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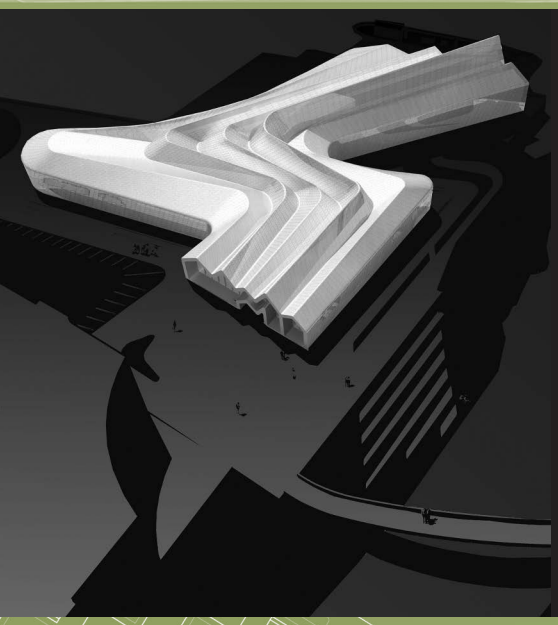

Architectural Drawing

A Visual Compendium of Types and Methods

Rendow Yee

ARCHITECTURAL DRAWING

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A Visual Compendium of Types and Methods

Fourth Edition

Rendow Yee

WILEY

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Dedicated to each student studying this book

past and present —

Always a source of insightful and innovative ideas.

To my parents —

Always a source for inspiration.

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Preface to the Fourth Edition

The fourth edition adds two important chapters, “Introduction to the Digital/Manual Interface” and “Introduction to Portfolio Building.” The first new chapter is critical for a student’s understanding of how manual drawing and digital modeling play off of each other as partners in design thinking. This partnership is increasingly important, as the simultaneous use of both modes seems to be the most efficacious approach to design drawing. The second new chapter addresses the need for students to formulate portfolios for their work and future careers.

I am deeply grateful for the superlative work of the contributing author for the digital/manual chapter, Professor William W. P. Chan of Morgan State University’s architecture department. He also worked with me as a consultant, shedding light on many other issues in the book. I would also like to express my deep gratitude for the three reviews I received for the portfolio chapter from Professor Mark A. Pearson of the College of DuPage, Professor Hiro Hata of SUNY at Buffalo, and Professor Chan. Special appreciation goes to Guobin Yu, who assisted with the transferring of countless images to CDs. A special thanks to Wiley assistant editor Lauren Poplawski and editorial assistant Danielle Giordano, both of whom patiently worked with me on numerous issues and problems. Finally, I would like to acknowledge the outstanding student projects submitted for inclusion in the book by the schools listed below.

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Preface to the Third Edition

The third edition introduces hierarchy to make the book easier to use and its information more accessible. The hierarchical table of contents, for example, allows readers to reference the most salient topics quickly. Structural hierarchy within each chapter is based on two stages: BASICS and BASICS APPLIED. BASICS incorporates fundamental elements such as theory, definitions, principles, and concepts. BASICS APPLIED provides step-by-step how-to applications, along with student and professional examples.

The third edition has also expanded the content in the companion website. In addition to the initial second-edition website chapter titled "Conventional and Computerized Representation in Color," two new chapters—and an appendix—have been added. The chapters are titled "Interfacing Manual with Digital: Professional Office Example" and "Interfacing Manual with Digital: Academic Studio Examples." The interfacing chapters show projects that integrate manual with digital methods. The appendix offers a brief review of geometric definitions and some important principles of descriptive geometry.

I would especially like to thank Professor William Chan of Morgan State University, who was so gracious in donating his time to review most of the chapters as well as the companion website in the second edition. I also appreciate the comments on specific pages by Professors Dick Davison of Texas A&M and Arpad Daniel Ronaszegi of the Savannah College of Art and Design. Finally, I would like to acknowledge the assistance of Tina Chau, Chalina Chen, and Susan Wu.

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Preface to the Second Edition

There are two important new features in the second edition. The first feature is the addition of a drawing and drafting exercises section at the end of the book. This will allow professors of architectural graphics and design communications to glean ideas for formulating fundamental drawing/drafting exercises to suit their own classes.

The second feature is a supplementary website chapter, "Conventional and Computerized Representation in Color," which can be found at www.wiley.com/go/yee. This overview chapter covers traditional color media such as watercolor, gouache, pastels, colored pencil, markers, airbrush, and mixed media. Various aspects of the potential of digital media are also discussed. In addition, typical student and professional solutions for the many drawing exercises in the textbook are shown on the website. These solutions are available to course instructors upon request at www.wiley.com/go/yee or by contacting your local Wiley college representative for details.

Finally, the topics of diagramming and conceptual sketching have been condensed into a single chapter with more explanatory text, and the chapter on presentation formats has been expanded to include professional competition drawings from notable offices.

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I am very grateful for three insightful critiques of the first edition. All chapters were reviewed by Professors Dick Davison and Stephen Temple; and Professor Owen Cappleman reviewed the chapter on diagramming and conceptual sketching, as well as the website chapter. I would also like to express my gratitude to all of the office professionals who contributed work in a very timely manner. In addition, I am deeply indebted to the strong support team from educational institutions that supplied me with exceptional examples of drawing exercises. A warm thanks to the following architecture schools and professors who contributed projects:

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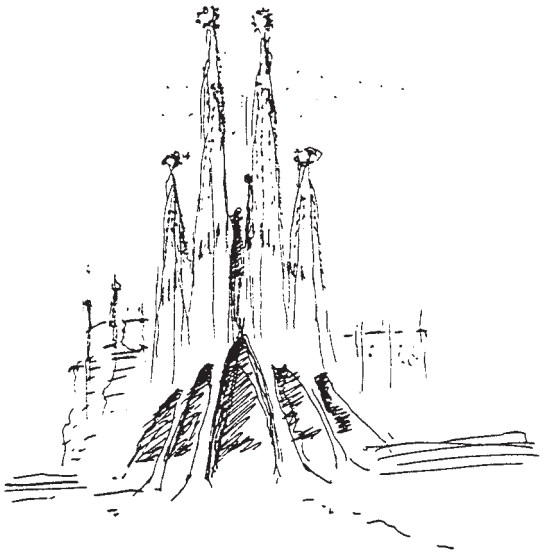

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Sketch: Student project by Susan Pruchnicki
Church of Sagrada Familia, Barcelona, Spain
10" × 12" (25.4 3 30.5 cm)
Medium: Pen and ink
Antonio Gaudi, Architect
Courtesy of Washington University
School of Architecture, St. Louis, Missouri

Preface to the First Edition

In the visual world of design education and the design professions, message (design) and language (graphics) are so interrelated that they cannot be separated. The design process always includes graphic skills to clarify and communicate the issues in question. This book's goal is to communicate a broad range of design-drawing methods; it is not intended to be a handbook on acquiring design skills.

People learn to communicate through language at an early age. They learn to speak, read, and write. The primary type of communication in any kind of design work, whether fashion or building, is drawing. To communicate our design ideas to others, we must learn how to draw. We must draw with enough facility to make our ideas clear. Furthermore, we need to be able to communicate graphic ideas to ourselves because as we work on any design our ideas are constantly changing and evolving.

The language of graphics requires the use of all aspects of the brain—analytical, intuitive, synthetic, and even emotional. The intent of this primer is to provide students and practitioners with graphic tools essential to visual communication methods in the design process. It will reinforce methods of perceiving existing reality in order to create an awareness of the visual world. It will also develop and build confidence in one's analytical and intuitive graphic skills and abilities.

It is quite common to find students with a wide range of backgrounds in drawing upon entering a beginning course in architectural drawing/graphics; some students may have had numerous courses in mechanical drawing and art in middle school and high school; other students have never used or been exposed to drafting or sketching equipment. There are also students who show a strong potential on aptitude tests related to spatial visualization, but for one reason or another they have never had an opportunity to develop this potential. This book can be used by those who have little knowledge of geometry or basic mathematics. However, it is also designed for intermediate and advanced students in architectural drawing. Students and practitioners with a prior knowledge of pictorial drawing or perspective will find this book to be a convenient reference guide for presentation work.

The first four chapters, including "Representational Sketching," are basic to the study of architectural graphics and provide the necessary framework to pursue the major areas of two- and three-dimensional pictorial drawings. The chapters on paralines, perspectives, and shadows illustrate the most common manual methods in current practice with detailed but simple explanations on the theory behind their use. The use of these procedures will help both the student and the professional in communicating and presenting design ideas. The remainder of the book is devoted to a brief introduction to the topics described by chapter titles "Delineating and Rendering Entourage," "Diagramming and Conceptual Sketching," and "Presentation Formats." The variety of drawings illustrates a large number of diverse styles; and the medium used, the original size, and the scale used (if applicable) are given for each drawing where this information was available. In this sense, the book acts as a springboard to stimulate readers to explore each topic in more detail by investigating the extensive bibliography. Many of the images included are residential building types, but a large variety of other building types are shown as well. In view of today's global culture, many drawing exhibits from outside the United States are also included.

This comprehensive guide attempts to elaborate equally on each of the architectural design-drawing methods in current use. However, the last quarter of the twentieth century has seen an upsurge in the use of paraline drawings. This is due to their ease of construction and their impressive ability to allow the viewer to see and to comprehend the total composition of a design. For this reason, a large number of professional paraline examples are included. Architecture and other design professions have been expanding their expressive vocabulary to include the emerging methods of three-dimensional computer imaging, animation, film, and video. This visual compendium of diverse graphic images done in a variety of both traditional and avant-garde media is rich in its content. Many illustrations are supported by personal commentary from their originators to help shed light on why each type of drawing was chosen to express the design.

Both students and design professionals are continually striving to come up with new ways to represent and express their designs. The graphic image examples that I have chosen are by no means exhaustive. These examples are meant to extend basic techniques that the students learn to a more advanced level as well as to provoke their imagination. They are not meant to dogmatically lead students onto a narrow path of particular styles or "isms"; instead, their goal is to encourage students to start their own journey of discovery and exploration.

As a reference for precise graphic constructions the book is laid out in a simple, easy-to-follow, step-by-step format. Although mechanically constructed pictorials are emphasized, freehand visualization techniques are encouraged. Most architectural schools have courses covering architectural design-drawing in a time frame from one to three semesters. In many cases the material is covered as an adjunct to the design-drawing studio. This book can be used under any kind of flexible time schedule as a student text or a studio reference, or as an office reference for practitioners. The encyclopedic nature of the book encourages browsing and wandering. For ease of reference, design-drawing types have been categorized in such a way that both students and design professionals will find them handy for reviewing design-drawing methods or for obtaining and extrapolating ideas for their own creative presentation compositions.

Plan sketch diagrams: Mica Moriane, official residence of the President of Finland
Mäntyniemi, Helsinki, Finland
Medium: Colored felt pens
Courtesy of Raili and Reima Pietilä, Architects

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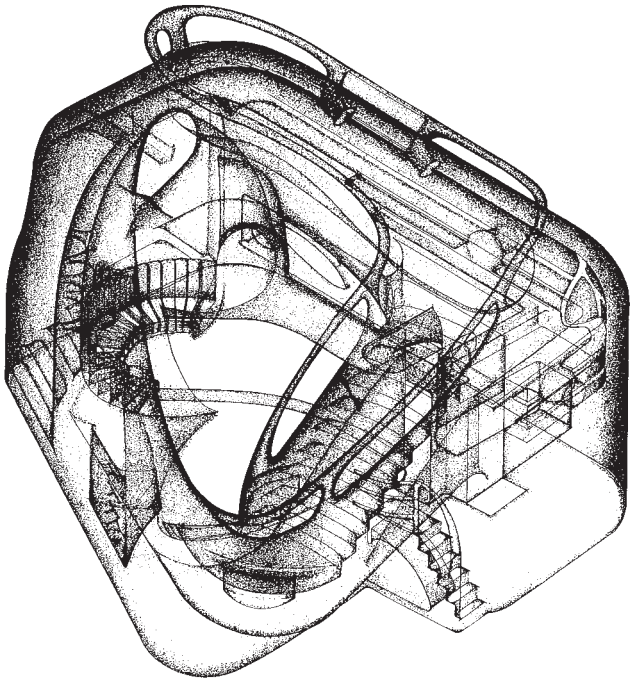

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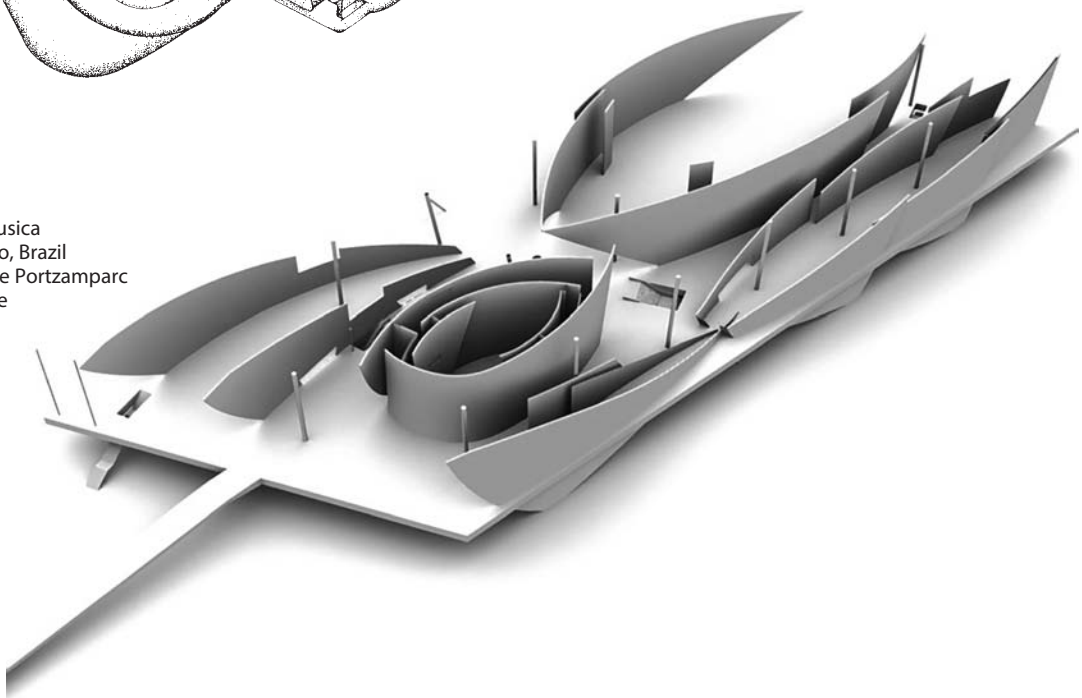
Transparent isometric
Courtesy of Eisaku Ushida & Katheryn Findlay of the Ushida-Findlay Partnership



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Rio de Janeiro, Brazil
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Courtesy of Arcspace

1

Representational Drawing

BASICS 3
BASICS APPLIED 16

Sketches of the built environment are analytical drawings that generally convey an overall image. We do these drawings to gain a greater understanding of the nature of the man-made and natural landscape. To capture and convey the essence of a place, such drawings must be executed quickly, accurately, and with confidence. These drawings are our pictorial expressions of the spirit and sense of place as we document what we see.

Geometric shapes are the building blocks for all derived forms. Environmental form and composition are an aggregate of simple and complex forms. Whether you draw from life or from your imagination, these forms must be graphically expressed and communicated in a composition within a two-dimensional surface to convey the perception of a third dimension.

The intent of this chapter is to cover the basic aspects of freehand descriptive sketching and delineating, including the types of tools, line, shape, proportion, and values as well as examining, observing, and depicting encountered environmental elements. Another goal is to hone your ability to sketch by using line, volume, texture, and tone—as well as proportional and perspective relationships—to describe various objects.

The following are some of the important skills, terms, and concepts you will learn:

Types of sketching pencils and the strokes they make
Types of sketching pens and the strokes they make
Sketching and delineating architectural elements like trees, cars, and buildings

Sighting
Vignette
Vantage point
Foreground
Entourage
Stippling
Blocking out
Rendering
Value
Middle ground
Delineating trees
Delineating cars
Hatching
Construction lines
Focal point
Background
Delineating figures
Scribbling

Representational Drawing

TOPIC: VEGETATION
Wang 2002.

TOPIC: DRAWING METHODS
Crowe and Laseau 1986.
Mendolwitz and Wakeham 1993.

TOPICS: HUMAN FIGURES, SIGHTING
Wang 2002.

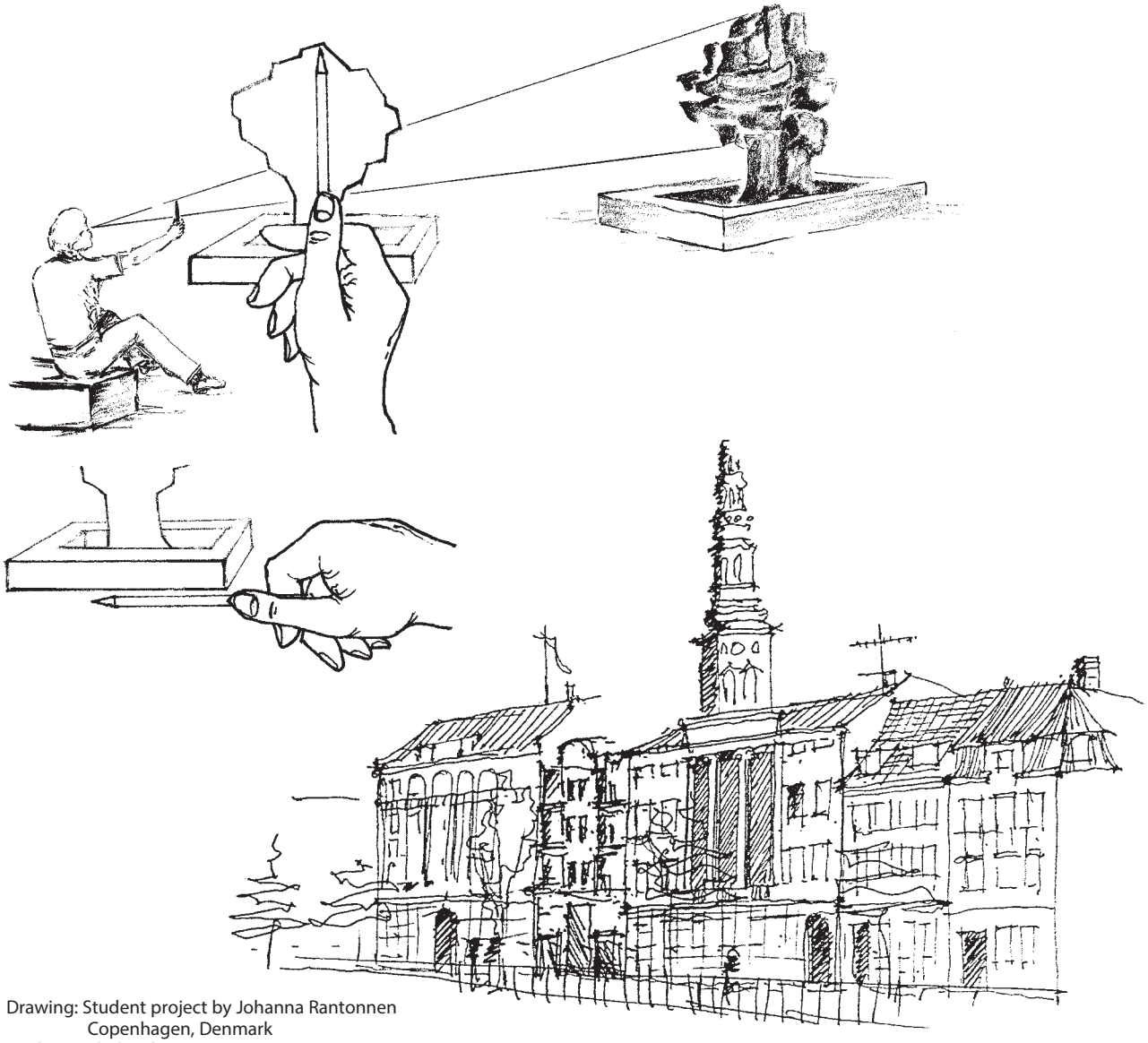
TOPIC: SKETCHING WITH MARKERS
Wang 1993.

TOPIC: BUILDINGS/TRAVEL SKETCHES
Ferriss 1986.
Johnson and Lewis 1999.
Predock 1995.

Chapter Overview
In studying this chapter, you will begin to develop skills in hand representational drawing and delineating. For continued study, refer to Ching 1990 and Wang 2002.

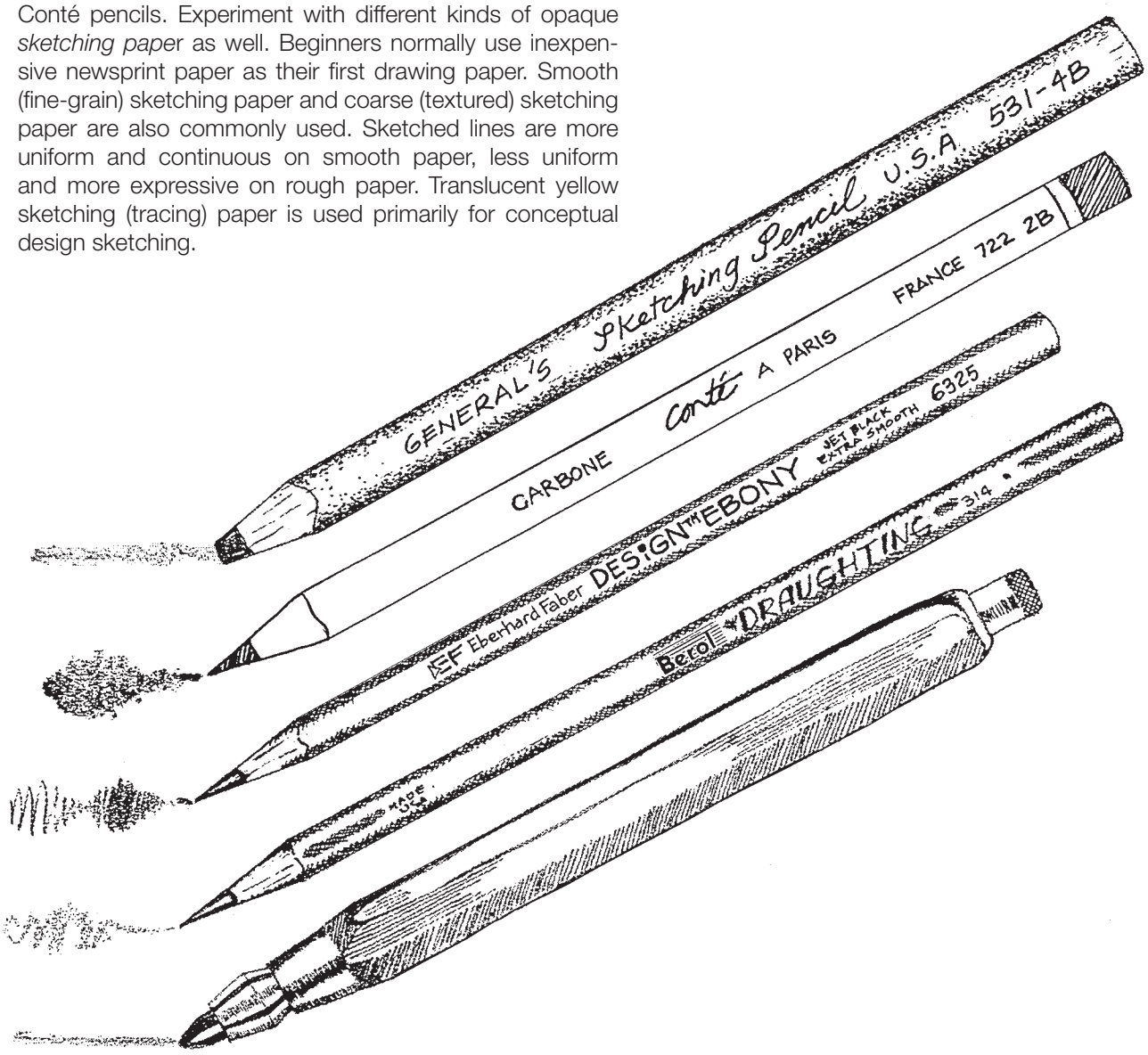
Drawing from life is essential to the development of the hand-eye-brain loop. The more you draw, the more you look at the world around you. As architects, artists, and designers become more aware of their surroundings, their work becomes more formidable. Often, when students begin drawing, their work does not have "the right shape"; in other words, it is not in the correct proportions. One of the most fundamental tools for controlling proportion is called *sighting* (explained on pp. 8 and 9). This method of using a drawing instrument held at arm's or partial arm's length as a measuring device (essentially simulating a picture plane) is highly effective in helping the beginner to make objects in the drawing the right shape, as well as controlling distances and relative sizes in general. Looking and recording reality with the aid of sighting strengthens the visual sense and brings confidence to the drawing process.

Drawing is a process that progresses from seeing to visualizing and, finally, to expressing. The ability to see gives us the raw material for our perceptions and, ultimately, for what we draw. Visual information seen by the eye is processed, manipulated, and filtered by the mind in its active search for structure and meaning. The mind's eye creates the images we see and eventually tries to express them in the form of a drawn image. Our ability to express and communicate relies on our ability to draw.



Drawing: Student project by Johanna Rantonnen
Copenhagen, Denmark
Medium: Ink sketch
Courtesy of the University of Virginia School of Architecture

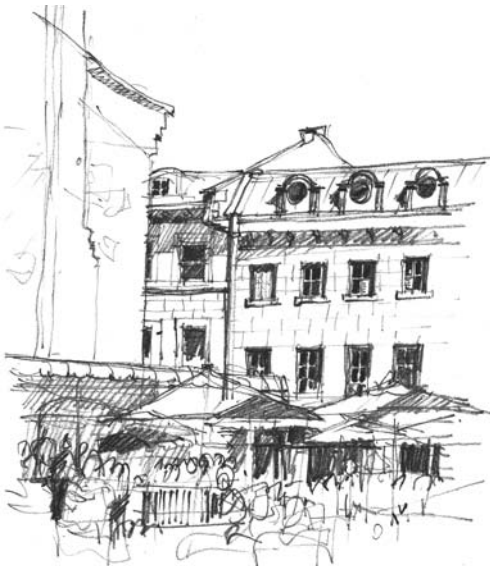
Some of the many quality *sketching pencils* are shown on this page. Other alternatives include charcoal sticks and Conté pencils. Experiment with different kinds of opaque *sketching paper* as well. Beginners normally use inexpensive newsprint paper as their first drawing paper. Smooth (fine-grain) sketching paper and coarse (textured) sketching paper are also commonly used. Sketched lines are more uniform and continuous on smooth paper, less uniform and more expressive on rough paper. Translucent yellow sketching (tracing) paper is used primarily for conceptual design sketching.



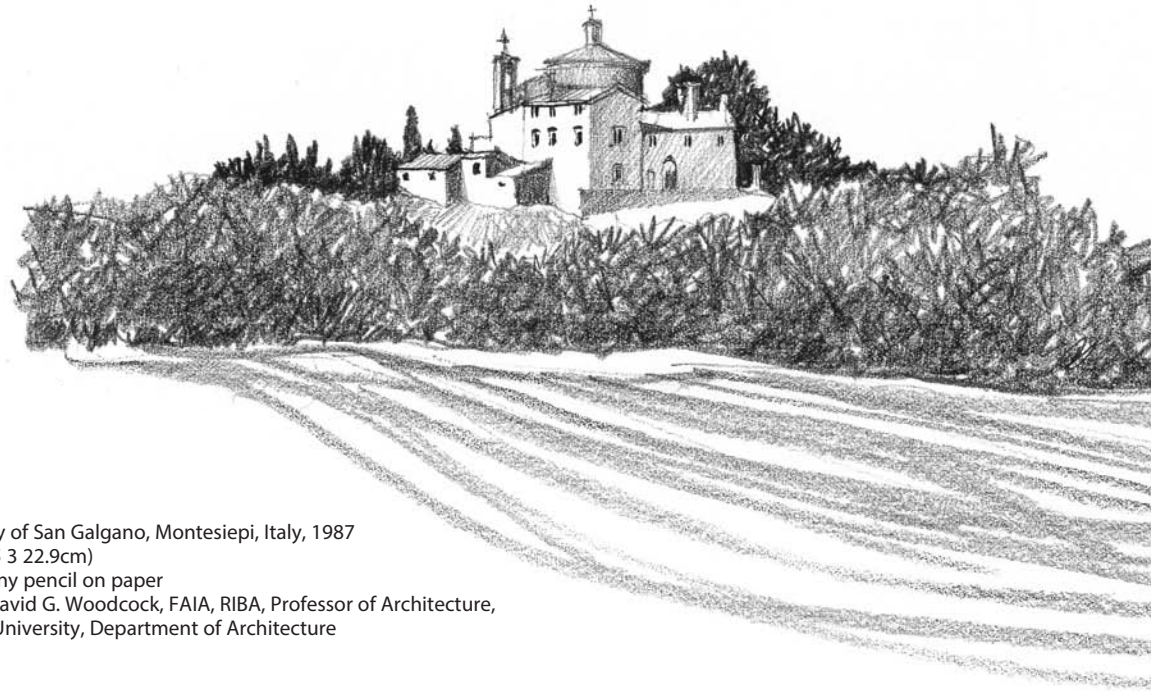
FREEHAND SKETCHING PENCILS

Soft lead sketching pencils can have round or flat leads. A flat sketching pencil can be thick (carpenter's pencil) or medium thick (chisel pencil). Both must be sharpened by hand. Flat sketching pencils are mainly used in three degrees: 2B, 4B, and 6B. They are commonly used for covering large areas quickly, as when creating tonal indications for brick, stone, and wood. Conté pencils or sticks come in three grades of black, in four different colors, and in soft, medium, and hard. Both Conté and Ebony pencils give smooth lines. The Ebony pencil's soft core is slightly wider than that of a typical pencil. Formerly, a good general-purpose sketching pencil with a soft lead was a Berol or Eagle Draughting 314; its successors are Sanford and General's Draughting No. 314. When round leaded pencils become too short from use, add length by using a pencil extender. An all-purpose mechanical leadholder clutch pencil can adapt its lead to almost any shape and is ideal for rapidly sketching over large areas. Excellent brands include Derwent and Mars.

Drawing on-site is always a challenge for me, and I rarely spend more than twenty minutes on a sketch. As an architect my objective is to learn more about the subject, so I focus a lot of attention on form and materials. Ebony pencil allows me to explore shade and shadow quickly, and by keeping at least two pencils with sharp points I can still pick out critical details.
[ARCHITECT'S STATEMENT]



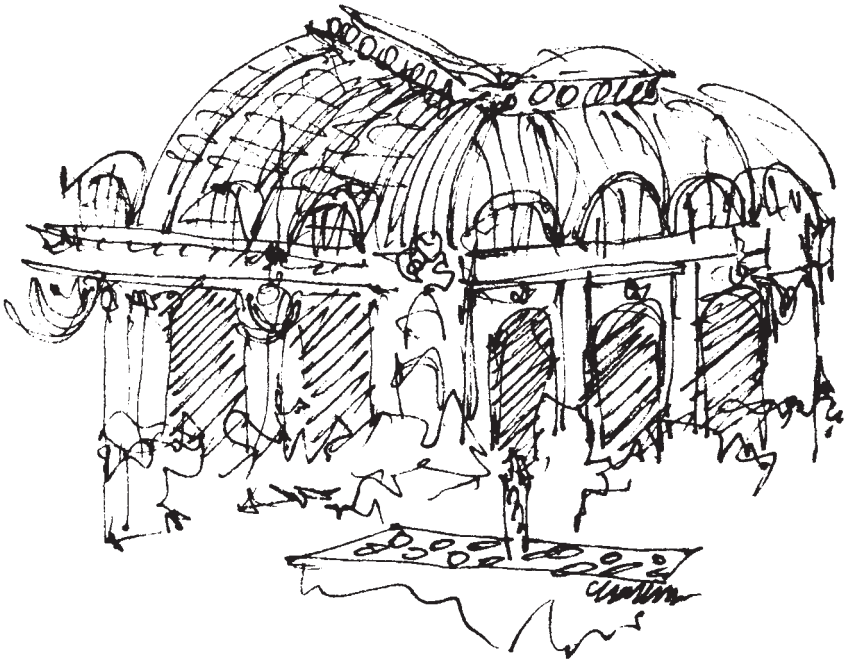
Sketch: Le Jardin Nelson, Montreal, Canada, 1993
9" × 12" (22.9 × 30.5 cm)
Medium: Ebony pencil on paper
Courtesy of David G. Woodcock, FAIA, RIBA,
Professor of Architecture, Texas A & M University,



Sketch: Abbey of San Galgano, Montesiepi, Italy, 1987
12" × 9" (30.5 3 22.9cm)
Medium: Ebony pencil on paper
Courtesy of David G. Woodcock, FAIA, RIBA, Professor of Architecture,
Texas A & M University, Department of Architecture

The quality of a freehand *pencil stroke* is determined by the hardness of the pencil lead, the character of the sharpened point, the amount of pressure applied, and the type of paper used. Softer pencils work better with smoother paper, harder pencils with coarser paper. Architectural pencil sketching is most often done with grades such as HB, B, and 2B, though softer leads are also used. Graphite and charcoal pencils can yield variable line widths and tone. Variable tone and value cannot be achieved when sketching with pens and markers. Lighting conditions resulting in shades and shadows can be most accurately represented by using soft lead pencils, charcoal pencils, square or rectangular graphite sticks, or Conté crayons. To prevent pencil work from smudging, cover completed sections of your drawing with tracing paper or use fixative sprays.

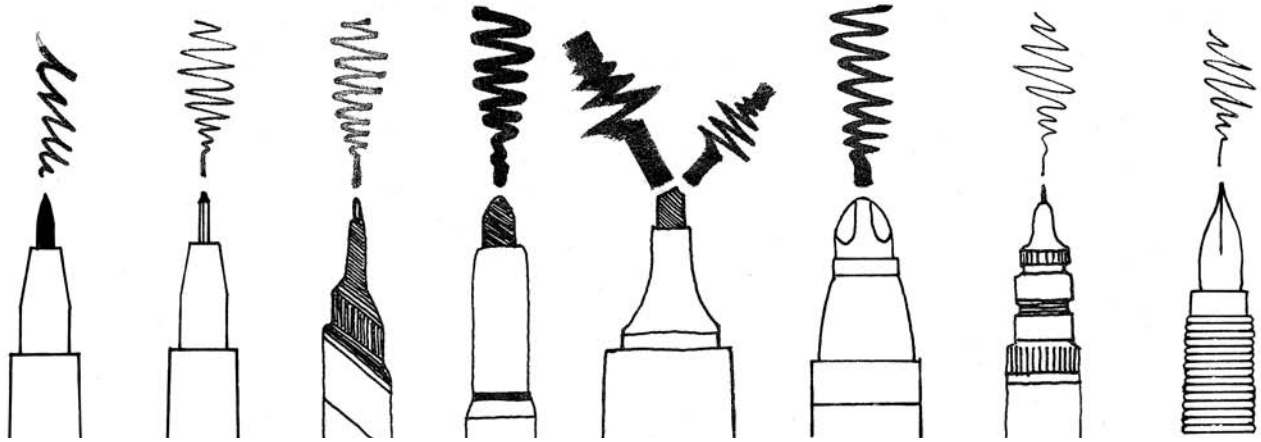
In producing firm, steady strokes, do not rest your hand on the drawing surface as in writing. The pencil should be held in a relaxed position; too tight a grip will cause hand fatigue. A wrist-and-arm movement will produce longer, continuous strokes. Use the wrist, elbow, and shoulders as pivot points. Attempt to master the control of sketching straight lines, curved lines, circular spirals, and circles. When sketching, use the whole page—draw big.



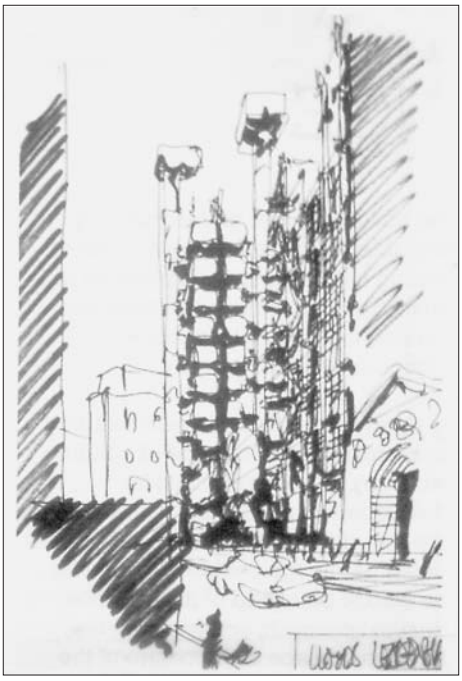
Sketch: The Garden Court of the Palace Hotel
San Francisco, California
Medium: Ink pen
Sketch by Charles Moore, Architect
Courtesy of Saul Weingarten, Executor, Estate of Charles Moore, and the Department of Architecture, UCLA School of Art and Architecture

Using *pens* or *markers* as graphic communication tools allows the architect/designer to express a wide range of images, whether they are representational, like the hotel courtyard and the Austrian street scene, or conceptual, as with the Lloyd's of London sketch. The London thumbnail sketch illustrates the loose, expressive quality that can be achieved with flexible felt-tipped markers. Contrast it with the very uniform, contoured lines *delineated* in the street scene with a fine-point, felt-tipped pen.

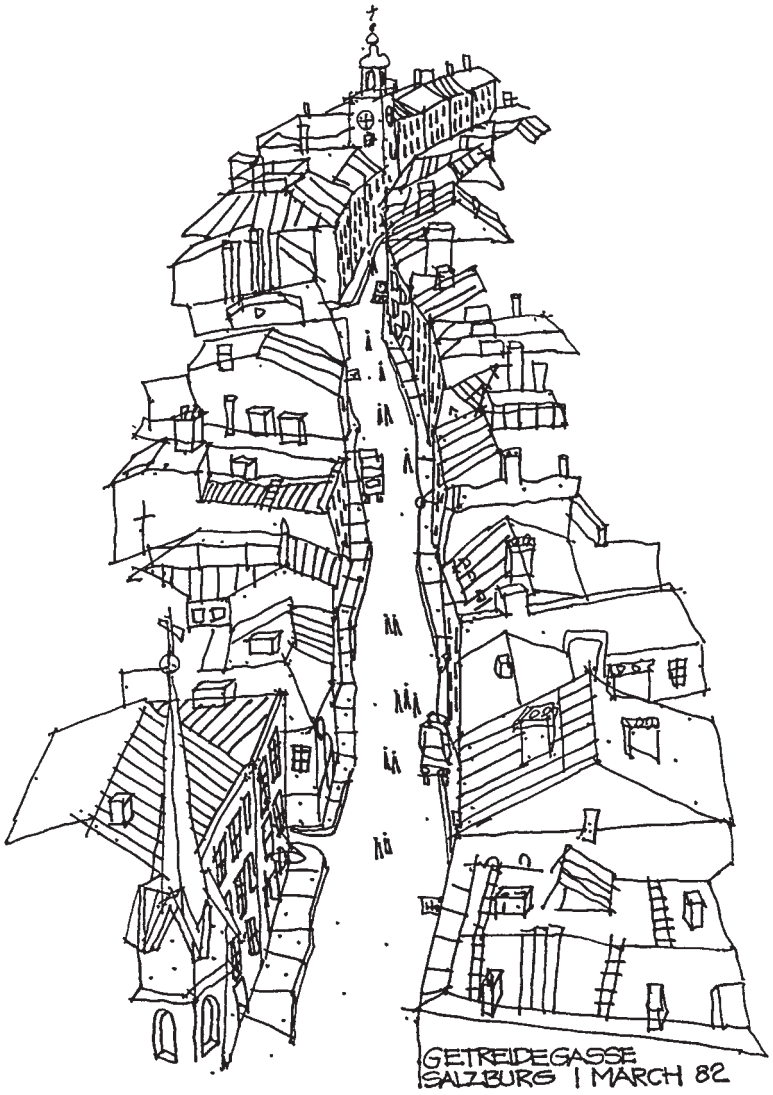
Pens and markers are frequently used to do thumbnail napkin sketches for both conceptual (see p. 68) and representational drawing.



In addition to pencils, line and tone can be produced by a variety of pens and colored markers. Markers are available in a range of halftones, but because they dry quickly, mixing tones is difficult. Marker tips vary in size from fine to broad and in shape from pointed to chisel. Finer tips generate fine lines with more detail, whereas broader tips generate wider lines and solid tones. Technical pens are commonly used for precise mechanical lines. Razor-point pens, cartridge pens, sketch pens, and fountain pens can create loose delineated lines that are permanent. Fountain pens traditionally used for writing become quite versatile in their application of line weight simply by adjusting finger pressure. Excellent for quick sketch studies, fountain pens can also produce much thinner lines when used upside down (i.e., rotated 180°).



Sketch: Lloyd's of London, London, England
11.75" × 16.5" (29.8 × 41.9 cm)
Medium: Brown felt-tipped marker
Sketch by Laurie Abbott
Courtesy of Richard Rogers Partnership, Architects

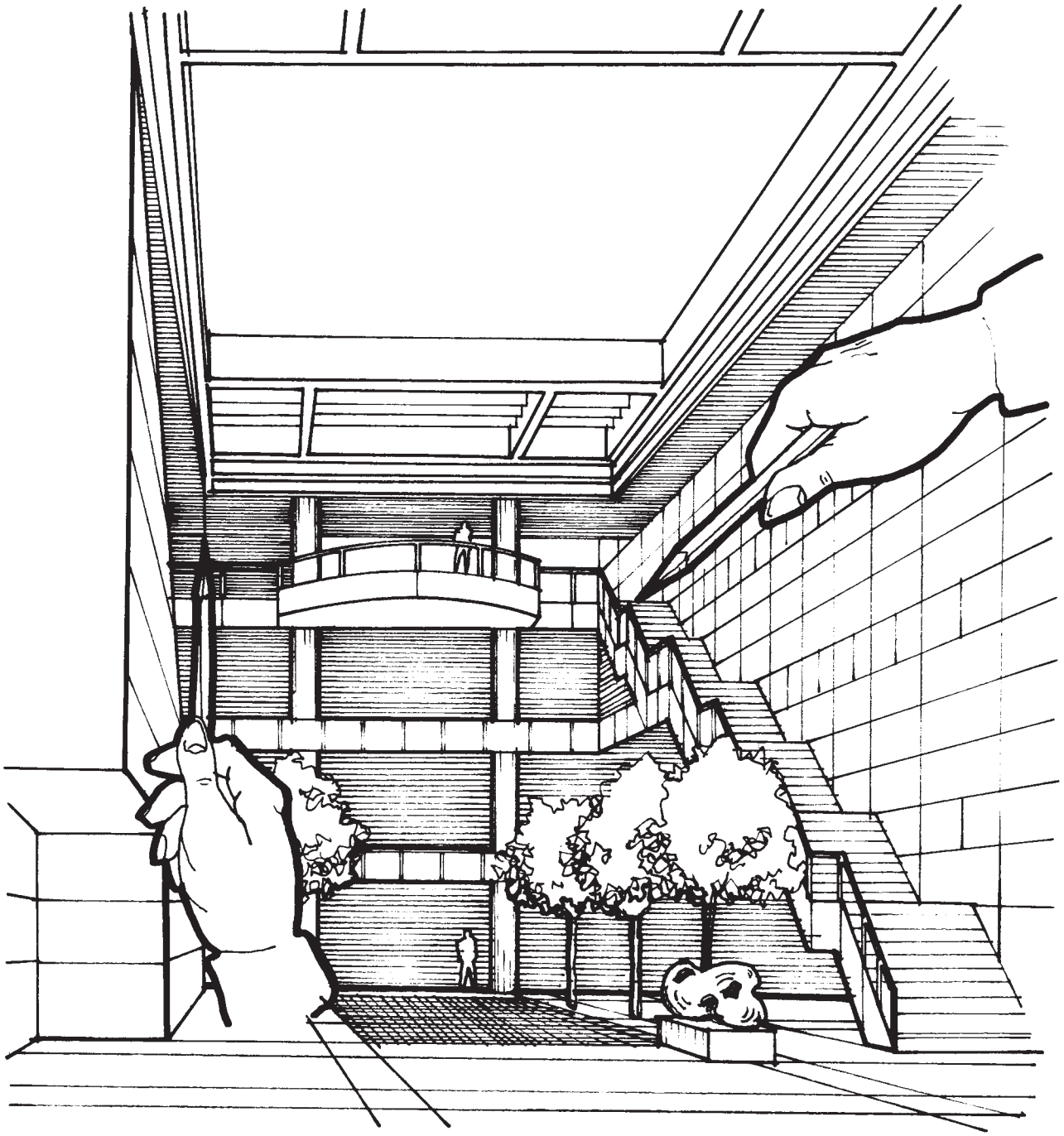


Drawing: Street scene, Salzburg, Austria
7"×10" (17.8 × 25.4 cm)
Medium: Felt-tipped pen on paper
Courtesy of Steven House, Architect, San Francisco

Ballpoint, felt-tipped, fiber-tipped, and roller-tipped pens can also generate a variety of line widths. In general, all types of pens create steady, fluid, smooth-flowing lines—without the need to apply pressure (unlike pencils). Remember that for architectural sketching, the width and type of the tipped nib are of most concern. Nibs can be made of felt, nylon, plastic, foam, etc. New nibs tend to be hard and become flexible after use (keep old ones for soft tones). Try to keep up with the ever-changing technology of newly developed nibs.

Felt-tipped markers are a quick, loose medium (similar to watercolors) for creating transparent presentations; they are quite effective when time is a critical factor. One of markers' advantages is that they very seldom smudge. They come in a large variety of premixed colors in addition to black and shades of gray. Markers are more suitable for smoother, harder, and heavier grades of paper, whereas pencils and colored pencils work best on medium-weight textured paper.

Pens and markers are perhaps best suited for sketching conceptual ideas. These tools give you the ability to loosen up and avoid inhibitions in the design-drawing process.



Drawing: Sacramento State Office Building, Sacramento, California
Fisher–Friedman Associates, San Francisco, California

To properly establish accurate proportions in transferring what you see to your drawing pad, you must accurately compare relative lengths, widths, and angles.

1. Observe the subject/scene that you would like to draw.
2. Close one eye, hold your head still, and extend your arm partially or to arm's length.
3. Holding a pencil or pen, make a basic unit length measurement on any part of the viewed scene, using the distance from your drawing instrument tip to the top of your thumb as a guide to proportion.