster's Collegiate Dictionary. Merriam-Webster Inc., Springfield MA, 2000.

[11] Peter C. Marzio. The Art Crusade. Smithsonian Institution Press, Washington DC, 1976.

[12] Bill Martin. The Joy of Drawing. Watson-Guptill Publications, New York, 1993.

[13] Frank Aborn. Object Drawing. Co-operative Printing Company, Cleveland, 1874.

[14] George Hartnell Bartlett. Pen and Ink Drawing. The Riverside Press, Cambridge, 1903.

[15] Bernard Chaet. The Art of Drawing. Holt, Rinehart and Winston, inc., New York, 1972.

[16] Eliot Goldfinger. Human Anatomy for Artists. Oxford University Press, New York, 1991.

[17] Arthur Zaidenberg. Studies in Figure Drawing. Garden City Publishing Co. Inc., 1950.

[18] William A. Mason. Course of Instruction in Drawing for the Grammar Grades. Walther Printing House, Philadelphia, 1902.

[19] Betty Edwards. The *new* Drawing on the Right Side of the Brain. J.P. Tarcher / Putnum, New York, 1999.

Appendix A

Student's work

Figure A.1: Self portrait 1

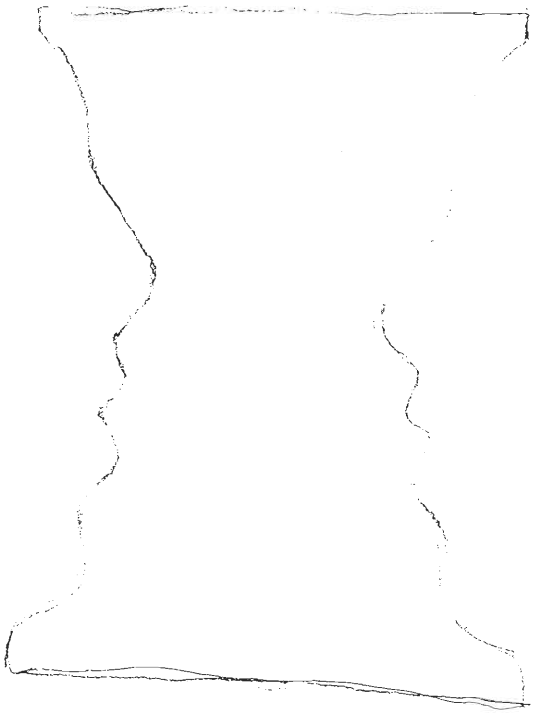


Figure A.2: Vases/Faces 1

Figure A.3: Upside Down Picasso 1

Figure A.4: Hand Contour 1

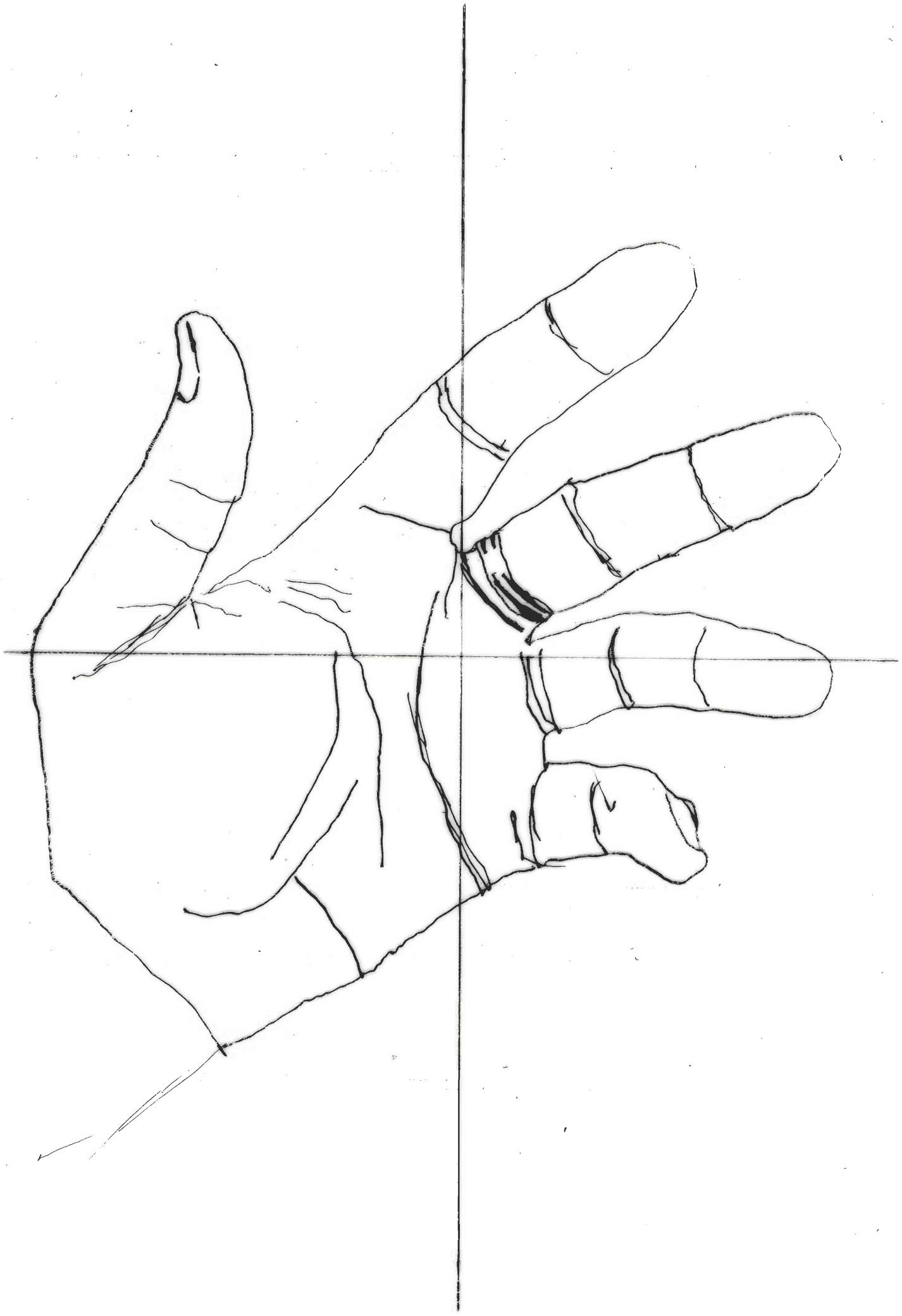


Figure A.5: Hand Drawing 1

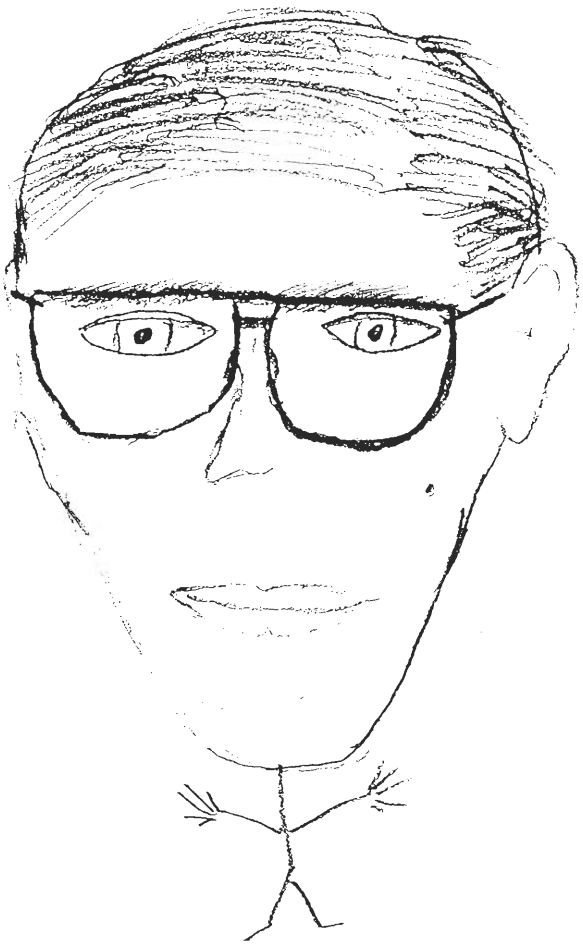


Figure A.6: Self portrait 2

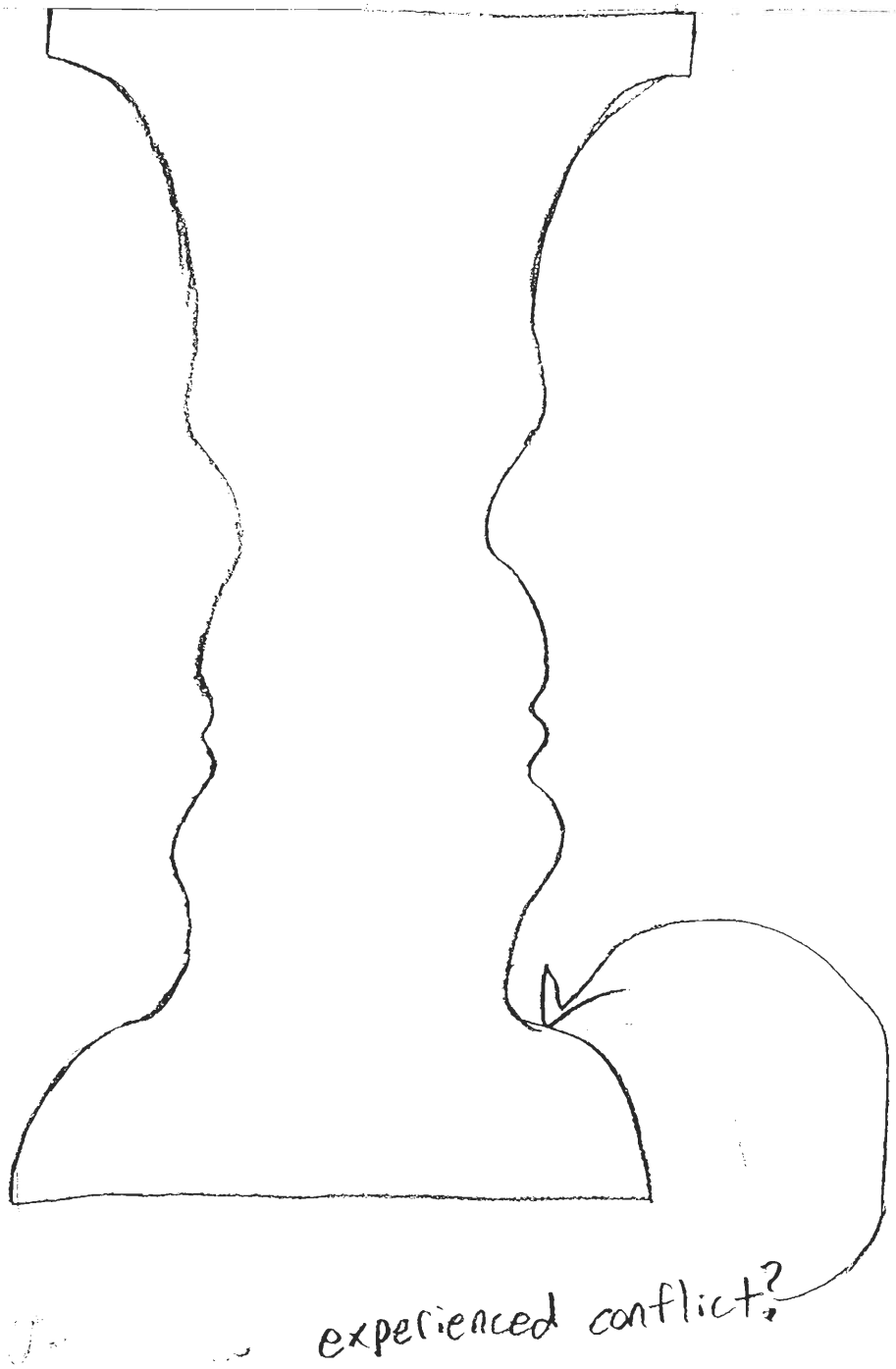
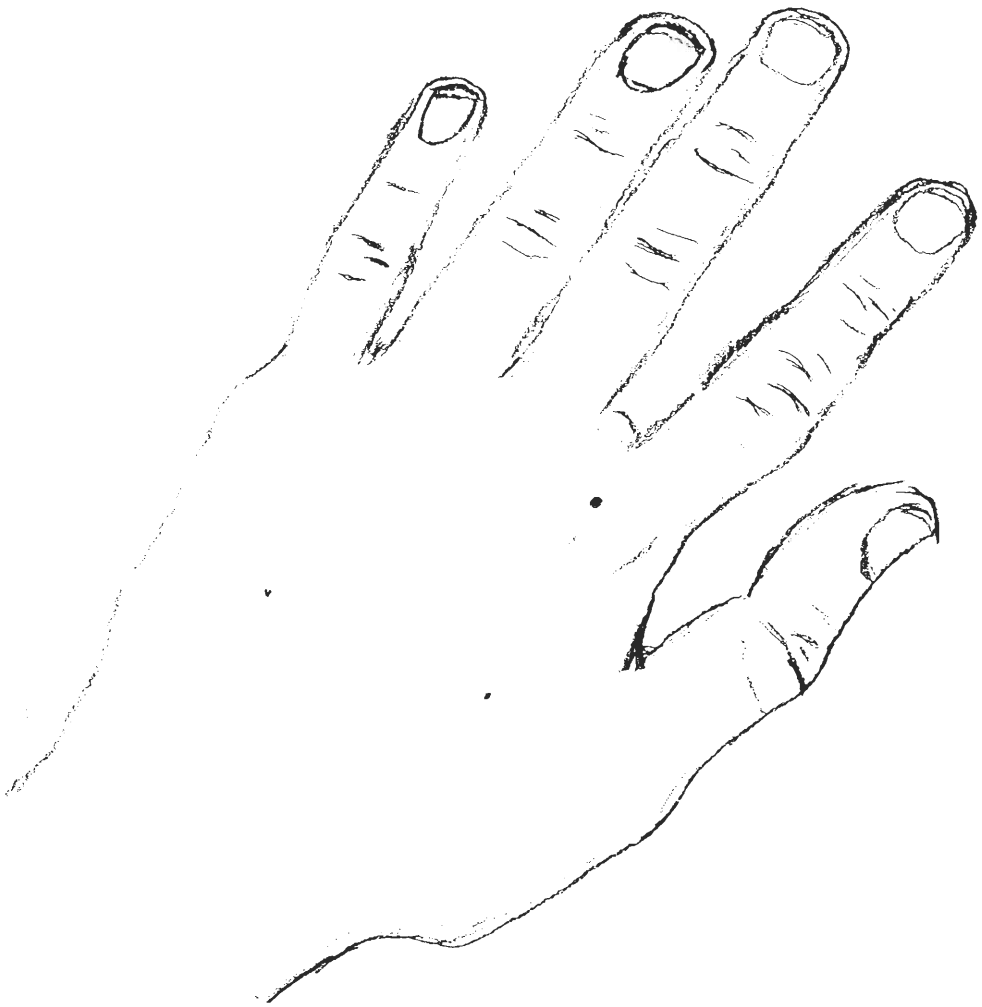


Figure A.7: Vases/Faces 2

Figure A.8: Upside Down Picasso 2

Figure A.9: Hand Drawing 2



(3)

4

3

Jack Waddell

2/14/00

Figure A.10: Self portrait 3

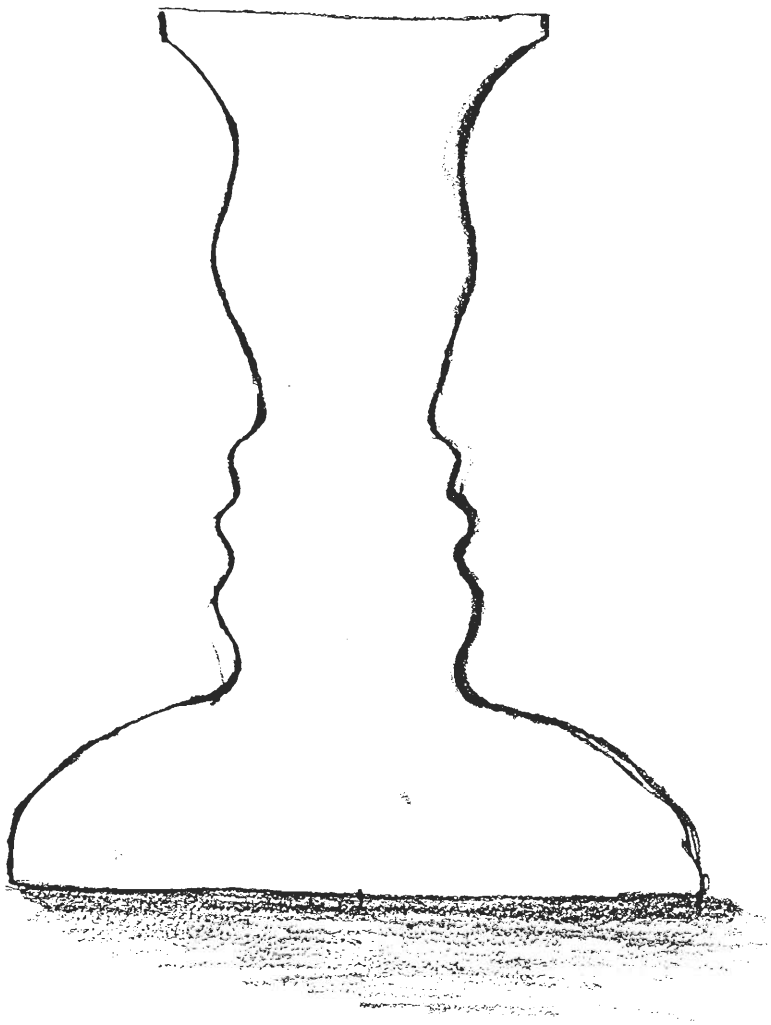
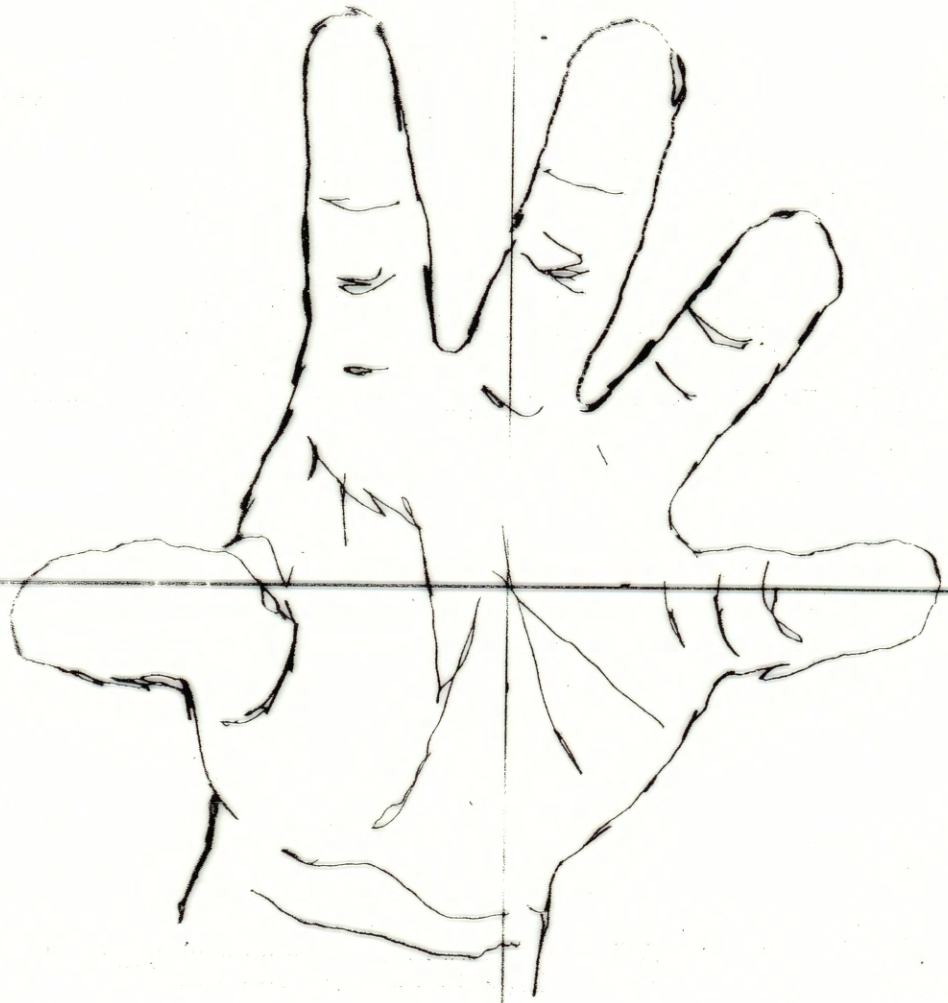


Figure A.11: Vases/Faces 3

Figure A.12: Upside Down Picasso 3

Figure A.13: Hand Contour 3



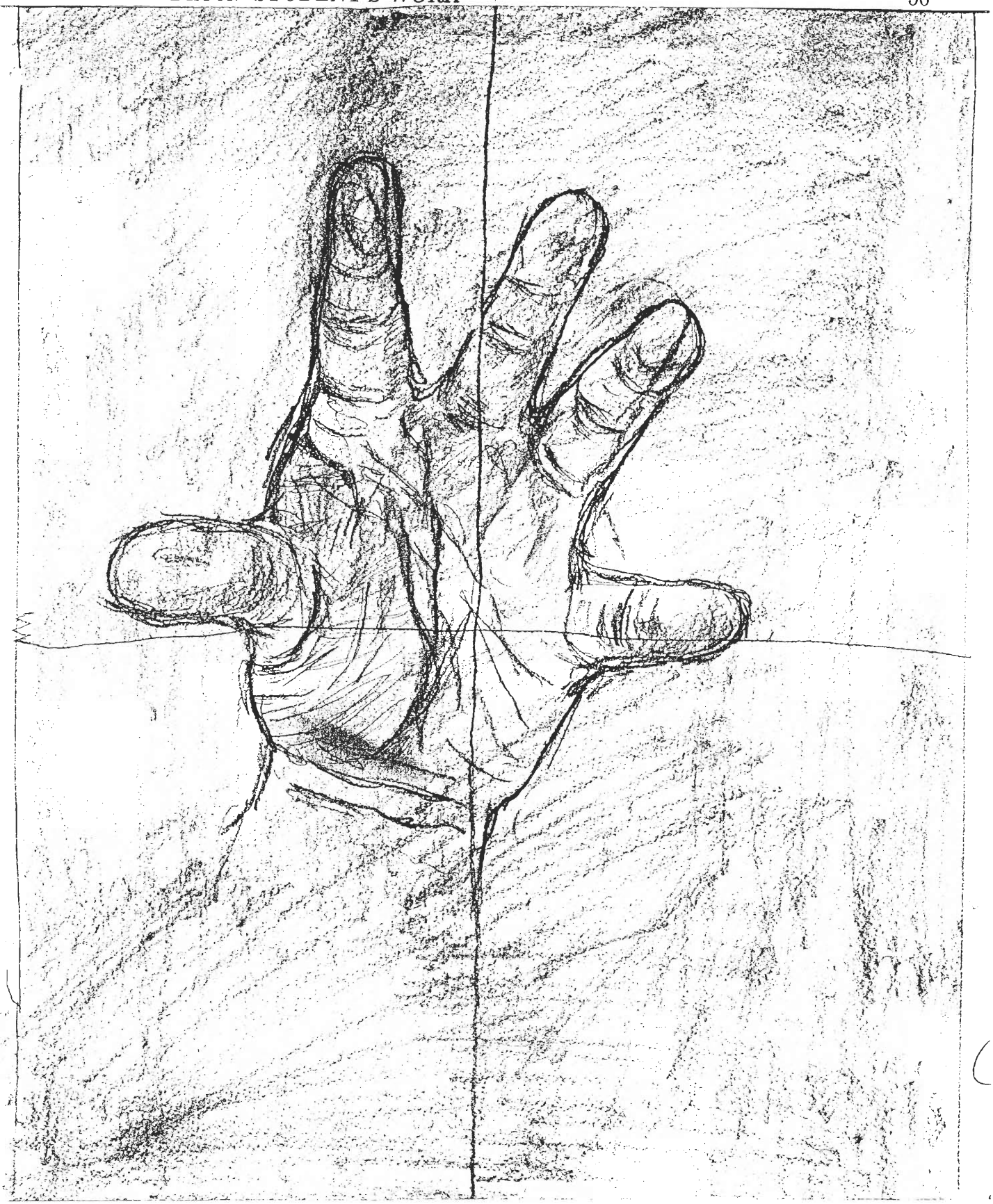
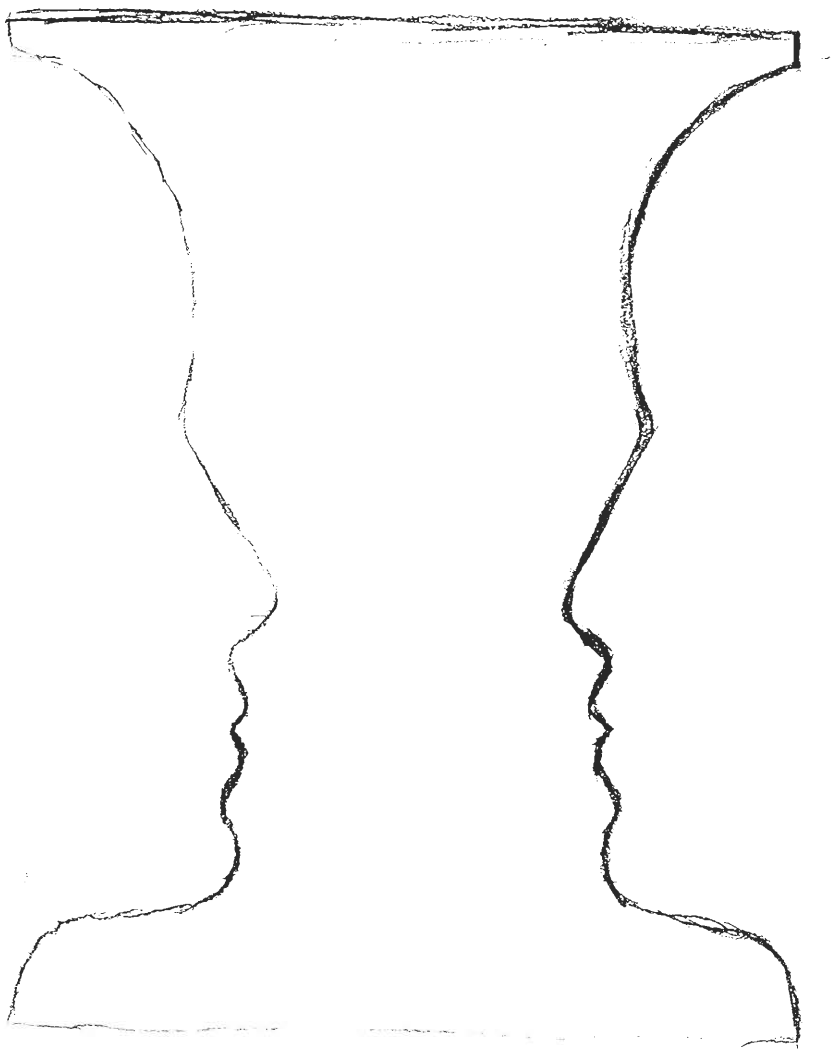


Figure A.14: Hand Drawing 3

Figure A.15: Self portrait 4

Figure A.16: Vases/Faces 4



Conflicted, but had no real trouble either way

Figure A.17: Upside Down Picasso 4

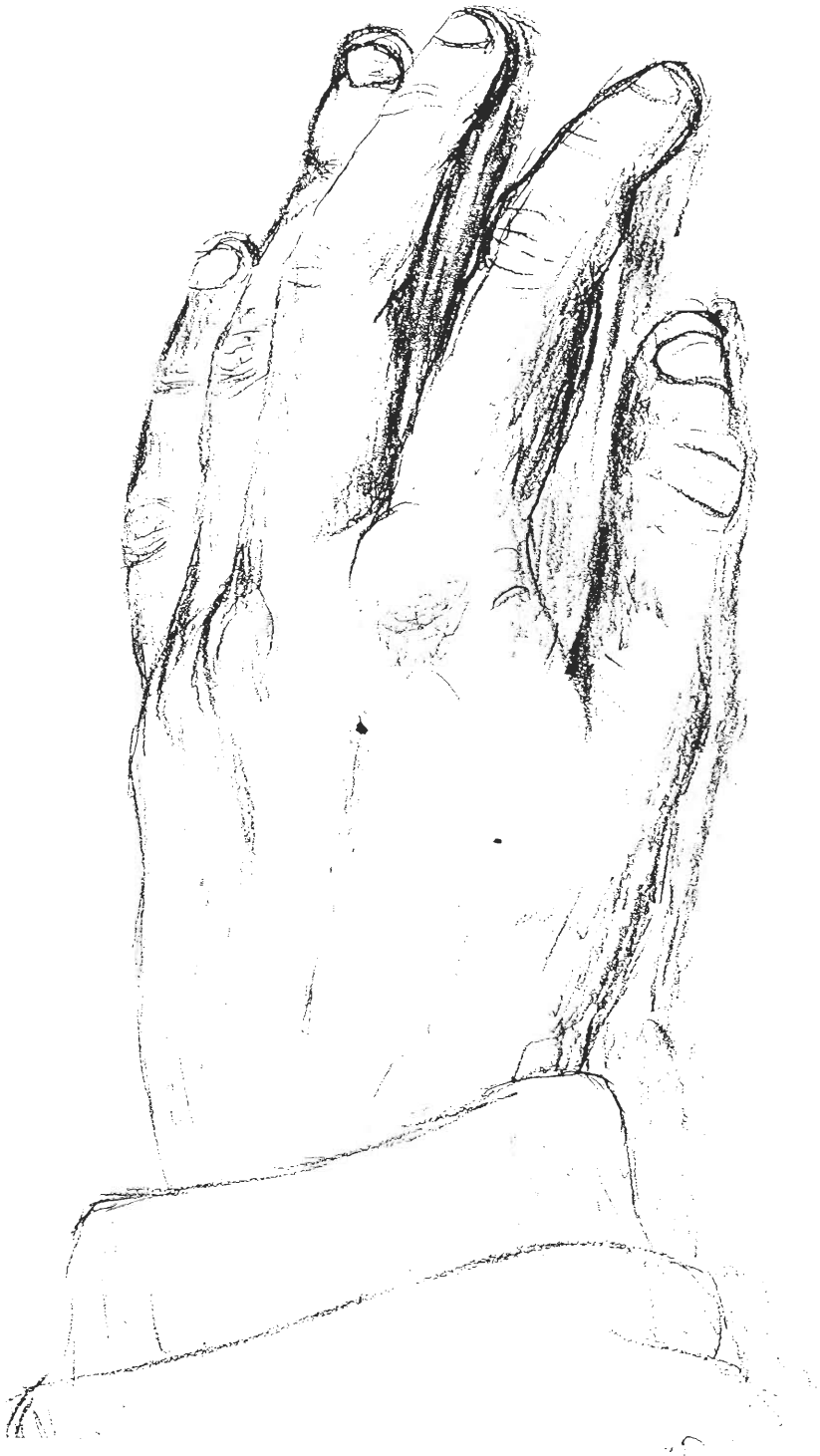


Figure A.18: Hand Drawing 4

Figure A.19: Self portrait 5

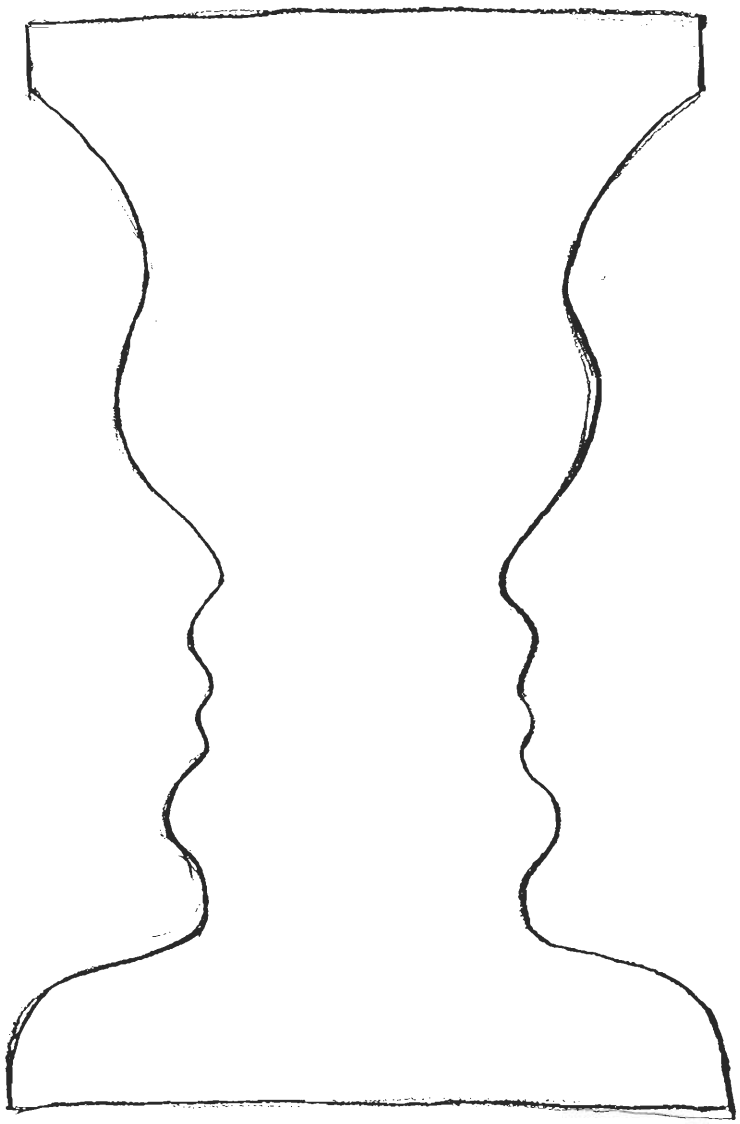


Figure A.20: Vases/Faces 5

Didn't think of cup or face - only lines

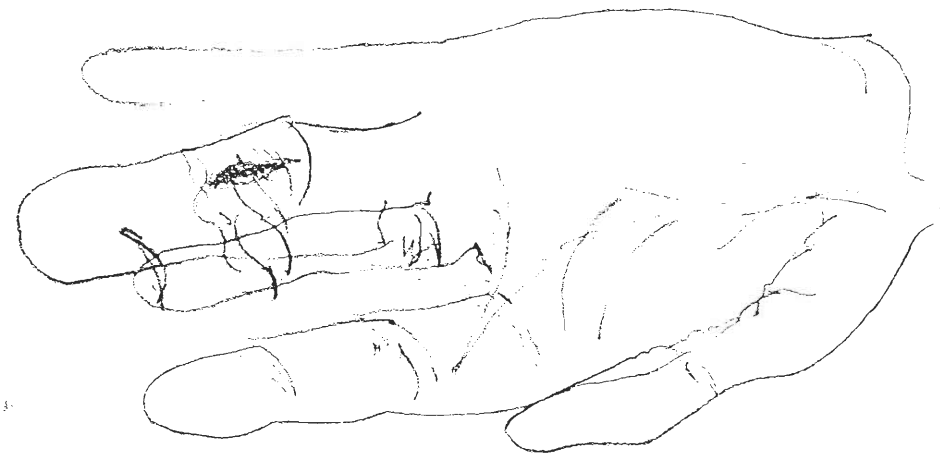
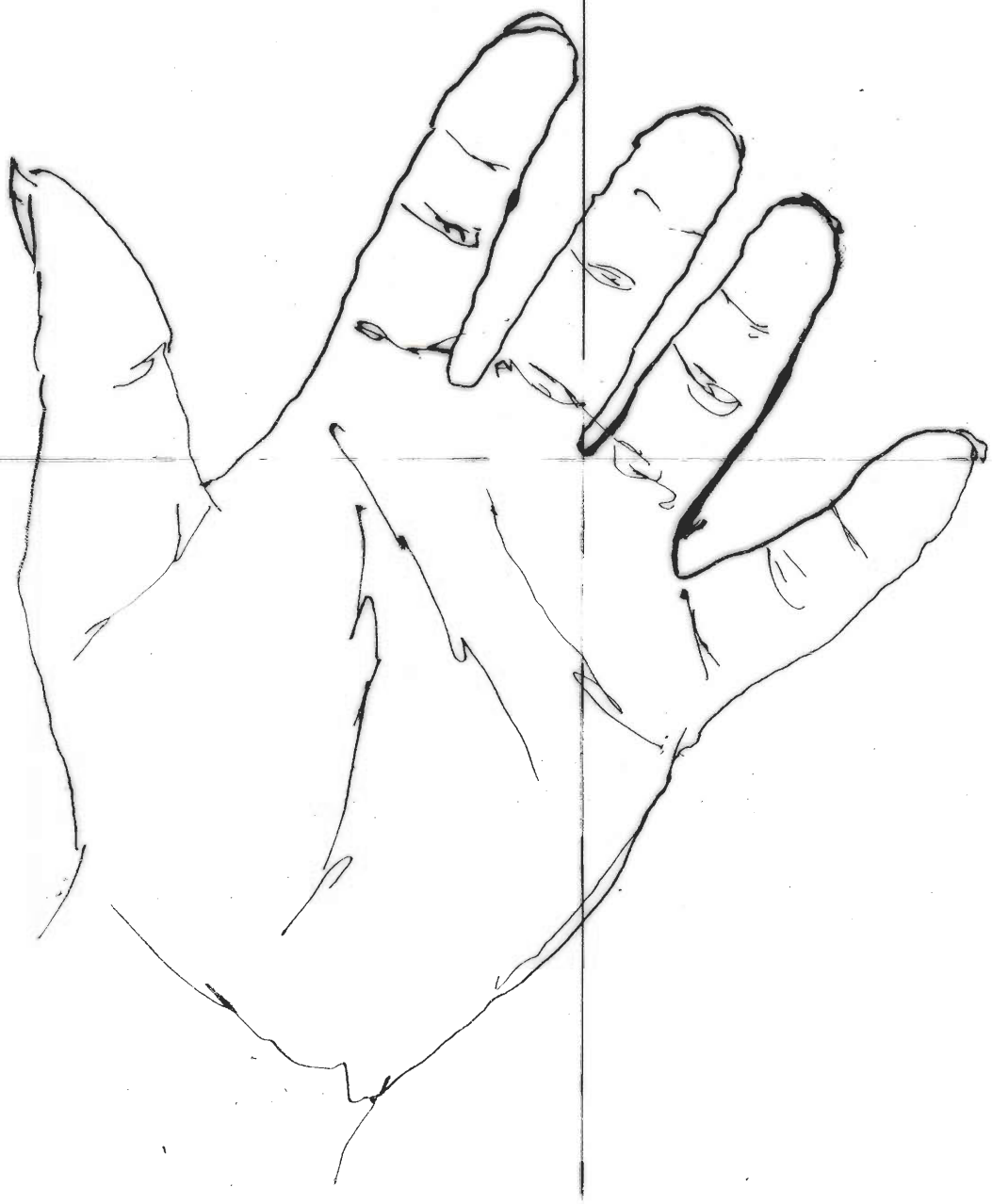


Figure A.21: Hand Contour 5



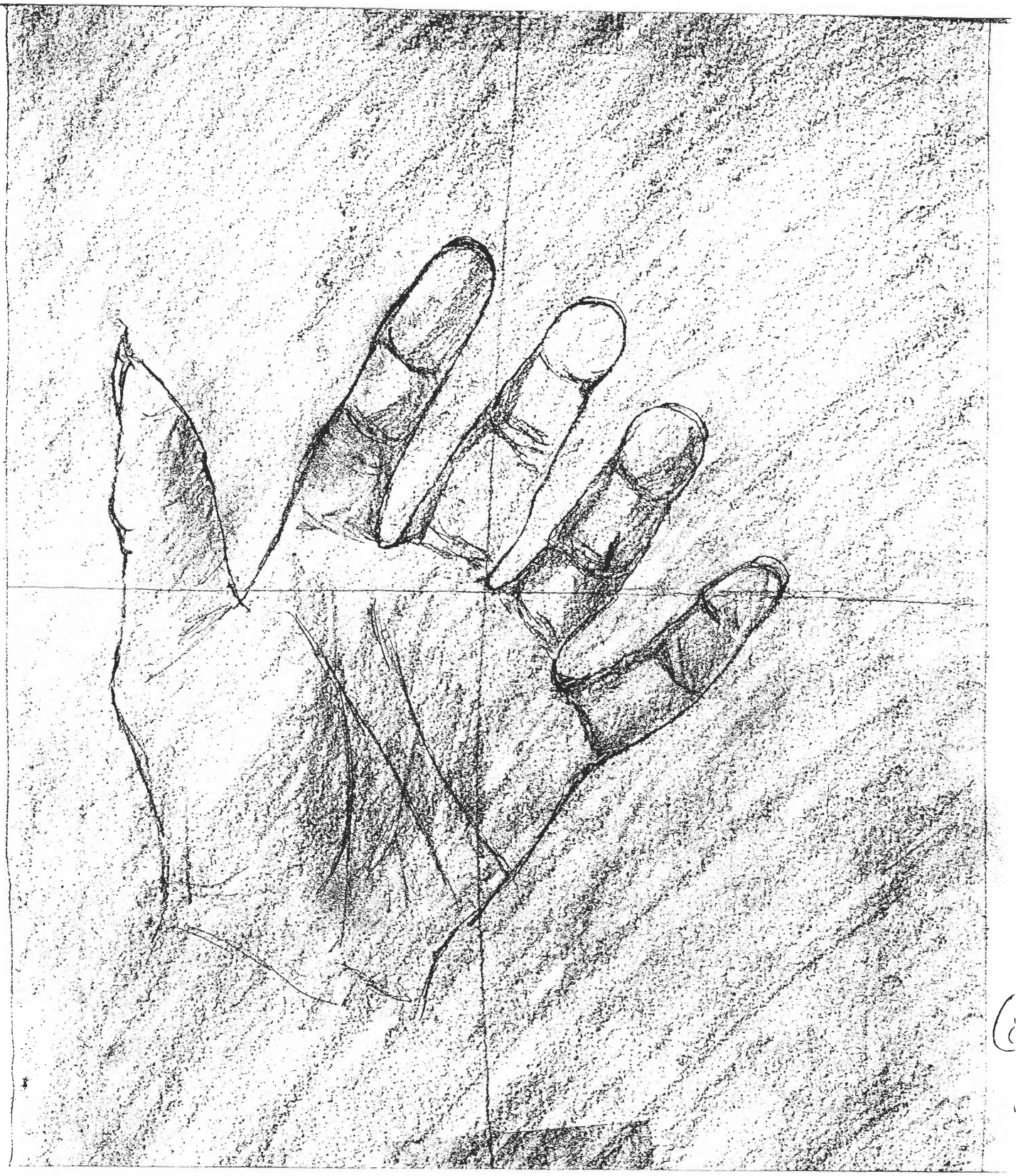


Figure A.22: Hand Drawing 5

Figure A.23: Self portrait 6

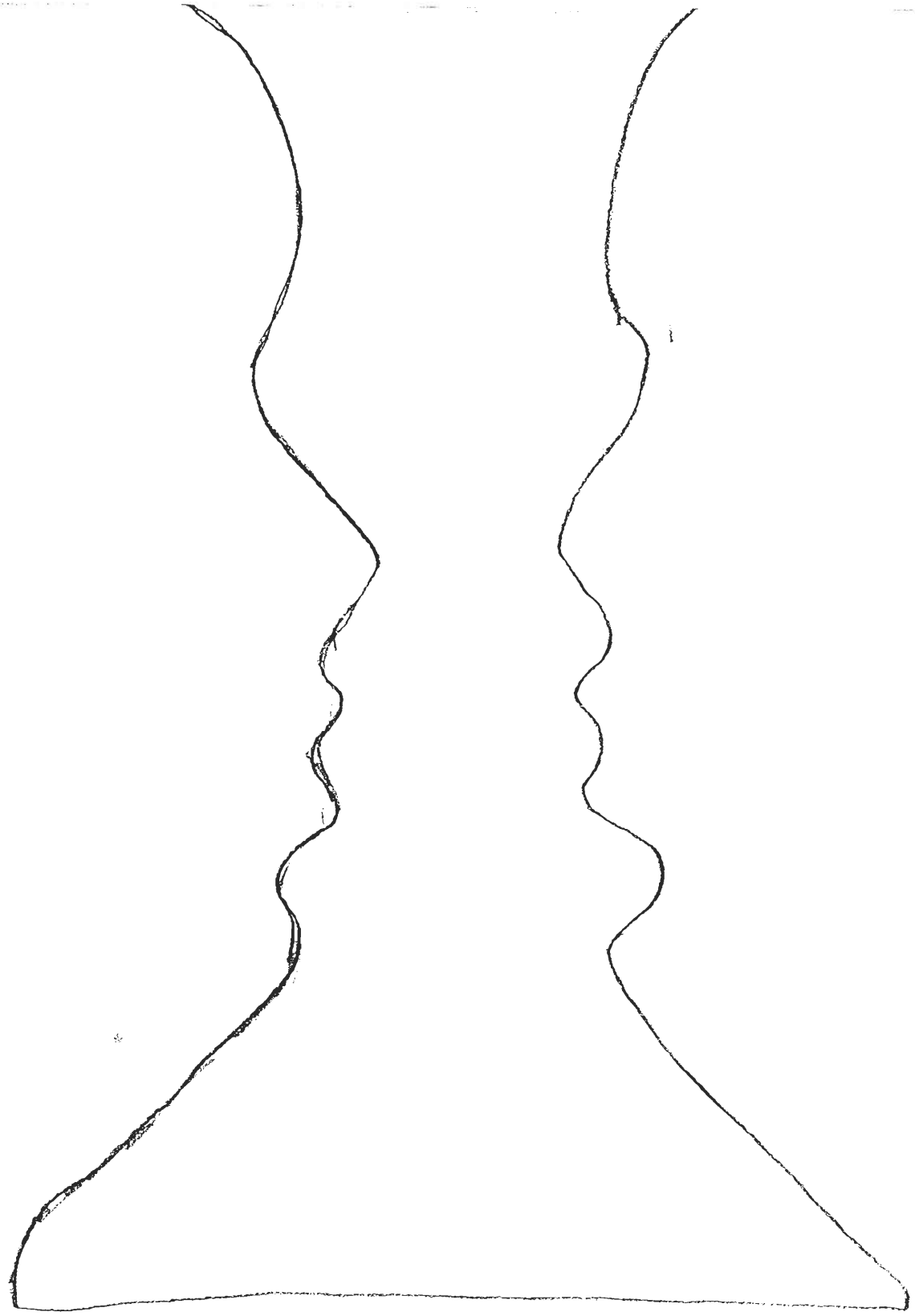


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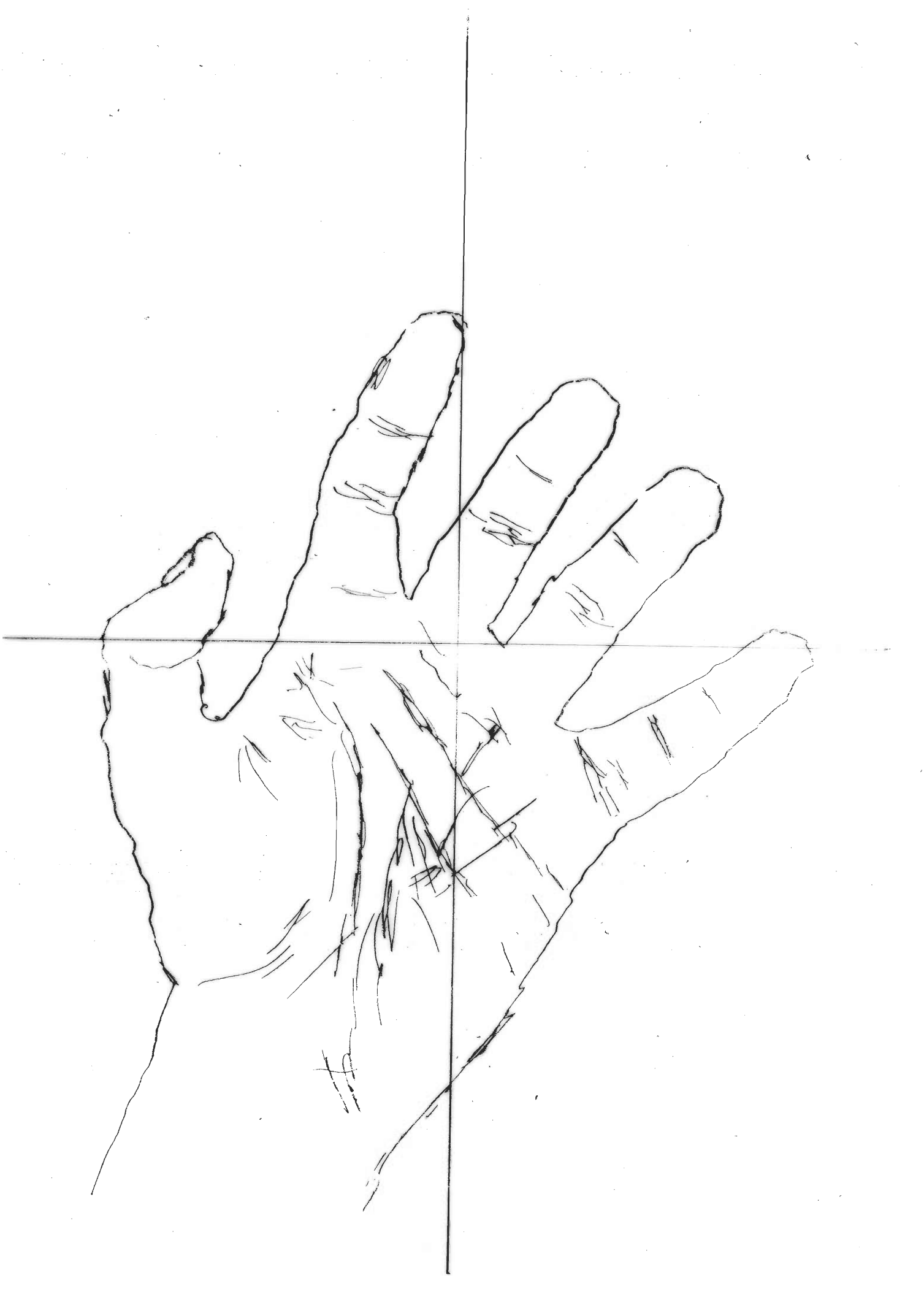
Figure A.24: Vases/Faces 6

Figure A.25: Upside Down Picasso 6

TANG

Figure A.26: Hand Contour 6



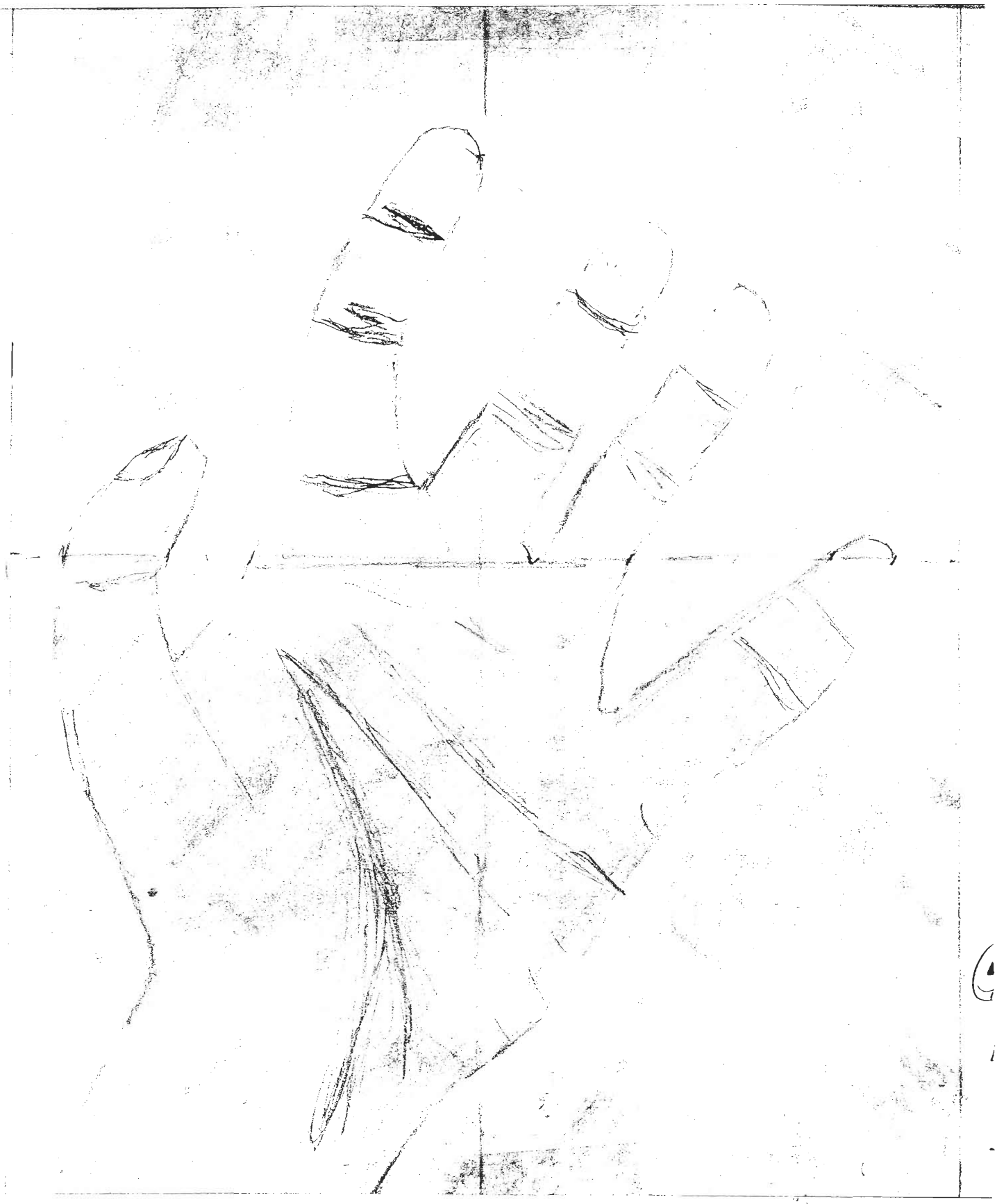


Figure A.27: Hand Drawing 6

Figure A.28: Self portrait 7

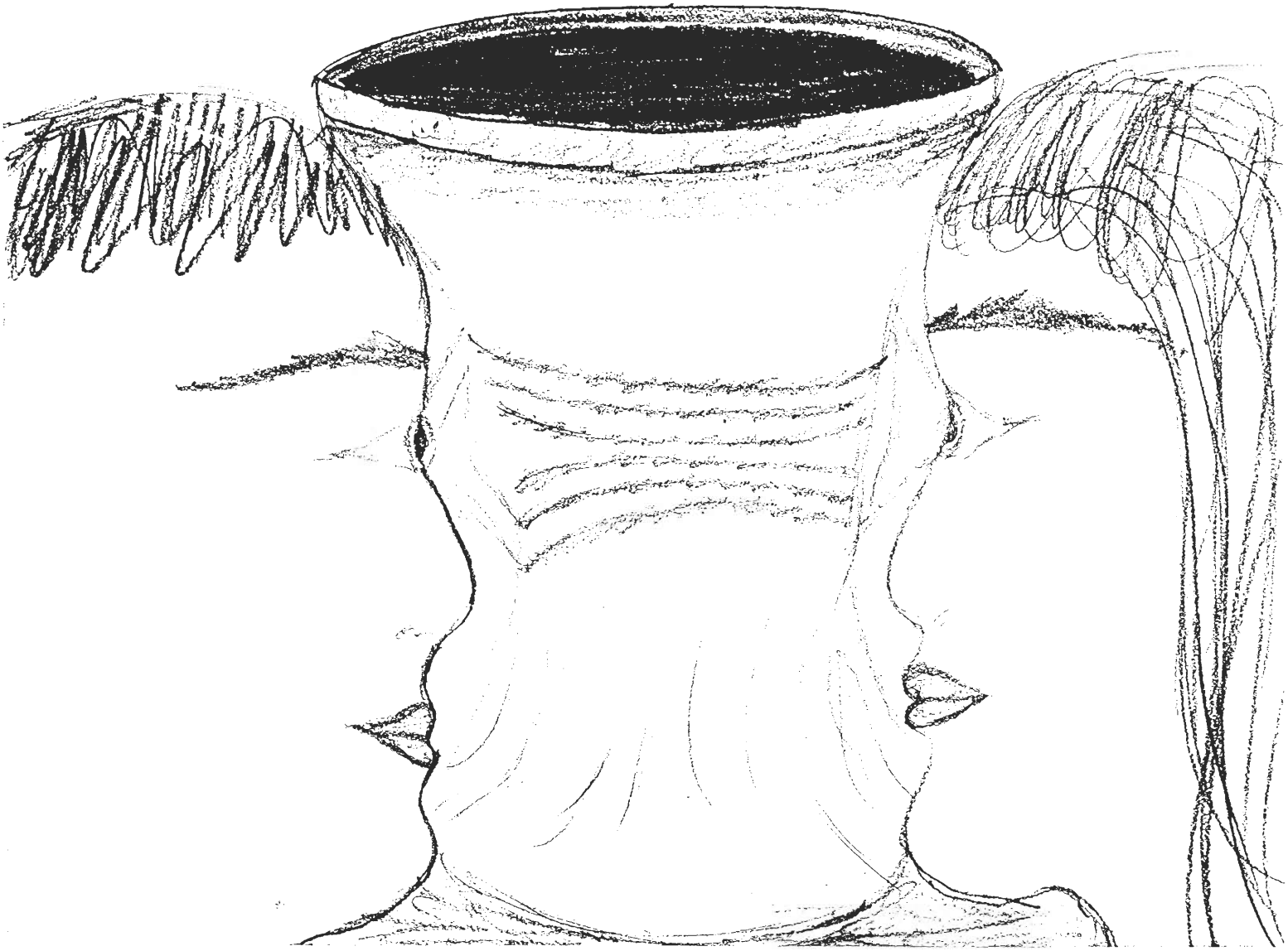


Figure A.29: Vases/Faces 7

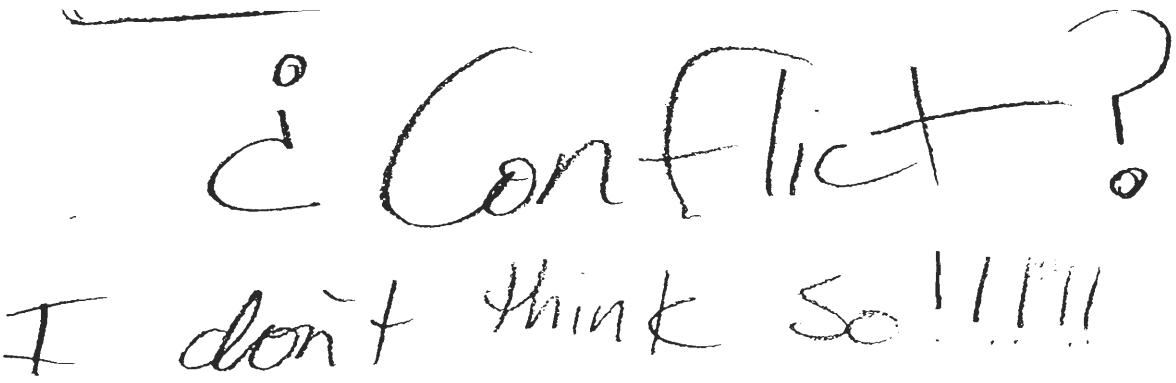


Figure A.30: Upside Down Picasso 7

Figure A.31: Hand Contour 7

Figure A.32: Hand Drawing 7

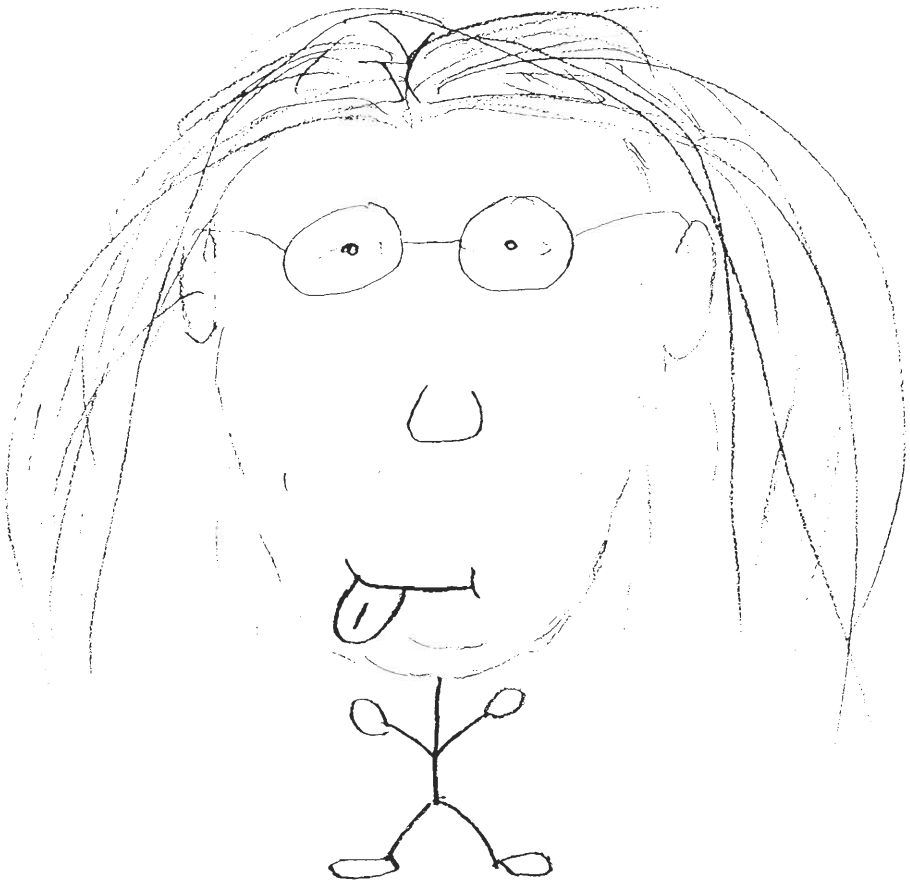


Figure A.33: Self portrait 8

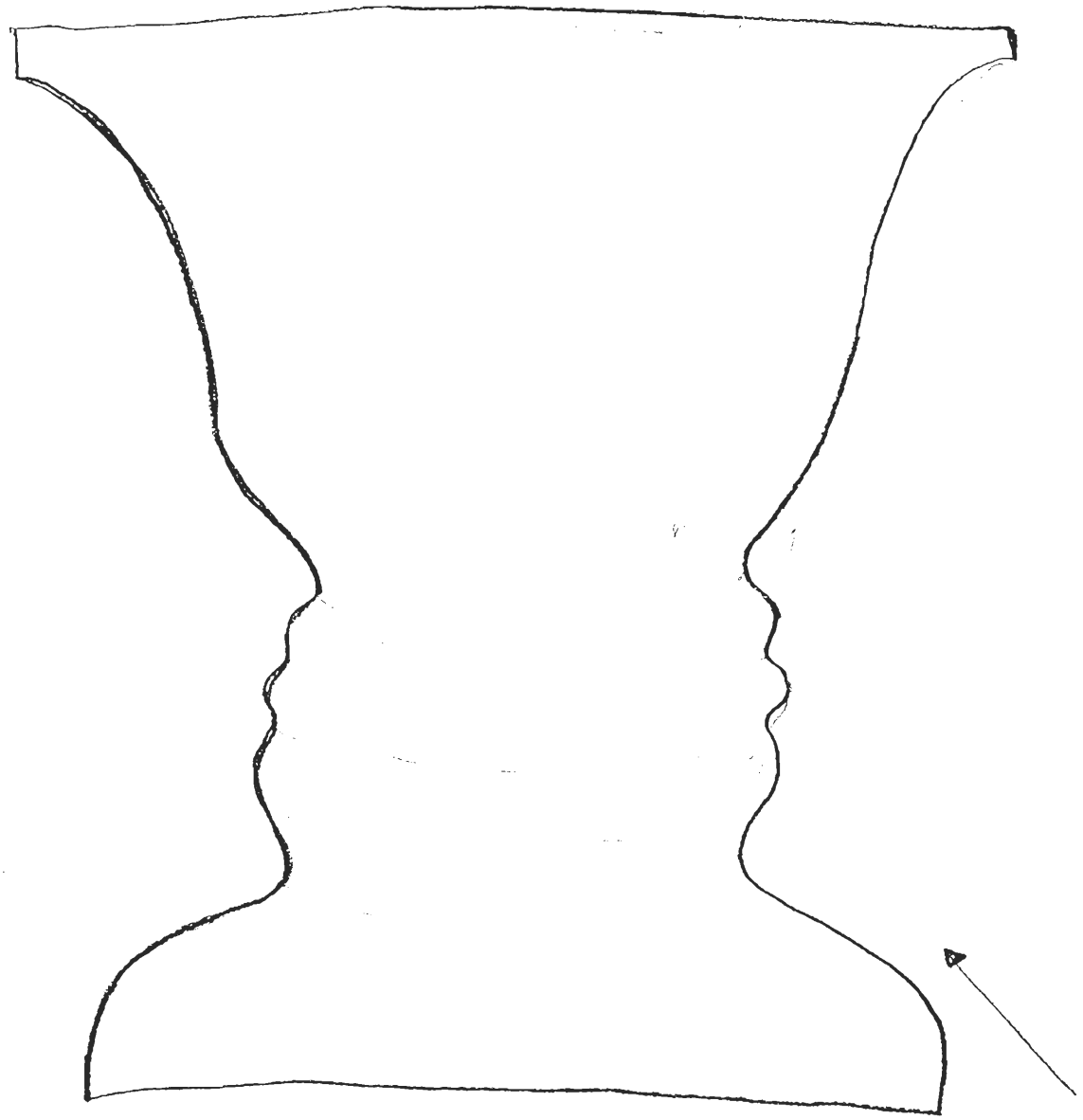


Figure A.34: Vases/Faces 8

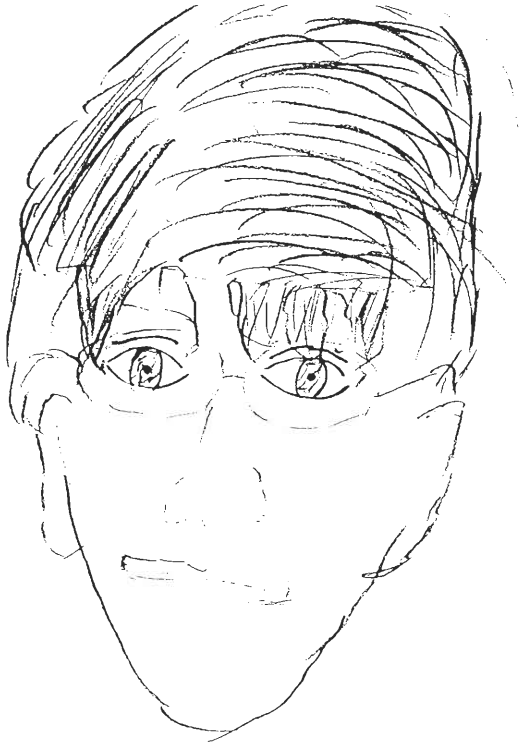


Figure A.35: Self portrait 9

Figure A.36: Upside Down Picasso 9

Nick Ho

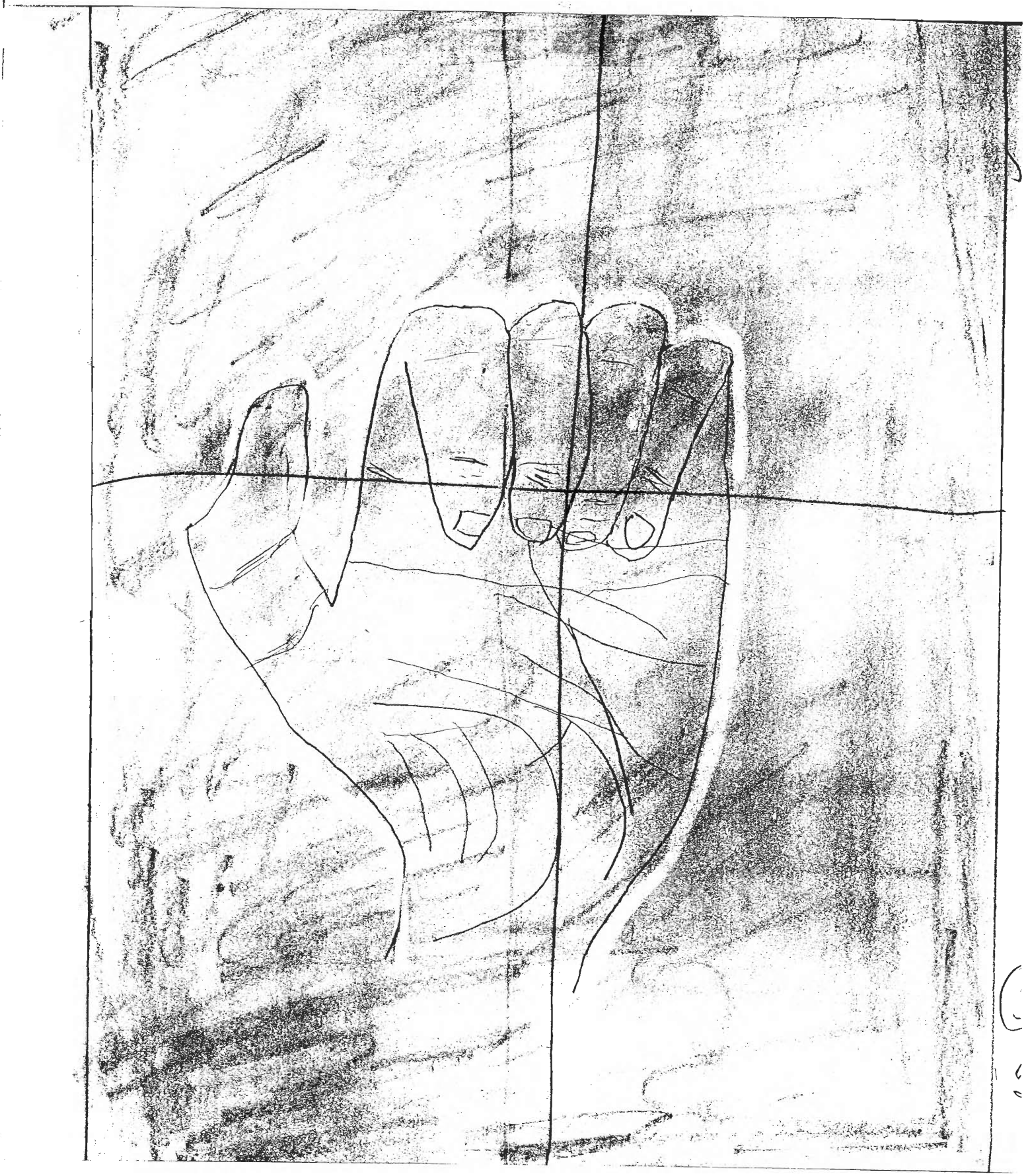
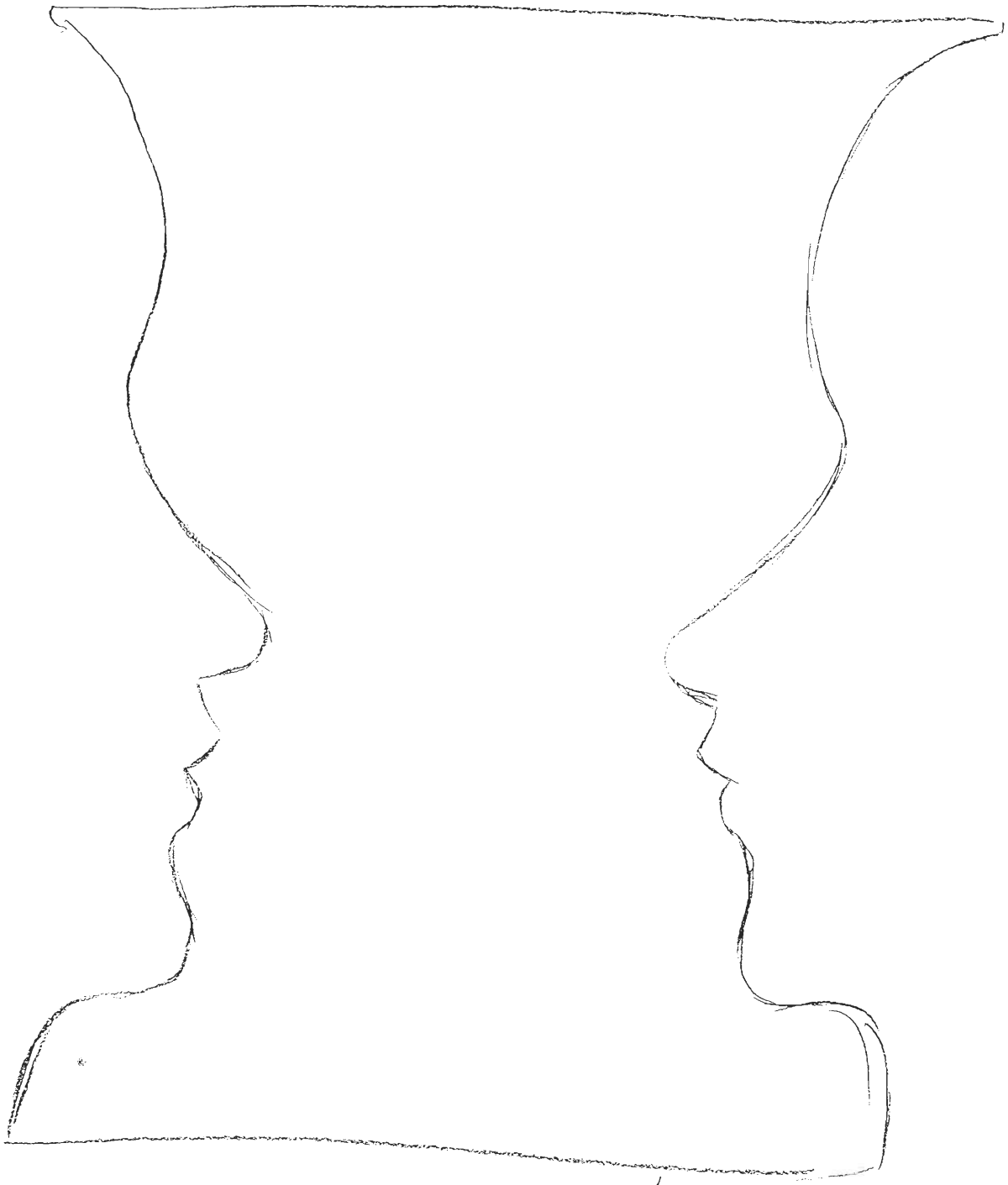


Figure A.37: Hand Drawing 9

Figure A.38: Self portrait 10



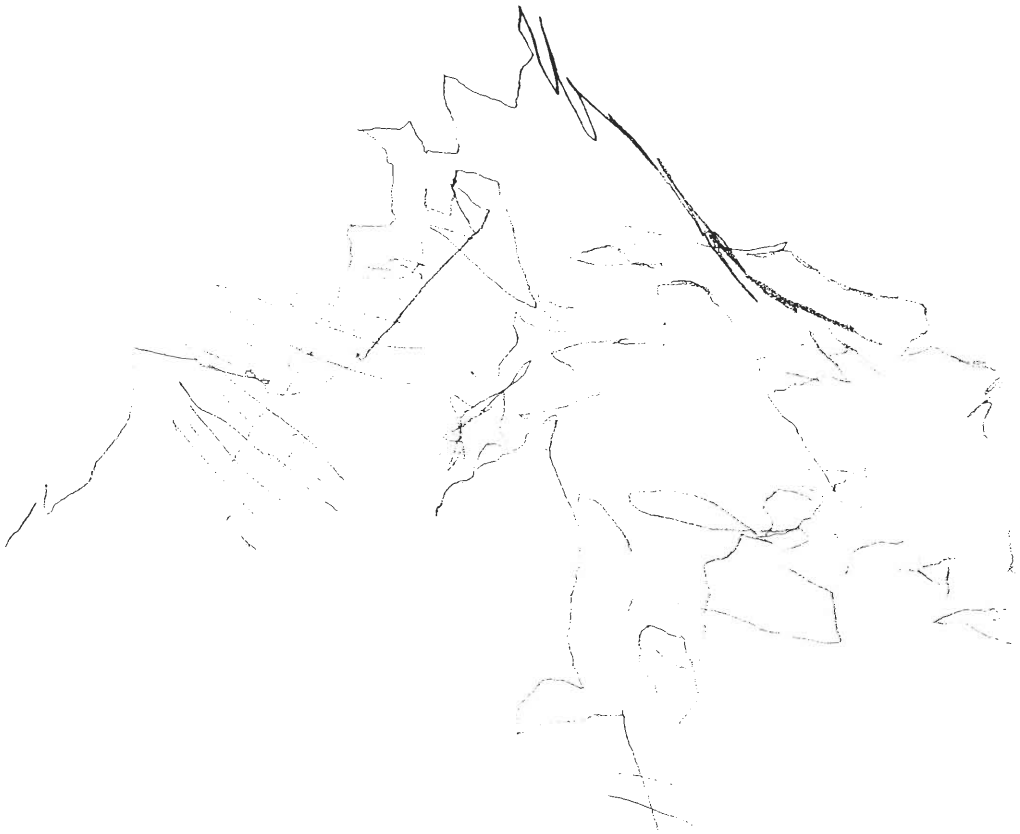
Right handed

As I am used to drawing faces facing left more, I am afraid my right-face isn't as good, despite the fact that I was supposed to be more at ease with it. However, there was no confusion as to which way to make the pencil go.

C.P.

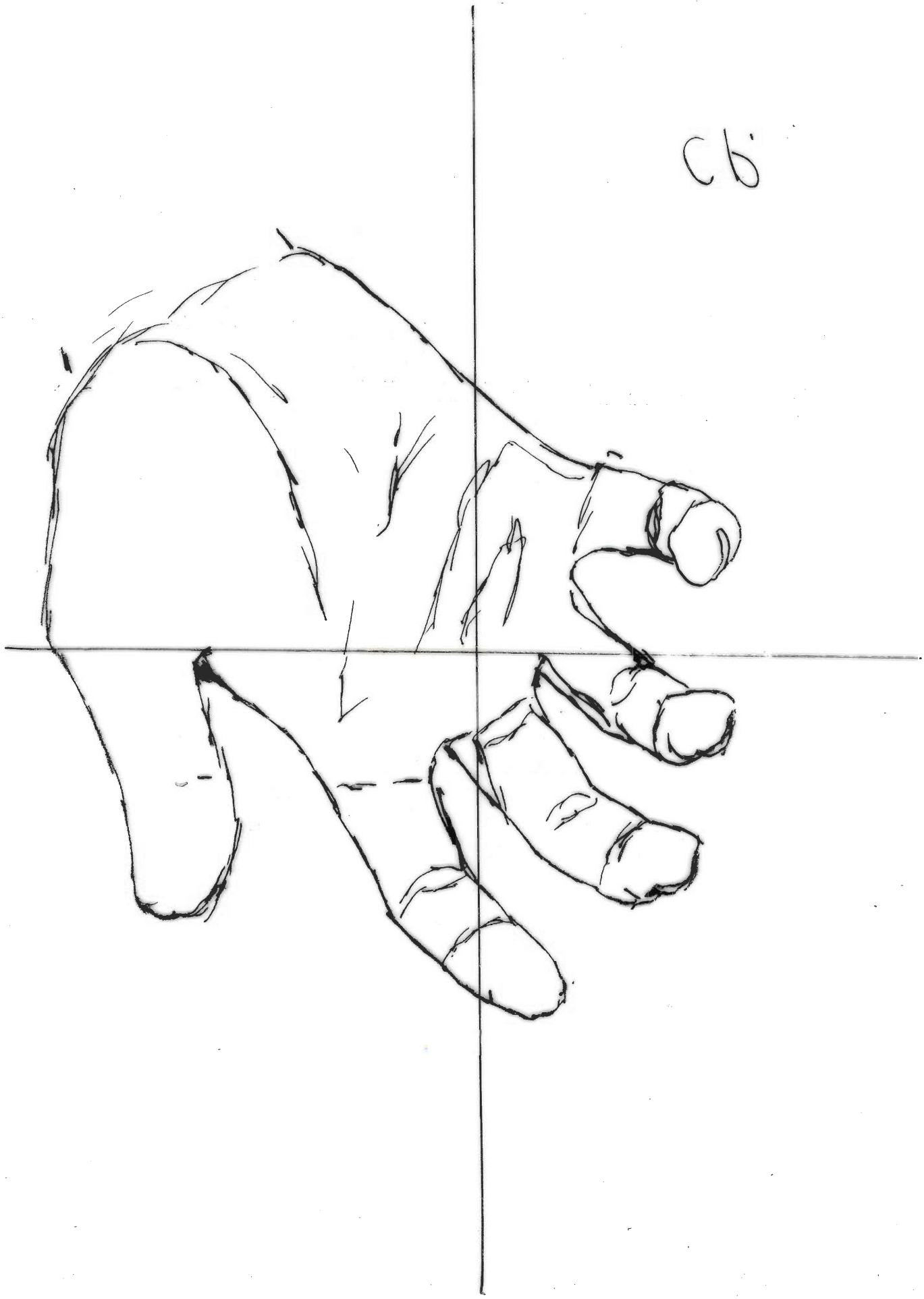
Figure A.39: Vases/Faces 10

Figure A.40: Upside Down Picasso 10



CP
"I know it like the back of my hand."

Figure A.41: Hand Contour 10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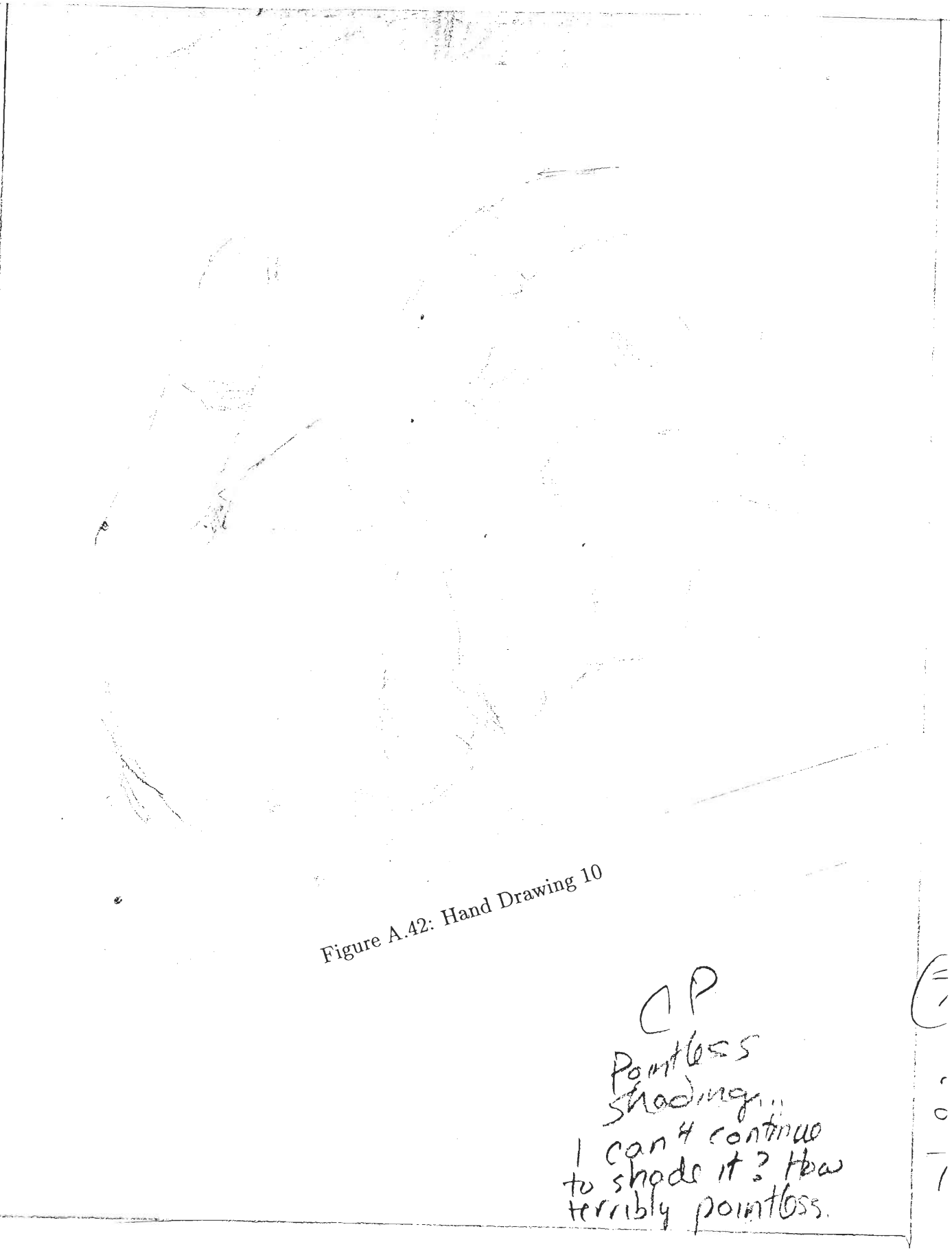

Figure A.42: Hand Drawing 10