

Before Beginning

Key Terms and Phrases

Scales
Material symbols
Mark making
Coordinated drawings
Paraline drawings [images]
Isometric drawings
Oblique drawings
Field measuring [field measurements]
Measured drawing
Hard-line drawing
Orthographic drawing
Computer-aided drafting (CAD)
Freehand drawing
Line weight
Accuracy
Economy of time

About This Text

It is hoped that this primer will be useful as a reference for independent study or as a companion textbook for an introductory drafting course. The underlying template for organizing this text is an introductory drafting course. Information is presented in a similar sequence, with each chapter introducing basic concepts and skills that can be built upon in subsequent chapters. However, specific topics can be referenced in any order. The instruction and examples address the design of building interiors and the various components and elements that constitute this specific area of environmental design.

Written detailed instructions and illustrations are used to guide readers from basic drafting conventions to advanced drafting techniques. From chapter assignments, beginners are able to use hand tools to produce scaled floor plans, elevations, sections, and three-dimensional line drawings. In addition, readers learn drawing techniques for indicating various materials, symbols for coordinating related drawings, architectural lettering, and accurately recording field measurements. The assignments are sequenced with increasing difficulty while

incorporating drafting methods presented in previous chapters. Consequently, basic methods and techniques can be practiced several times, leading to greater skill achievement and eventual mastery.

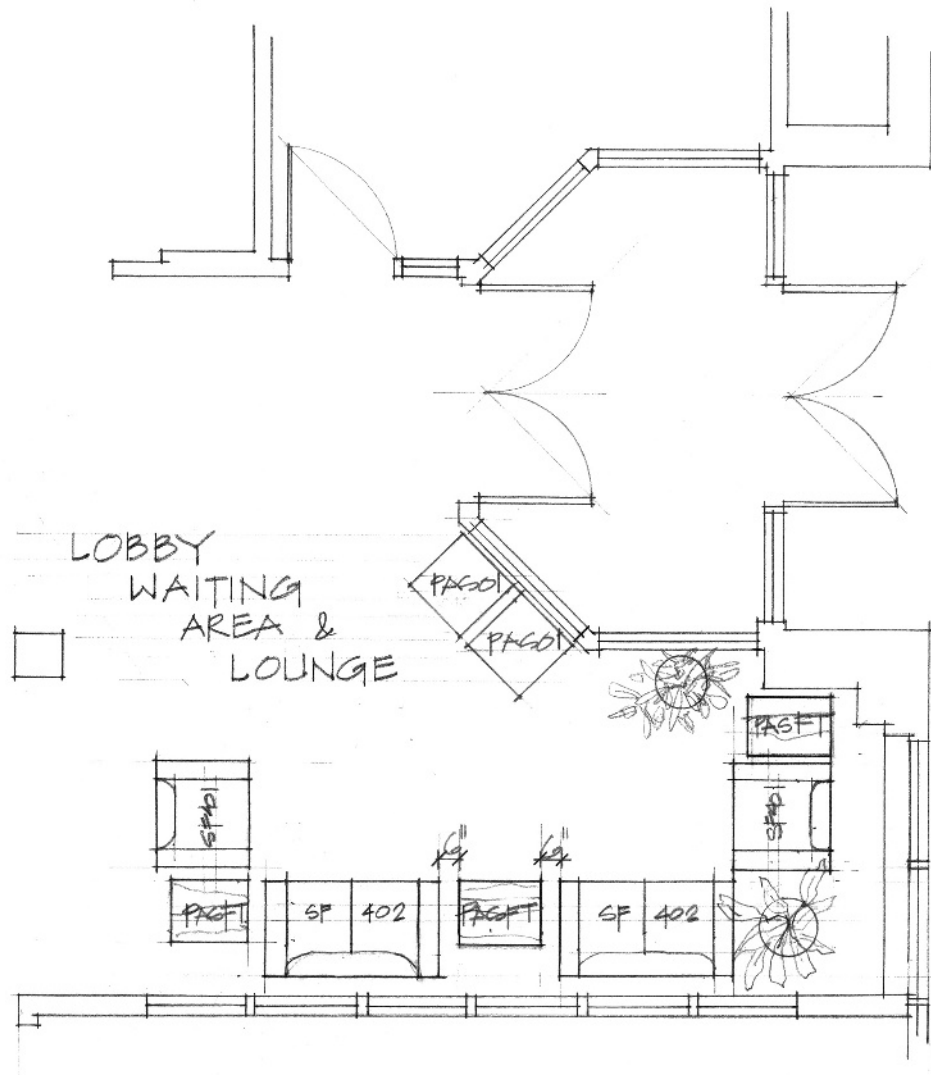


FIGURE 1.1 Furniture floor plan

Chapter Descriptions

This chapter explains the difference between architectural drafting and freehand drawing, and the rationale for learning how to manually draw even though computer-aided drafting is relied on almost exclusively in professional practice. Readers are presented with the primary concepts that guide drafting practice and suggestions for successfully gaining skill. From viewing examples integrated into the text, readers will gain an appreciation for manual drafting and understand how it can be used to communicate and inspire interior design concepts.

Chapter 2 outlines what is needed to begin learning how to draft. Tools are illustrated, and the purpose and proper use of each tool is outlined with text and illustrations. In this chapter, readers learn the correct way to hold a pencil and how to use an architectural scale. Measurement scales commonly used for various interior design drawing types are introduced, and the level of detail that can be illustrated with each scale is portrayed. The first assignment is a series of practice exercises for gaining basic skill using tools and applying various commonly used scales.

Chapter 3 introduces two-dimensional or orthographic drawings, beginning with the most familiar type, the floor plan. Figure 1.1 is an example of a partial floor plan that shows walls and furniture. Step-by-step instructions indicate how to develop this type of drawing. The concept of projecting a two-dimensional view from another is explained. The assignments present an opportunity for practicing orthographic projection and developing a drawing.

Chapter 4 presents the techniques and methods for architectural lettering. Readers are introduced to appropriate variations in form for both letters and numbers. Additionally, suggestions for composing the drawing sheet with a border and title block are introduced. The assignments focus on lettering practice.

Chapter 5 focuses on adding information that helps convey design details in the drafted drawing. Included are examples of many common interior surface materials and textures. Methods for duplicating these are discussed, and completed drawings are shown before and after surface material symbols and other details are applied. Completing assignments will increase proficiency of mark making for representing various materials.

Drafting conventions for adding dimensions and notes to a drawing are presented in Chapter 6. Methods and suggestions are given for positioning dimensions and supporting lines in a way in which they can be easily read off the drawing. The assignments provide drawings for practice placing dimension lines and notes.

Chapter 7 presents drafting conventions for illustrating a project with multiple drawings. Readers are introduced to graphic symbols that connect one drawing view to another. Examples show how these symbols are used to organize a group of drawings into a sequential set that allows for easy navigation while locating information. The assignments require readers to learn suggested symbols to coordinate a set of drawings.

Chapter 8 introduces three-dimensional drawings to readers (Figure 1.2). In this lesson, each type of

drawing is explained, including isometric and oblique drawings. The illustrations for this chapter guide drafting students through the steps for producing a paraline image using dimensions from orthographic drawings. Drawing techniques are introduced for maximizing the view of the interior. The assignments provide an opportunity to practice the steps for creating a three-dimensional view.

Techniques and methods for recording field measurements and producing drafted drawings from

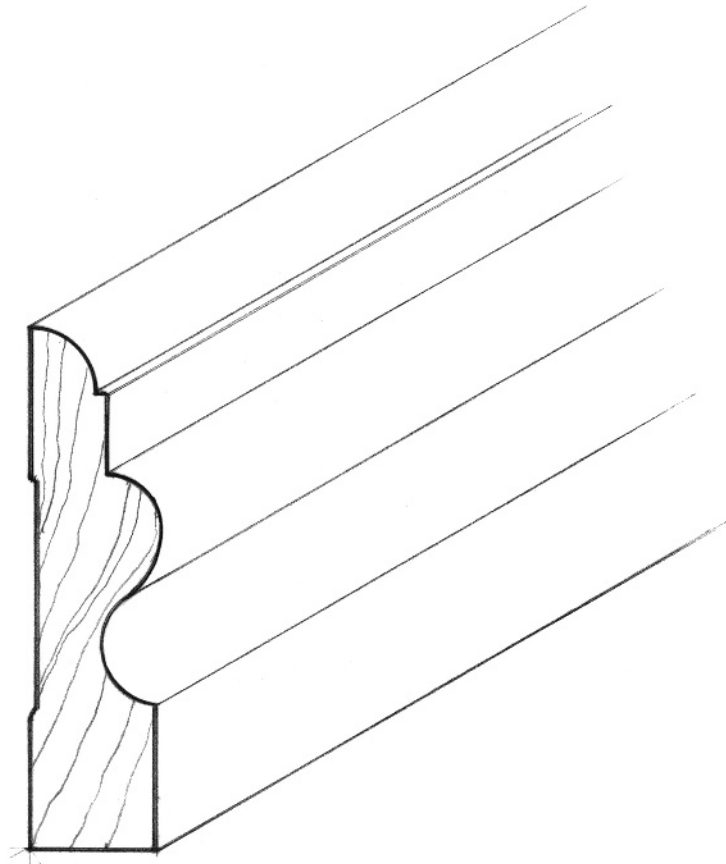


FIGURE 1.2 Three-dimensional view of wood molding

freehand sketches is the topic of Chapter 9. Particular attention is focused on the sequential steps for obtaining measurements and recording information in the field for use later in constructing orthographic views. The assignment gives beginners an opportunity to create a set of drawings starting with freehand sketches.

Chapter 10 expands field-dimensioning techniques by introducing measured drawing. This set of instructions provides methods for recording site conditions with the greater accuracy necessary for documenting historic or significant interiors and components. In the second portion of this chapter, more advanced illustrative techniques are explored for rendering manually drafted drawings. The assignments guide students to experiment with the various methods presented.

Drafting versus Freehand Drawing

Unlike other types of drafting, architectural drawing has been developed with the practical purpose of communicating specific information to readers. Methods and techniques that allow information to be conveyed with clarity in a concise, efficient manner have evolved over time. As a result, architectural drafting is a graphic communication system that uses line drawings together with notes and symbols to effectively convey information that describes the subject depicted. Drawings vary based on their purpose and intended audience, whether that is a client, builder, or vendor.

What characteristics do all drafted drawings have? They are all line drawings in which most lines are

typically drawn with the aid of tools (Figure 1.3). There are exceptions, but even drawings with mostly freehand lines are started with drafted layout lines.

Drafted drawings may be referred to as *hard-line drawings* and are drawn in a standard proportional size or scale. Thus, readers can measure distances and determine the actual size of various planes or components being depicted. For drawings intended for conveying construction, dimensions are noted on the drawing so that contractors can simply read sizes off the drawing. Other drawings may display dimensions for the convenience of readers.

In order to assist viewers in seeing the object as it really exists or is intended, the drafts person uses material symbols to depict varying surfaces. With the addition of notes added to the drawing, one is able to easily determine the size, configuration, and complexity of the object or space being drawn (Figure 1.4).

The most common drafted drawings are two-dimensional and are referred to as *orthographic drawings*. These all share the trait of missing a third dimension. For example, they may show height and width but not depth, or they may indicate depth and height but not width. At first, it may seem strange looking at this type of drawing, but viewing only two dimensions is an effective way in which to focus on each plane of a three-dimensional object or space at a time. When separate views are completed, it is useful for organizing information. As readers scan the various drawings, their attention is directed to the necessary information in a sequential order. Chapter 3 is devoted to the construction of orthographic views.

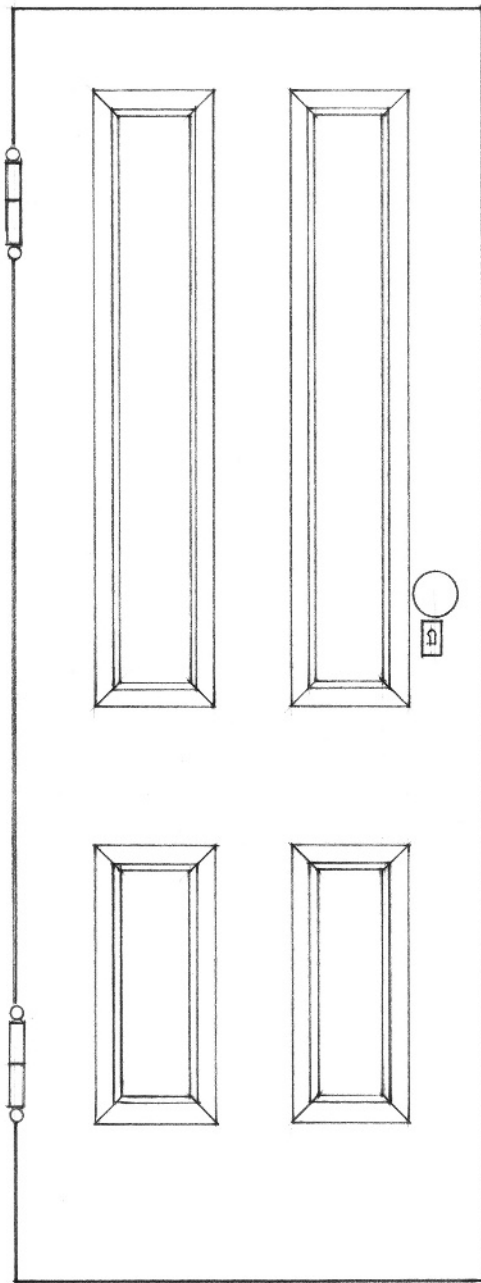


FIGURE 1.3 Drafted four-panel door

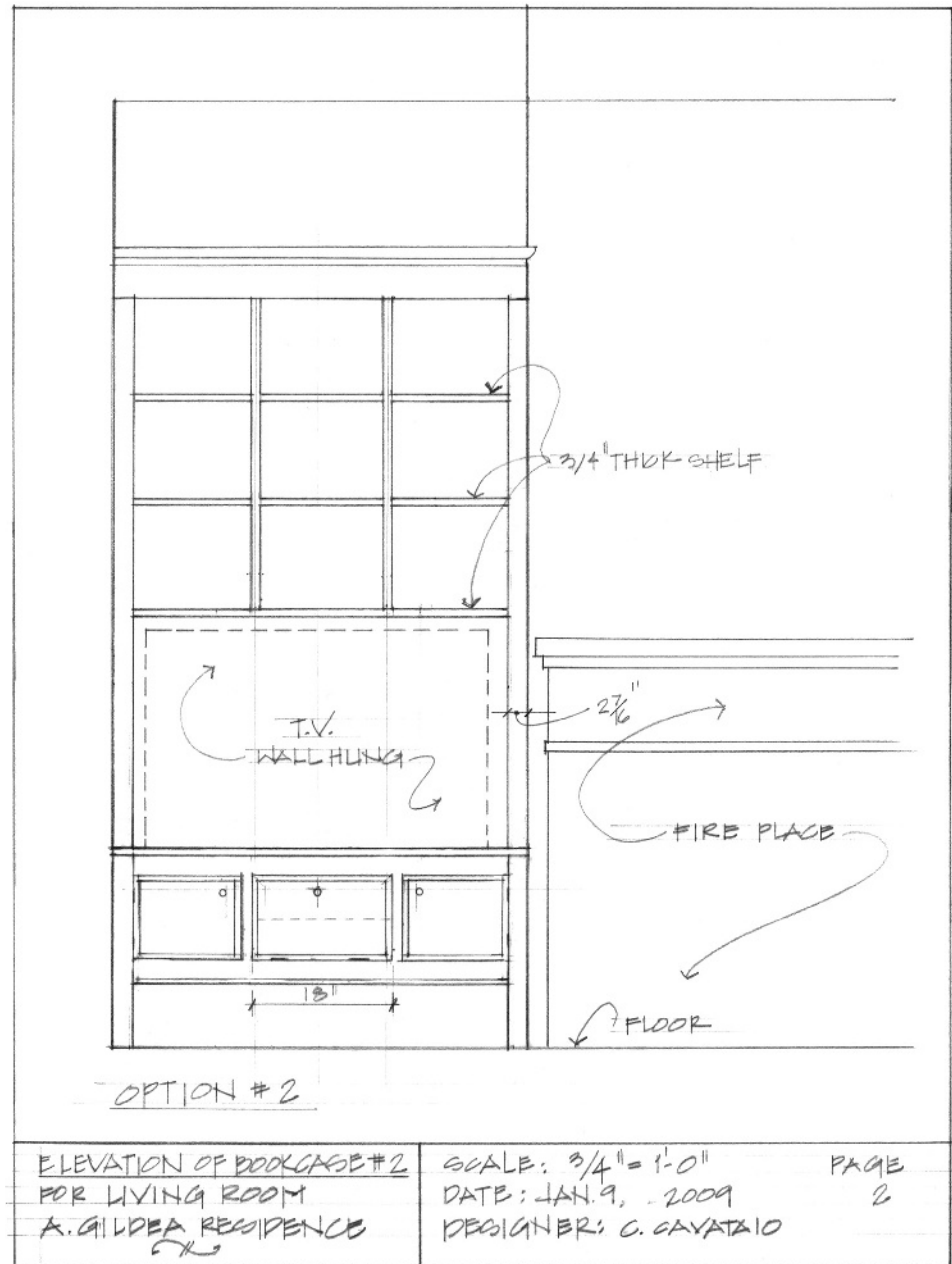


FIGURE 1.4 Elevation of built-in bookcase with notes and dimensions

What Skills Are Needed to Draft by Hand?

Because manual drafting is done with hand-held tools and precision is required, finger dexterity is necessary. Learning to draft requires practice, not unlike learning other crafts such as carpentry or sewing; it takes repeated attempts. Although some individuals are able to attain skill more quickly than others, anyone can learn to draft with dedication to practice and patience.

Initially, students need to learn the way to use each tool. Every piece of equipment has a primary function and may require the suggested way of holding it in order to have success. Some tools are multifunctional, depending on how they are held. Experimenting with each one is the best way to start. Additionally, in the beginning, a significant amount of time needs to be dedicated to learning how to read the various dimensional scales on the architect's scale.

Why Learn Manual Drafting?

Why learn how to draft manually, when computer-aided drafting is used almost exclusively in design practice today? Anyone in the twenty-first century who is about to embark on a journey to learn how to draft manually may be asked or may wonder about the answer to this question. This query is reasonable given that today few design firms or individual designers depend on hand-drafted drawings for any phase of a project. Following are some good reasons why it is still worth the

time and effort to learn this valuable form of design communication:

- ***Manual drafting is an effective way to create thoughtful design solutions.*** Manual drafting has merit as a tool to aid in the design process. The physical movement required seems to aid the thought process. Practitioners and educators alike have put forth the idea that manual drafting is an excellent way in which to learn how to design. There seems to be anecdotal evidence that hand drafting engages designers in a way the computer does not. From observation, it appears that those with the ability to develop their ideas through hand drafting are more likely to have successful, thoughtful design solutions. The time it takes to move equipment around the drawing board and produce lines on paper allows for moments when designers can feel as if they are inside the space or experiencing the object being depicted. Perhaps this approach results in a deeper connection to the interior.

Although it may take longer to produce a drawing manually, the process allows time for careful consideration. Manipulating drawing equipment while anticipating the sequence of marks requires mental focus. It has been noted that hand-drafted drawings often have fewer technical errors than do computer-generated ones.

- ***Drafting aids visualization skill.*** Like all forms of drawing, drafting aids in visualization of the subject. This ability is critical for those in creative fields. Particularly for creating three-dimensional objects or spaces, it is necessary to see all planes in order to perfect design solutions (Figure 1.5). The act of producing a drawing can greatly aid understanding the subject and make it easier to solve design problems. It seems apparent that all forms of freehand drawing and drafting collectively assist in developing this ability.
- ***Manual drafting is helpful for learning architectural design communication.*** Manual drafting is useful for learning architectural drafting's distinct graphic vocabulary and common practices of communicating three-dimensional space with all the symbols, abbreviations, and terminology. It has proven helpful in the academic setting to isolate

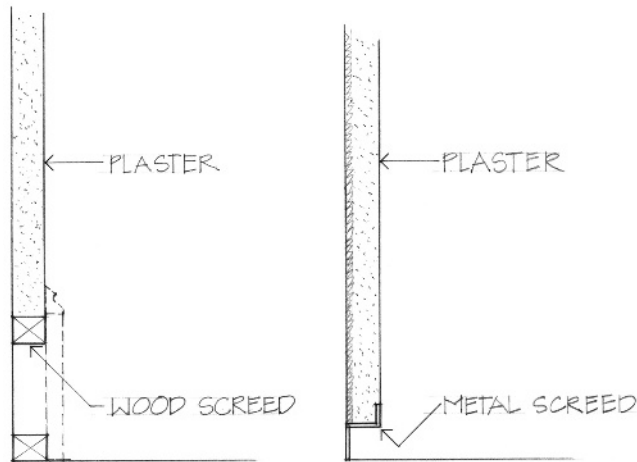


FIGURE 1.5 Design details for base of plaster wall



FIGURE 1.6 Door knocker; drawn freehand over layout lines

learning drafting language from learning computer-aided drafting software operations. With an understanding of architectural drafting conventions already in place, it is easier for students to focus just on computer software commands.

- Learning to draft aids the development of freehand drawing skill.** It is not unusual for a design instructor to occasionally hear a student lament that he or she cannot draw a straight line, as if this somehow indicates that he or she has less capability to draw at all. Interestingly, as manual hard-line drawing skill increases, so too does the ability to sketch. The physical exercise and control learned in drafting can be useful for producing freehand parallel and perpendicular lines as well. The increased confidence in manual skills allows designers to select the most effective method of delineation depending on the situation (Figure 1.6). It is not uncommon for designers to blend both hand and computer-generated techniques on the same drawing. Learning manual drafting adds a valuable tool to the kit of skills that designers can access to successfully communicate solutions.

- Manual drafting is an act of personal creativity and expression.** Perhaps the most compelling reason to learn how to draft manually is that hand drawing is a way to personalize the design process and resulting documentation. Although drafting for the purpose of designing a space is not fine art, it does elevate the process to one that is physically connected to the designer. Everyone has a different drawing style, making drafting like handwriting. When a draftsman makes a mark on a piece of paper, it is unmistakably his or hers. A drafting instructor can clearly distinguish which students produced each drawing. This fact makes manual drafting continually original and special.

As with other crafts, drafting results in the production of a tangible product. This aspect is noteworthy. Although designers cannot imagine living without digital modes of communication, manual drafting creates a sense of satisfaction that comes only from producing something that is tactile.

- **Learning hand drafting helps embed interior design knowledge.** In addition, hand drafting has proven helpful as a way to learn knowledge about construction of objects and spaces,

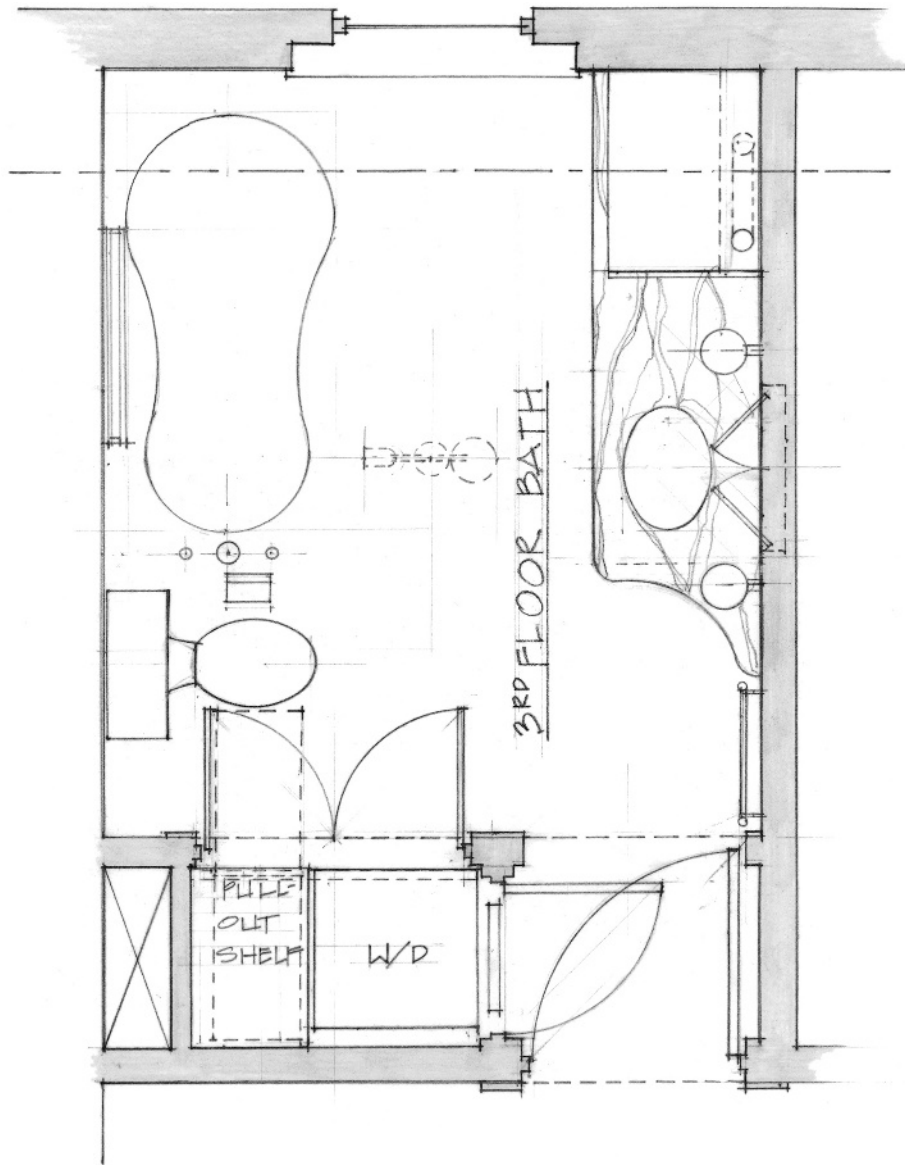


FIGURE 1.7 Bathroom floor plan

materials, and components. While perfecting their hand-drafting skills, students are learning about how the object or space will be put together. For example, drafting has been used to successfully introduce wood furniture joints, the concept of proportioning, and for identifying historic elements in an interior. The drawings in this book were selected keeping this dual purpose in mind. They are intended to aid in building drafting skill while presenting information about design and construction. Thus, learners are expanding their knowledge base while also gaining manual skills.

This knowledge also is a foundation for learning computer-aided drafting. Graphic concepts learned while manually drafting are transferable to digital drawings. Among these concepts are how to incorporate line weights to make a drawing easier to read and how to organize the drawing with dimensions, symbols, and notes. Figure 1.7 shows a floor plan that uses line types to portray the various components in a bathroom.

- **Drafting creates joyful mindfulness.** Manual drafting brings satisfaction to the creative process. When an individual is mentally connected to the physical movements required to produce a drawing, the results can be a peaceful meditative state. The mind slows down and a deeper connection develops between the designer and the work underway. The benefit is that creative concepts are more likely to be generated under these circumstances.

Three Critical Concepts

Along with the guidelines for using tools and laying out a sheet of drawings, some critical concepts for manual drafting are constant and essential for successful work. These concepts are emphasized throughout this book:

1. **Line weights make all the difference.** Line weight refers to both the darkness and the thickness or width of the line. Because drafted drawings are primarily made up of lines, the draftsman is making the drawing read more easily by varying line weight. This approach is essential to creating a drawing that is easily understood as well as graphically

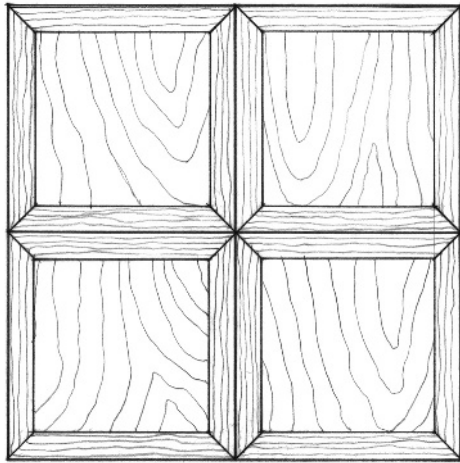


FIGURE 1.8 Wood flooring detail

FLOOR TILE _____

appealing. Figure 1.8 shows how the line thickness alone can emphasize the boundary of the object over thinner lines that indicate wood grain.

2. ***Accuracy cannot be emphasized enough.*** Architectural drafting requires care in measuring, marking reference points, and then placing lines so that drawings can remain measurable with the architectural scale.
3. ***Economy of time is the concept behind many common drafting conventions.*** This idea means that less is often better as long as communication is not compromised. This suggestion can include using fewer tools to construct the drawing or using an additional piece of equipment to reduce time while increasing accuracy. Through experimentation the drafts person discovers methods that produce the best results in less time.

Expectations and Frustration

Without a doubt, learning to draft sometimes takes a large dose of patience and unyielding dedication. In the beginning weeks, students can be discouraged after seeing what they believe is their too-slow progress, or

frustration results from the inevitable errors that come with attempting a new skill.

What makes learning to draft a challenge? The finger dexterity and simultaneous coordination of multiple tools required to produce exacting marks is well known by those who have practiced drafting. Learning to hand draft is as much a physical challenge as it is a mental one.

To alleviate the complexity of using multiple tools, try to keep only the instruments that will be used while producing a drawing on the drafting surface. Spend time before starting a project to organize the drafting surface. In this way, the number of items that need to be kept out of the way of the drawing area will be minimized, and less time will be spent moving equipment around.

It is equally important to prepare for the mental challenge of drafting. Here it is a matter of observing how one's mind comprehends new information. Some individuals can work in a more stimulating environment than others can. The drafting student needs to be in a calm but focused state. In the beginning, it is important to pay attention to what one requires in order to remain mentally focused and alert.

Given this need, many beginners cannot listen to music with lyrics while drafting. Because drafted drawings are produced in a measurable scale, one is performing calculations. This is occurring while manipulating tools on the drafting board in order to produce marks that are intended to begin and end at specific locations. Concentration must be maintained to ensure that errors are not made.

Those readers who are about to start learning drafting need to consider what typically assists them in

maintaining a sense of relaxation and openness to learning. For some, this might include sipping a favorite beverage. However, caution is needed to prevent spilling a drink on a drawing. It is highly suggested that the drink be kept on a side table or counter. This requires the individual to stand up and walk over to the drink, thus creating an opportunity for both a mental and physical break from drafting tasks.

Regarding breaks, it is recommended that one stop work after every hour of sitting at the drawing board. This is a good time to do some stretching, particularly of the neck, shoulders, and upper back. It is also helpful to flex the fingers and shake out tension from the wrists and arms. Figures 1.9 and 1.10 illustrate stretches that will help strengthen and release tension in hand and finger muscles. The arrows indicate the direction in which to move the fingers.

These areas are most likely to be used during drafting. If any other parts of the body become painful, then it may be necessary to adjust the angle of the drafting board or the height of the chair to provide a more comfortable position.

It is not uncommon for pain to develop in the fingers from holding the pencil or lead holder too firmly. Pay attention to this tendency, because mental stress and working over a period of time can cause one to tense muscles that ordinarily would not exhibit tightness. The next chapter explains positions for holding the pencil as well as other tools.

How do you prevent distress or frustration from failed attempts? It is much easier to prevent this reaction

than to have to deal with the upset. Taking frequent breaks is helpful. Stopping work gives one time to consider how the work at hand is progressing and also allows time to consider any remedies for errors, as well as next steps. Here are some other suggestions for decreasing the likelihood of a mental meltdown while learning to draft:

- *It is difficult to estimate how much time it will take to finish a drawing.* Realize that everyone is unique, and the amount of time needed to complete work will vary from one individual to another. Initially, it is important to be flexible and allow more time than suggested or estimated.
- *Beginners need to avoid comparing their work to that of others.* Some people grasp concepts and build skill more quickly. In addition, not all drafting skills are acquired at the same rate over time. Some leaps in ability and some smaller incremental steps will occur during the early phase of learning. Interestingly, those who take more time initially to build ability can also be the ones with greater skill later on. The key is keeping to a regular practice schedule.
- *It is important not to work for more than four hours without taking a longer break.* It is recommended that one leave the room and take a walk or engage in another activity for at least a half hour. This change of pace will refresh and relax exerted muscles and help put progress in perspective.
- *It cannot be emphasized enough that the small amount of time it takes to check work underway is well worth it.* It is much better to catch a mistake early. In particular, errors with scale are not easy for the novice to detect, but they need to be looked for at regular intervals as the drawing is completed.
- *It is better to draft a little every day than to sit for one day and try to complete a drawing.* By dedicating smaller amounts of time to learning this craft, one will be more likely to see progress at a satisfactory rate.

At some point, almost everyone will feel as though his or her drafting skill development has reached a plateau. Suddenly, the work does not seem to show improvement. Why is this? After learning the basic concepts, achieving greater skill and proficiency will take longer. This is common and should not be a concern. If one desires to master manual drafting, then dedication to continued practice is

the best solution. It also happens that the elusive higher skill level is achieved only after completing a larger multi-sheet project. It is as if, while paying attention to the drawing content, the individual loses the self-consciousness of making each stroke and is suddenly able to reach a higher skill level. This has been observed most often while acquiring architectural lettering skill.

Assignments

Assignment 1: Select a Dedicated Space in Which to Draft

Having a designated workspace in the home is the best way to ensure that drafting skills are learned and mastered. Consider the area within your living space where you would prefer to work. The acquisition of tools and supplies may influence your idea of where you want to work, but it is useful initially to consider the most comfortable location without being overly concerned about spatial needs for equipment.

The following questions will guide you while you consider the best available space for drafting:

- **Where would you be least likely to be distracted or disturbed?**
- **Is there natural light available?**
- **Is there a pleasant view outside for resting the eyes?**
- **Is the room or space thermally comfortable, with adequate ventilation?**
- **Are there electrical outlets close by for plugging in drafting equipment?**

- **Is shelving or a closet nearby for storing supplies and drawings or space to install the same?**
- **Is there a horizontal surface for setting aside drawings that are not being worked on or space to install the same?**
- **Is there a surface nearby for placing items on, such as a coffee cup, telephone, or perhaps an audio system?**
- **Is there a way to protect drawings from pets, spills, or unintended damage even when you are not in the space?**

Assignment 2: Exercise for Fingers

The hands are the most important tools for manual drafting. There are many exercises for relieving tired and sore muscles in the arms, shoulders, and back, but the hands are often ignored. The simple stretch movements illustrated in Figure 1.9 will increase circulation in the fingers for greater strength and sensitivity that will help while manipulating drafting equipment. Stretch the fingers apart while also stretching the hand back toward the top of the wrist. Do this motion slowly to avoid overstretching the muscles and joints. The arrows indicate the direction of stretch. This same movement will help

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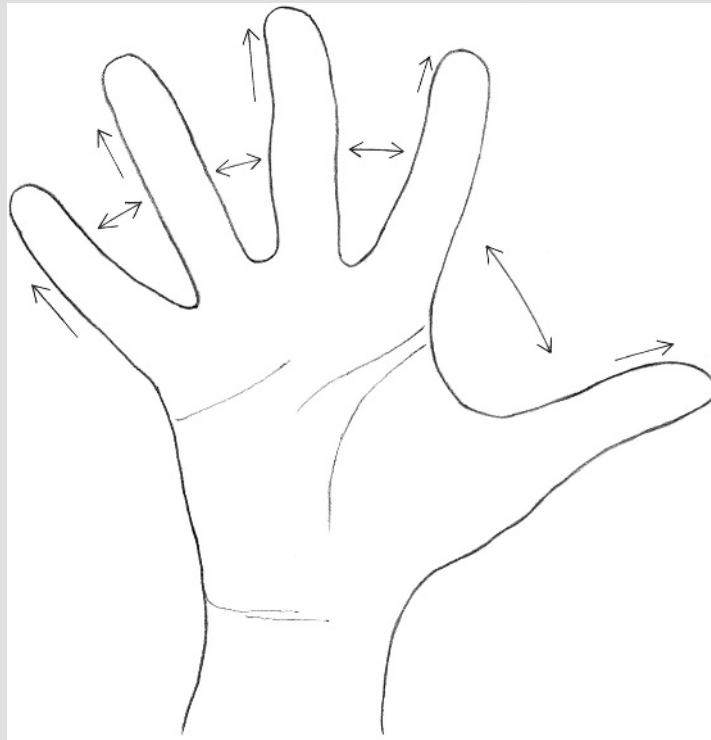


FIGURE 1.9 Hand and finger stretch

relieve stressed muscles each time at the end of a practice session. Start by doing this movement three times a day with each hand.

The second stretch, shown in Figure 1.10, involves making a tight fist with the thumb tucked under the fingers. The arrows indicate the direction of motion. Do this movement first, and then release and do another fist with the thumb outside. Release and do the same with the opposite hand. Do not force the hand into too tight a fist. Once drafting practice is underway, do these movements before you start work and when you are taking a break and finished for the day.

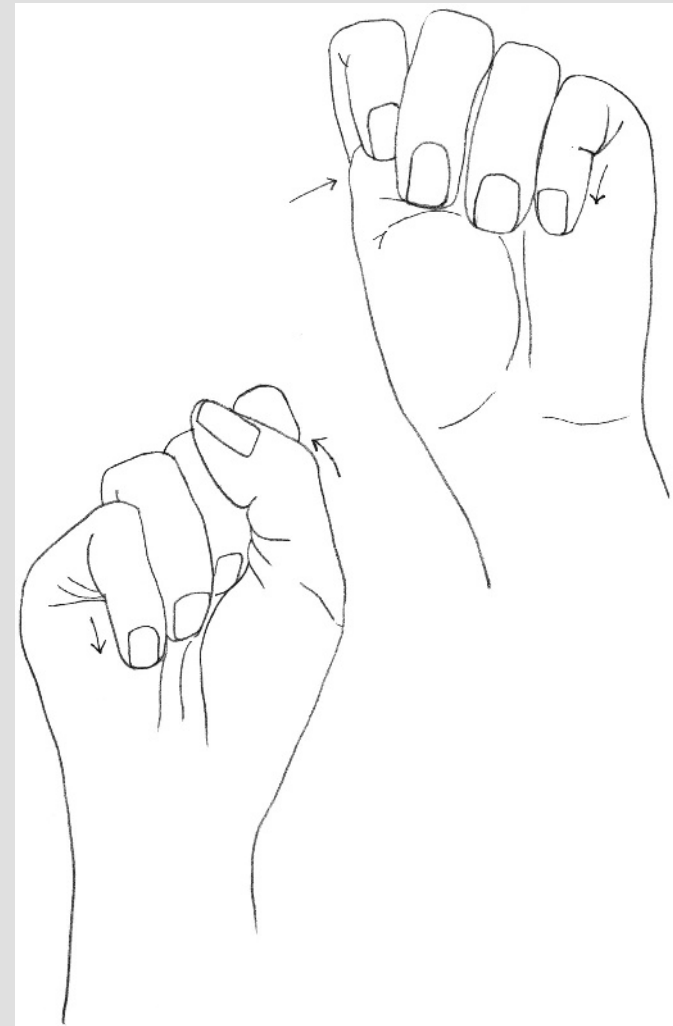


FIGURE 1.10 Fist exercises

For both exercises, the objective is to gently prepare the hands for grasping tools and handling a pencil. Avoid forcing your hand into the positions, and stop immediately if there is any pain.