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Architectural Drawing

Prepared especially for home study

By

WILLIAM S. LOWNDES, Ph. B., A.I.A.

and

FREDERICK FLETCHER, A.I.A.

Registered Architect

5637 A-3

Part 1

Edition 3

6 Assignments

International Correspondence Schools, Scranton, Pennsylvania

International Correspondence Schools, Canadian, Ltd., Montreal, Canada

Architecture home study course /
ARCHITECTURAL DRAWING

V. 8 PART 1

By

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*"The higher men climb, the longer
their working day. And to keep at the
top is harder, almost, than to get there.
There are no 'office hours' for leaders."*

—Cardinal Gibbons

But for the man who has found the job he loves, work is no longer "labor." And learning more about that job becomes a thrilling, exciting adventure.



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ARCHITECTURAL DRAWING

PART 1

INTRODUCTION

What This Text Covers . . .

1. INTRODUCTION TO ARCHITECTURAL DRAWING .. Pages 1 to 12
Architectural drawing is the special language of the architect. Various kinds of architectural drawings are explained. The use of paper is described. Each paper has its particular use.
2. SYMBOLS AND INDICATIONS Pages 13 to 21
Symbolism is used in architectural drawing. In this section, you will find symbols for materials, architectural features, plumbing fixtures, and electrical outlets.
3. DETAILS OF WINDOWS Pages 22 to 40
The construction of many types of windows is explained. Screens and shutters are included.
4. DOORS AND CORNICES Pages 41 to 57
Details for exterior doors in frame and masonry walls are shown and explained. Details of interior doors are given. Cornices are illustrated.
5. INTERIOR DETAILS Pages 38 to 71
You will be interested in the many interior details that are shown in this section. The detailing of a chimney requires considerable care. Stairs, doors, interior trim, and wainscot are included.
6. KEY TO CRITICISM Page 72

5837A

1. **Definition of Architectural Drawing.**—Architectural drawing is the special language of the architect, which he uses to convey to his client impressions of how a contemplated building will appear when completed. It is also used to convey to the contractors and workmen who perform the work of erection the information regarding size, form, materials, dimensions, etc. necessary to enable them to estimate the probable cost of the building, and to erect the building as the architect conceives it in his own mind.

Architectural drawing is based on the principles of projection drawing, which are applied in making the working drawings required for the erection of the building. It also employs the principles of perspective in drawings that show the building as it will actually appear when viewed from some particular point.

2. Architectural drawing does not require the extreme accuracy that is called for in some forms of mechanical drawing. A sufficient degree of accuracy is obtained by placing lines of dimensions on the drawings to define the limits of certain portions of a building. Where precision is required, large-size drawings are made which show details at exact size.

Freehand drawing is employed to a great extent in architectural drawing. In designing a building the architect generally finds it helpful and often absolutely necessary to make numerous freehand studies or sketches illustrating various portions of the design. In making these studies a thorough knowledge of freehand drawing and facility in handling a pen or pencil are essential. Familiarity with the principles of perspective drawing will also be found invaluable. These freehand studies, the architect's first conception of a problem, are generally made with a soft

pencil and without the use of instruments. In laying out a working drawing, instruments such as are used in mechanical and geometrical drawing are employed, and harder pencils are used than those used in making the studies.

The elements of beauty and character should always be considered in making an architectural drawing. These elements are not often considered in mechanical drawing, where the principal aims are accuracy and economy in the use of materials. Although utilitarian considerations also enter into architectural drawing, they must be studied in conjunction with the expression of beauty and character.

3. Importance of Architectural Drawing.—As has been stated, architectural drawing is the special language of the architect. Without its use no building of any importance could be erected. The subject should be understood by all those interested in the construction of buildings, and in the education of an architect a thorough knowledge of its meaning is fundamental.

A person who is desirous of becoming an architect is urged to study this most important subject thoroughly. He should practice drawing whenever he has time to do so. A student of this course should draw carefully and studiously all the plates and exercises called for in the texts on *Architectural Drawing* and send them to the Schools for correction. He should also, as a means of self-improvement, study and copy as many as possible of the other drawings that are shown in the illustrations throughout these texts, but these drawings are not to be sent to the Schools for correction.

By doing this work the student may feel assured that he is improving himself in a way that will be of the greatest advantage to him when the time comes for him to do practical architectural work. The beginner should always endeavor to have his work neat and clean with clear, sharp lines and careful lettering, as neatness is very desirable. He should not, however, forget that his object is not only to draw lines neatly and accurately, but to make them convey useful ideas. Otherwise the drawing is of little practical value.

4. Technique of Architectural Drawing.—Methods used in the production of drawings are described in previous texts, which also include instructions regarding the use of drawing boards, T-squares, triangles, drawing instruments, papers, pencils, pens, etc., and require the making of a series of elementary drawings.

5. Nature of Architectural Drawing.—Architectural drawing, in its complete sense, does not consist merely in making marks, lines, letters, and numerals on sheets of paper. It is the language used to express ideas of the design of buildings and their numerous parts, and to show the construction of the buildings and the application of the materials of which the buildings are to be made.

The numerous uses of architectural drawing as applied to design, construction, and the uses of materials cannot be taught in a single lesson. The subject is presented gradually, only enough design and construction being considered at one time to explain the drawing that is being made.

ARCHITECTURAL DRAWINGS

DESCRIPTION OF CLASSES

6. Classification.—It is customary, in the course of presenting a complete conception of a proposed building, to make several kinds of drawings. These include preliminary studies, preliminary sketches, working drawings, scale details, and full-size details.

The preliminary studies are the freehand sketches which the architect or draftsman makes when formulating his ideas for a building. The preliminary sketches are those made to show to the client so that he may get a good general idea of the proposed building and may make any changes that he desires before the permanent and detailed drawings are made. Both the studies and the sketches will be described in a succeeding text.

7. Working Drawings.—The working drawings must be as complete and accurate as possible; they are not merely pictures. Every line, dot, mark, letter, and numeral must have a definite meaning so that exact estimates of the cost of the work can be made and so that the building can be properly erected from the drawings. Working drawings consist of sheets showing plans of the different floors, the basement, and the attic; elevations of the front, rear, and sides of the building; sections, through the principal portions of the structure. The sections show details of particular parts that cannot be shown properly on the plans or elevations. All necessary dimensions should be noted on these drawings. The working drawings are generally drawn to the scale of $\frac{1}{4}$ inch to the foot. On very large work they are sometimes drawn to the scale of $\frac{1}{8}$ inch to the foot, so that the drawings may be made on sheets of paper or cloth of a convenient size.

Working drawings are never rendered or colored, but are plain line drawings made with pencil or pen on tracing paper or cloth and then blueprinted. Colored washes and lines will not reproduce in color on blueprints and are little used.

The working drawings are first laid out accurately and drawn in pencil on tracing paper, the materials of which the building is to be constructed being indicated by various markings. After the dimensions have been carefully checked, the drawings are traced on tracing paper or cloth, the tracing generally being done with pencil or India ink. When the dimensions and notes are all carefully put in and the titles are lettered, the sheets are ready for blueprinting.

The working drawings, together with the specifications, form the basis of the contract to construct the building. Since they are documents that form part of the contract, they are therefore sometimes referred to as contract drawings.

8. Examples of Working Drawings.—In connection with this text, working drawings are given which fully illustrate this form of architectural drawing. Other illustrative material of this kind is found in the working drawings in this text as well as in that of the succeeding text.

9. Scale Details.—After the working drawings have been completed and the specifications which describe the work to be done on the building have been written, the architect proceeds to make scale details, which are drawings of certain parts of the building at a larger scale than that used for the working drawings. This is done with parts of the building, such as the windows, doors, cornices, porch finishes, etc., which cannot be shown clearly at a scale of $\frac{1}{4}$ inch. The scales commonly used in making these drawings are $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, and 3 inches.

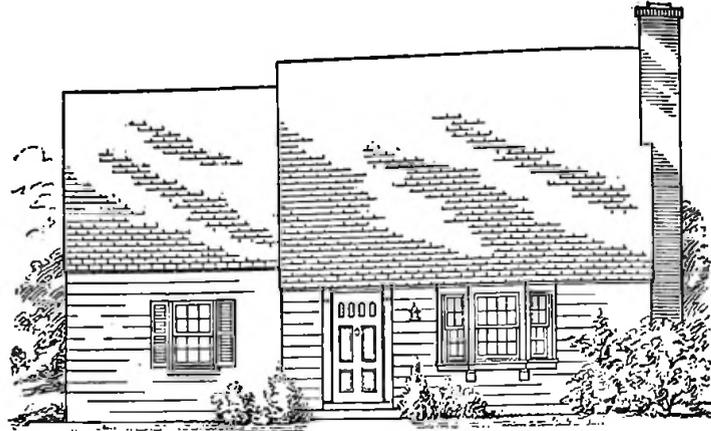
10. Full-Size Details.—It is necessary to show some portions of the building at full size. Carvings, moldings, and similar details of a building cannot be satisfactorily shown in any other way. Full-size details often make very large drawings, but can generally be shown on large sheets of heavy tracing or bond paper from which prints can be made.

11. Plans.—The plan of any object is the view of it as seen from above. In the case of buildings, there may be several plans. These are horizontal sections, or cuts taken through the building, one at each story, showing the building as it might appear with the upper parts removed. The arrangement of walls, partitions, doors, windows, chimneys, stairs, etc., should all be shown in their proper relative positions and sizes.

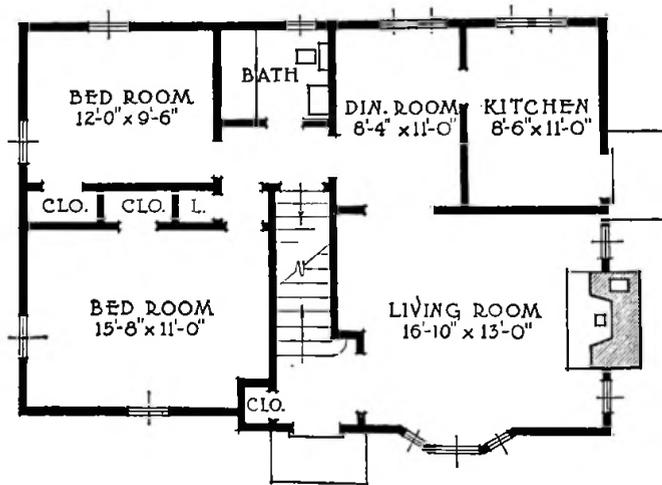
12. Elevations.—Elevations are projections or views of the exterior of a building or parts of a building, showing the relative heights and sizes of its various parts. The heights of the stories, windows, doors, porches, roofs, and chimneys are all shown. The term *elevation* is also applied to the projection of any part of the building viewed horizontally.

13. Sections.—Sections are cuts through the building made by vertical planes. These drawings show the elevations of the interiors of the various rooms, of the chimneys, and of stairs, together with cuts or sections through the floors, walls, and roofs. A section is a very useful drawing, as it gives information that cannot be shown in an elevation or a plan.

14. Use of Projection Drawing.—The principles of projection drawing are employed in making plans, elevations, and



· FRONT ELEVATION ·
(a)



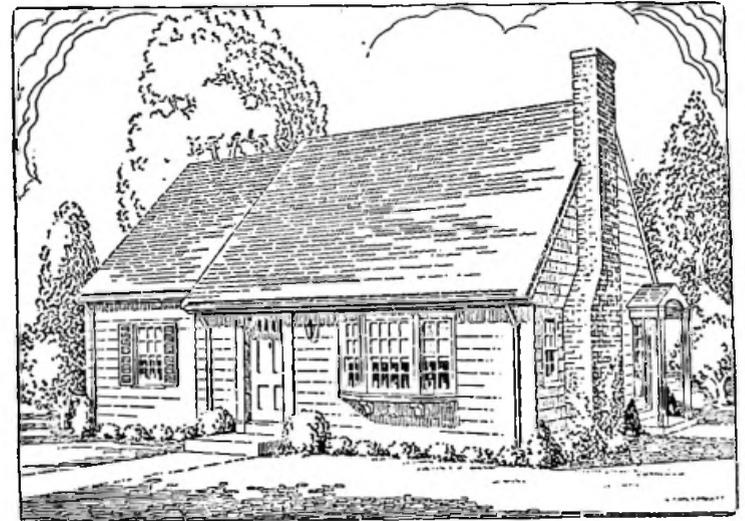
· FLOOR PLAN ·
(b)

FIG. 1

sections, one from the other, and a good knowledge of these principles is of the greatest value. By means of these three kinds of drawings, not only the entire building but all its various details may be completely shown, so that all those inter-



· SIDE ELEVATION ·
(a)



(b)

FIG. 2

ested in its construction may be fully informed as to the kind of building that is to be erected.

15. Examples.—In Figs 1 and 2 are shown elevations, a plan, and a perspective view of a small building. These draw-

ings are of the nature of preliminary sketches, which, when approved by the client, are worked up into working drawings. In Fig. 1, view (a) is a front elevation, and view (b) a first-floor plan. In Fig. 2, view (a) is an end elevation, and view (b) a perspective of the building.

IMPORTANT DETAILS OF PRACTICAL DRAWING

16. Expressing Ideas.—As an architectural drawing is the means used by the architect to express ideas, each line and mark placed on a drawing has a definite meaning. Using unnecessary lines and marks and repeating an idea a number of times on working drawings should be avoided.

17. Lettering Drawings.—When an idea cannot be expressed fully and accurately by lines alone, lettering should be used to make the idea complete. This lettering should be done very carefully and neatly, so as not to spoil the appearance of the drawing. Good lettering on drawings is of great importance. Poor lettering may spoil drawings that are otherwise good. Lettering should be practiced on separate sheets of paper, and should not be made on the drawing until the student is thoroughly proficient. All lettering should be done freehand.

In this practice work, as well as in the finished drawing, it is important to draw guide lines, even when tracing lettering.

18. Some architects and draftsmen make copious notes on their drawings, describing the kinds of materials used, the finishes of these materials, and other matters that properly belong in the specifications. This practice is undesirable, as it is liable to give the drawings a confused and crowded effect. Points that are covered in the specifications should not, as a rule, be repeated on the drawings.

The lettering required for the average drawing includes the title of the drawing, which explains what the drawing shows, as for instance, First-Floor Plan. The scale to which the drawing is made, the name of the client, the location of the building, and other data should also be given. In large offices some of this information is occasionally shown by means of a rubber stamp.

19. Keeping Drawings Clean.—It takes some time to complete a drawing, and in all probability it will become soiled as lead-pencil marks and fine particles of dust are rubbed back and forth over it by the T-square and triangles. It is advisable to cover part of the paper or cloth with tracing paper, which can be tacked down to cover the parts not in immediate use. These parts will thus be kept clean while work is being done on the exposed part. This method tends to keep the paper cleaner than if the whole paper were exposed at one time.

The T-Square, triangles, and scale should be wiped off occasionally with benzine.

20. Use of Papers.—Tracing paper is used by most draftsmen for laying out their work. It is also used for detailing and sketching, preliminary studies, and, in fact, for almost every kind of architectural drawing. Tracing paper is made of different thicknesses for various kinds of details, the heavier, or thicker, paper being used for the larger drawings. Samples of papers from which to choose can be obtained from dealers. Sketches may be made directly upon the paper and rendered in pencil or pen and ink, or the paper may be first mounted on cardboard.

In laying out working drawings the first-floor plan of a building may be drawn on the tracing paper and the other floor plans traced by placing sheets of the same kind of paper over it.

21. This method of placing one drawing on another is conducive to accuracy. For instance, in laying out a set of plans, the first floor is carefully drawn, and, by placing a sheet of transparent paper over it, the exact position of the walls, partitions, stairs, and chimneys can be easily drawn upon the new sheet for the second-floor plan. Considerable measuring and redrawing are thus eliminated, and errors caused by inaccurate measurements are avoided. In the case of elevations, the floor heights, window heights, cornices, etc. can all be traced through from one elevation to the others with rapidity and accuracy.

22. Both working drawings and details at small scale may be made in ink on tracing cloth. It is especially desirable to do

this when the finished drawing is to be handled freely. Paper is easily torn, whereas the cloth is durable, and, from the tracings made on it, many prints can be made. Full-size and large-scale details are generally drawn and completed directly on the tracing paper. From these, blueprints are made for contractors and workmen; but, since only one or two prints of such details are usually necessary, the drawings need not be handled much.

23. Tracing paper is the most useful paper in the architectural drafting room. It comes in rolls of convenient widths, and, to make its use more convenient, the draftsmen often cut the rolls into lengths to suit their requirements exactly.

Bond paper is strong, durable and transparent. It takes pencil and ink well and blueprints may be made from it. Vellum is as strong as bond paper but is more transparent. Vellums and bond papers are available in rolls and in sheets of various size. Both papers are used extensively in architectural offices.

For fine exhibition and competition drawings and rendered drawings, white opaque paper is used. Hot-pressed paper has a smooth surface and is suitable for pen-and-ink rendering; cold-pressed paper presents a rougher surface and is more suitable for wash drawings. Certain grades may be bought by the yard, although the finer grades come in two principal sizes, namely, Imperial, 22 in. \times 30 in., and Double Elephant, 27 in. \times 40 in. Whatman's is a good brand and is easily obtainable.

Tinted papers are frequently employed in making sketches and studies. A pencil or pen is used for the lines and shadows, and Chinese white for the high lights, or, mixed with color, for skies and backgrounds.

24. **Use of Tracing Cloth.**—Tracing cloth is affected by moisture, and when freshly unrolled and exposed to a damp atmosphere will tend to buckle. If a tracing is being made on cloth and is allowed to remain uncovered overnight when the weather is damp, the cloth will stretch and the part traced will no longer fit over the drawing beneath. Sometimes the drawing, also, is ruined. Great care must, therefore, be taken to keep tracing cloth as dry as possible, especially during the time in which a tracing is being made. The tracing should be covered

at night with a cloth, or the board should be turned upside down so that the tracing rests on the surface of a drawing table. Sheets of newspaper or drawing paper may also be tacked over the tracing cloth when no work is being done on it.

Some draftsmen cut pieces of tracing cloth of suitable size from the roll a day or two before they expect to use them and expose them to the air in the office. This exposure will cause the cloth to expand and contract, so that it will not shrink or swell while the drawing is being made on it. In cutting a piece of cloth off the roll, the selvage should always be removed or else the cloth will pucker, or gather, along the edge. The selvage is at the edges or sides of the cloth, and shows at the ends of the roll.

When water comes in contact with tracing cloth, the cloth loses its transparency. Tracing cloth should be rubbed with powdered chalk to overcome the oily nature of its surface. However, when the cloth is rubbed with powdered chalk it may stretch a trifle. In such cases it is advisable to take out the tacks that hold the cloth in place and tack it down again, pulling it tightly while it is being tacked. It is important to remember these points when using tracing cloth.

Tracing cloth is not generally used in most architects' offices on account of the expense. In all government work, however, and where a large number of blueprints of the drawing are needed, ink tracings on tracing cloth are required. A draftsman should therefore be prepared to make a good ink tracing on cloth.

DRAWING ASSIGNMENTS

PLAN OF WORK

25. **Drawing Plates.**—The drawing work of this instruction paper consists of six drawing plates, some of which are made up of more than one exercise. The plates are to be drawn according to the detailed instructions given for each, and they are to be sent, one at a time, to the Schools for correction and criticism. As a rule, a second plate should not be sent to the Schools before a passing grade has been received on the previous plate.

Accompanying the illustrations of the plates are descriptions and isometric views of the parts of the building that are detailed in the plates. These descriptions and views should enable the student to visualize the details as he draws them and understand their significance and use.

The methods followed in all the drawings in these texts on Architectural Drawing will be, as far as possible, those used in most architects' offices. A person who has studied conscientiously and mastered the instructions given will find himself familiar with the drawing practices used in such offices.

Illustrations of details besides those shown in the required plates are given in the instruction pamphlet, and drawings of some of these details should be made for practice and self-improvement. This additional work is not, however, to be sent to the Schools for correction.

26. Directions for Sending In Work.—When we receive your work on Plate I, we shall examine it, correct it, and return it to you. On this first plate it will probably be necessary for us to make a number of corrections. These, however, are no indication of our opinion of the merits of your drawing; they are merely a means of enabling us to give you specific aid. All the corrections and suggestions made on your work should be carefully studied immediately when you receive your corrected drawing.

If you are asked to send us additional work on Plate I, do all the work called for, being careful to avoid repeating the errors made on your first effort. Improvement is sure to result.

While you are waiting for the return of your corrected work, you may study some other subject in your course. Not until you have received a passing grade on Plate I should you begin work on Plate II.

On all drawings that you send us, the plate and exercise numbers, the date, and your name and class letters and number should be placed as shown in Fig. 3.

The lines in pencil drawings should be firm and black. On a hard, smooth paper use a soft pencil, and on a soft paper use a hard pencil.

PLATE I, TITLE: SYMBOLS AND INDICATIONS

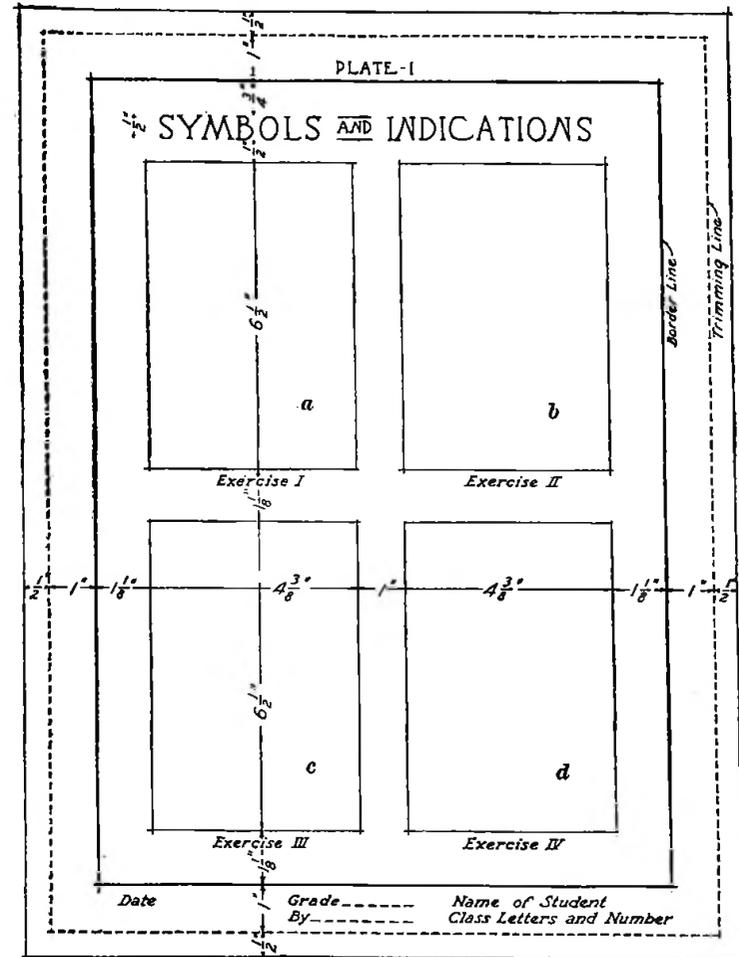


FIG. 3

27. General Directions.—Cover the surface of the drawing board with a piece of smooth, heavy paper and on top of this tack a sheet of transparent bond paper measuring about 16 in.

×22 in. Lay off the outer lines with a pencil, as shown in Fig. 3, making a rectangle measuring 15 in.×20 in. One-half inch inside this rectangle draw the trimming line, and 1 inch from the trimming line draw the border line. Lay out the panels *a*, *b*, *c*, and *d* according to the dimensions shown on the illustration. After all the lines have been drawn, measure the dimensions once more to make sure that they are correct and proceed with the exercise. All these lines should be drawn lightly so as to be barely visible. Strengthen the border line with a firm, even pressure of the pencil point on the paper. The lines that are drawn lightly are needed only as guides in laying out the drawing and can be easily erased when the drawing is finished.

The panels *a*, *b*, *c*, and *d* of Plate I are to be filled in the four exercises of Plate I. Exercise I is to be placed in panel *a*, Exercise II in panel *b*, Exercise III in panel *c*, and Exercise IV in panel *d*.

The space between the upper border line and the panels is for the title, as shown in the layout of Plate I given in Fig. 3.

The space between the lower border and the trimming line is for the student's name and class letters and number, the date, the grade and the initials of the examiner. If the name and class letters and number are omitted, the drawing cannot be identified readily or perhaps not at all, and there is liable to be a delay in the return of the corrected plate.

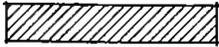
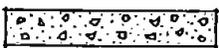
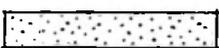
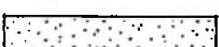
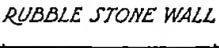
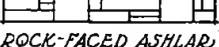
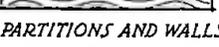
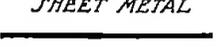
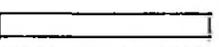
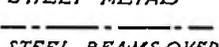
The four exercises are to be made first in pencil on transparent bond paper and then traced in ink again using transparent bond paper. Both copies are then to be cut along the trimming line shown in Fig. 3 and sent to the Schools for examination and criticism. The character of both the pencil and the pen work will be considered in giving a grade on the work.

28. **Plate I, Exercise I: Symbols for Materials.**—In making a drawing in which it is necessary to show several different materials, and when it is desirable to make prints from the drawing, these different materials are indicated by certain conventional symbols as shown in Plate I, Exercise I. These symbols vary in different offices, but the ones shown will be found satisfactory. On every working drawing there should

PLATE I, EXERCISE I

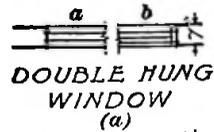
SYMBOLS FOR MATERIALS

IN PLAN & SECTION IN ELEVATION

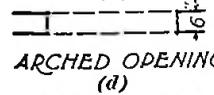
	BRICK	
	STONE, PLASTER OR STUCCO	
	CONCRETE	
	MARBLE	
	TERRA COTTA	
	WOOD	
	EARTH	
	INSULATION	
	PARTITIONS AND WALLS	
	WOOD AND PLASTER, PARTITIONS AND WALLS	
	ALTERNATE FOR WOOD & PLASTER PARTITIONS	
	WOOD BLOCKING AND TIMBERS	

NOTE: CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE PROCEEDING WITH THE WORK AT THE BUILDING

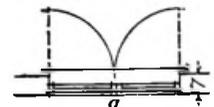
PLATE I, EXERCISE II



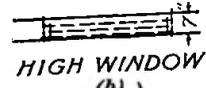
DOUBLE HUNG WINDOW (a)



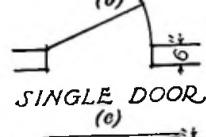
ARCHED OPENING (d)



CASEMENT WINDOWS OPENING OUT
NOTE FRENCH DOORS ARE SHOWN SAME AS CASEMENT WINDOWS



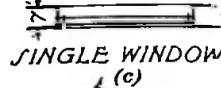
HIGH WINDOW (b)



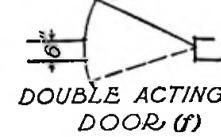
SINGLE DOOR (e)



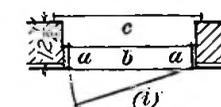
DOUBLE DOOR (f)



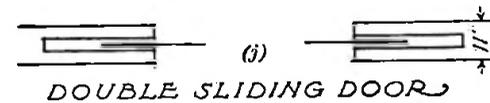
SINGLE WINDOW (c)



DOUBLE ACTING DOOR (f)



SINGLE DOOR IN BRICK WALL (i)



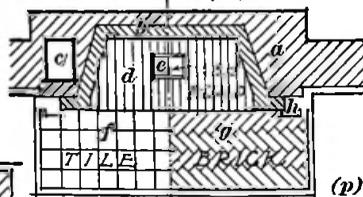
DOUBLE SLIDING DOOR (j)



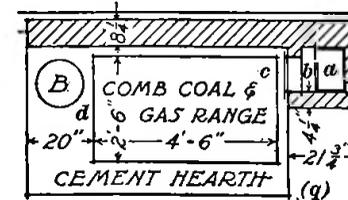
SINGLE SLIDING DOOR (k)



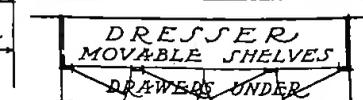
DOUBLE HUNG WINDOW IN BRICK WALL (l)



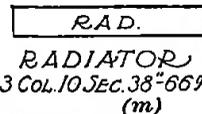
FIRE PLACE (p)



RANGE AND BOILER (q)



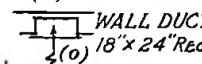
DRESSER (r)



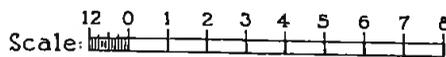
RADIATOR
3 COL. 10 SEC. 38" x 66" (m)



REGISTER 12" x 17" (n)



WALL DUCT 18" x 24" Reg (o)



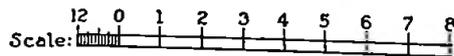
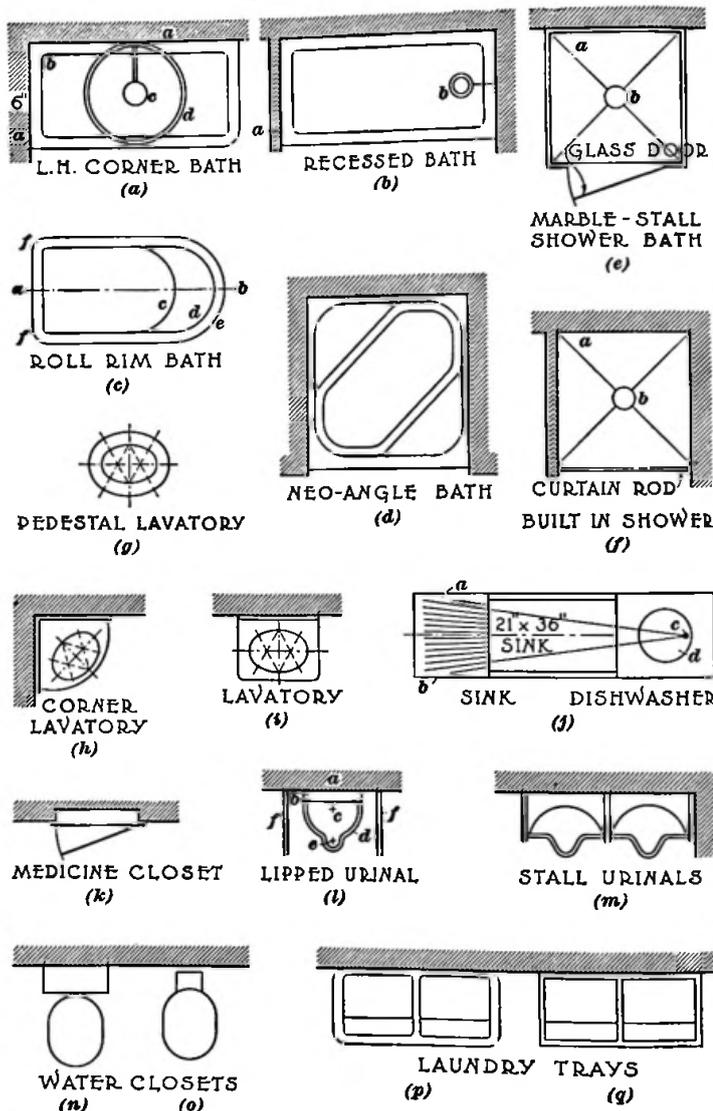
be a parallelogram containing all the symbols used in that drawing. This will prevent any misunderstanding of their significance. In drawing these symbols on Plate I they should be made exactly the same size as are those given in the illustration. The note given at the bottom of Exercise I is generally put on drawings so that the work of one contractor will fit the work done by another.

29. Plate I, Exercise II: Parts of Buildings.—A plan is made up of lines, all of which are drawn to indicate parts of buildings. A series of the most common of these indications is given in this exercise. The arrangement of lines used to show various kinds of doors, windows, fireplaces, etc., are here shown, and by drawing these elementary parts of the plan the beginner will be familiar with them when he comes to make working drawings.

In drawing these indications, they should be made at the scale of $\frac{1}{4}$ inch to the foot. The scale at which they are shown is given at the bottom of the illustration. The lines should be made as nearly as possible of the same thickness as those shown, and the snappy, vigorous character of these lines should be copied. The dimensions shown in the illustration are to be used as a guide in laying out the various indications on the plate. The scale given in the illustration should be ticked off on a strip of paper. This strip of paper should then be used as a scale to measure off the various parts of the illustration that are not covered by dimensions. These distances should be laid out on the drawing paper at $\frac{1}{4}$ inch scale.

30. Plate I, Exercise III: Plumbing Fixtures.—A series of indications that are used to show various plumbing fixtures on architects' drawings is shown in Exercise III. Various types of bathtubs, showers, wash basins, sinks, laundry tubs, water closets, etc. are given. As one or more of these indications are used on every plan, it is necessary to be familiar with them all. The indications are to be drawn at $\frac{1}{4}$ inch to the foot, the scale generally used in working drawings. The sizes of the fixtures are shown at the scale given at the foot of the illustrations.

PLATE I, EXERCISE III



31. In drawing the bath in (a), Exercise III, first lay out the lines of the partitions at *a*, the partitions being made 6 inches in thickness. Draw the outside line of the tub next and then the rectangle showing the inside lines of the bath. Draw the small curved corners *b* freehand, so that these curved lines meet the ends of the straight lines. A shower is indicated at *c* and a ring from which a curtain is suspended is indicated at *d*. A recessed bath is shown in (b). The partition *a* forming one end of the recess may be made 4 inches in thickness. A shower head is shown at *b*.

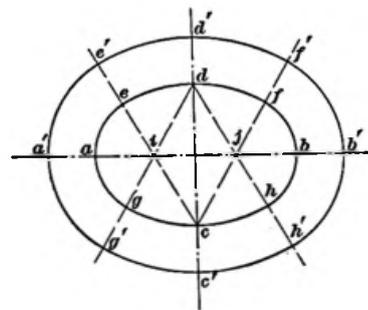


FIG. 4

In drawing the bath in (c) draw the axis line *ab* first, then the semicircles at *c*, *d*, and *e*, and then the straight lines. Draw the small curves *f* freehand.

The recessed neo-angle bath in (d) is about 48 inches across the front and 50 inches from front to back. The bath is 21 inches wide inside and the rim is 2½ inches in width. Two corners are used as seats. This bath may be recessed, or it may be obtained as a corner bath.

Shower-baths or shower compartments are shown in (e) and (f). The floors pitch, as indicated at *a*, to drain at *b*. In (e) the shower is enclosed in a glass or marble partition with a glass door. The shower may be built in as in (f) and may have a curtain across the front instead of a door.

32. An oval pedestal lavatory is shown in plan in (g), Exercise III. For drawing an indication of an oval basin a

method is shown in Fig. 4. Draw the axes *ab* and *cd* of the basin perpendicular to each other. Draw the width *cd* of the bowl equal to 12 inches. With points *c* and *d* as centers and with a radius equal to *cd*, draw arcs *ef* and *gh*. Draw lines at 60° with *ab*, through *c* and *d*. The intersection of these lines with the axis at *i* and *j* will be the centers for the end curves.

Make the distances *cc'* and *dd'* about 4 inches, and draw the curves *e'f'* and *g'h'* with a radius *cd'*. With the radius *jj'* draw the curves *f'h'* and *e'g'*. If the work is done carefully, a satisfactory double oval will result. The ovals in the other basins (*h*) and (*i*) can also be drawn in this manner.

The drain board of the sink shown in (*j*) shows the grooves *a* and *b* radiating from the point *c*. A dishwasher is indicated at *d*. The dishwasher may be covered with a drain board similar to the one at the left side of the sink.

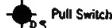
In (*k*) is shown a plan of a medicine closet, which is usually placed over a lavatory, the door containing a mirror.

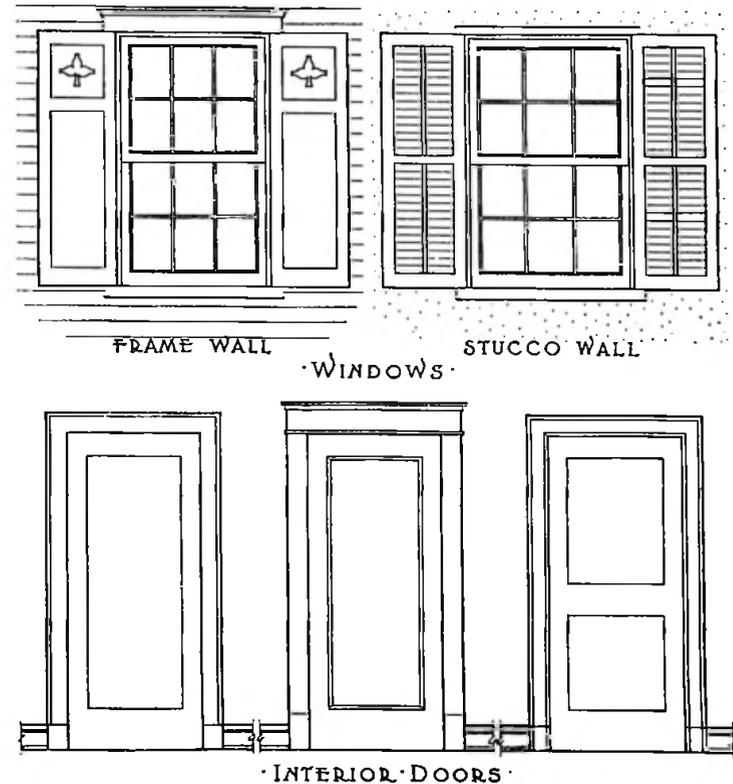
33. The urinal in (*l*), Plate I, Exercise III, is shown by drawing, against the wall or partition *a*, the rectangle *b*, making it about 5 in. × 18 in. From the point *c* as a center and with a radius of 9 inches, draw a semicircle *d*. With *e* as a center, draw a semicircle with a radius of about 3 inches. Draw two additional semicircles inside the first. Connect these parts of circles, as shown, by freehand curves. Draw all these lines faintly at first. Draw in the desired lines firmly and remove the unnecessary lines with a soft eraser. Partitions between urinals are shown at *f*. Stall urinals are shown in (*m*).

Plans of two water closets are shown in (*n*) and (*o*). Draw the seats by making two semicircles and joining them by straight lines.

In (*p*) and (*q*) are shown indications of laundry tubs, or trays. In (*p*) is shown a set of two tubs made of wood, slate, or soapstone, the material being about 1½ inches thick, and in (*q*) is shown a set of two porcelain tubs. In the tubs in (*q*) the material is about 3 inches thick, and should be so shown. The corners are rounded with freehand curves. Practice in drawing these exercises will be profitable. The thickness, as

PLATE I, EXERCISE IV

- | | | | | | |
|---|-----------------------------------|---|----------------------------|---|----------------------|
|  | Ceiling Outlet |  | Wall Fan Outlet |  | Push Button |
|  | Ceiling Outlet (Gas and Electric) |  | Wall Lamp Receptacle |  | Buzzer |
|  | Ceiling Lamp Receptacle |  | Single Convenience Outlet |  | Bell |
|  | Ceiling Outlet for Extensions |  | Double Convenience Outlet |  | Annunciator |
|  | Ceiling Fan Outlet |  | Floor Outlet |  | Interior Telephone |
|  | Pull Switch |  | Lighting Panel |  | Public Telephone |
|  | Drop Cord |  | Local Switch - Single Pole |  | Clock (Secondary) |
|  | Wall Bracket |  | Local Switch - Double Pole |  | Clock (Master) |
|  | Wall Bracket (Gas and Electric) |  | Local Switch - 3 Way |  | Time Stamp |
|  | Wall Outlet for Extensions |  | Local Switch - 4 Way |  | Electric Door Opener |



well as the firmness and strength, of the lines shown in the illustration should be closely imitated.

There are, of course, many modifications of these indications, but the ones given in the exercises will be generally understood by architects and contractors. The scale at the bottom of Exercise III is to be used in measuring the sizes of the parts of the drawings. All the indications are to be drawn in the exercise, however, at a scale of $\frac{1}{4}$ -inch to the foot.

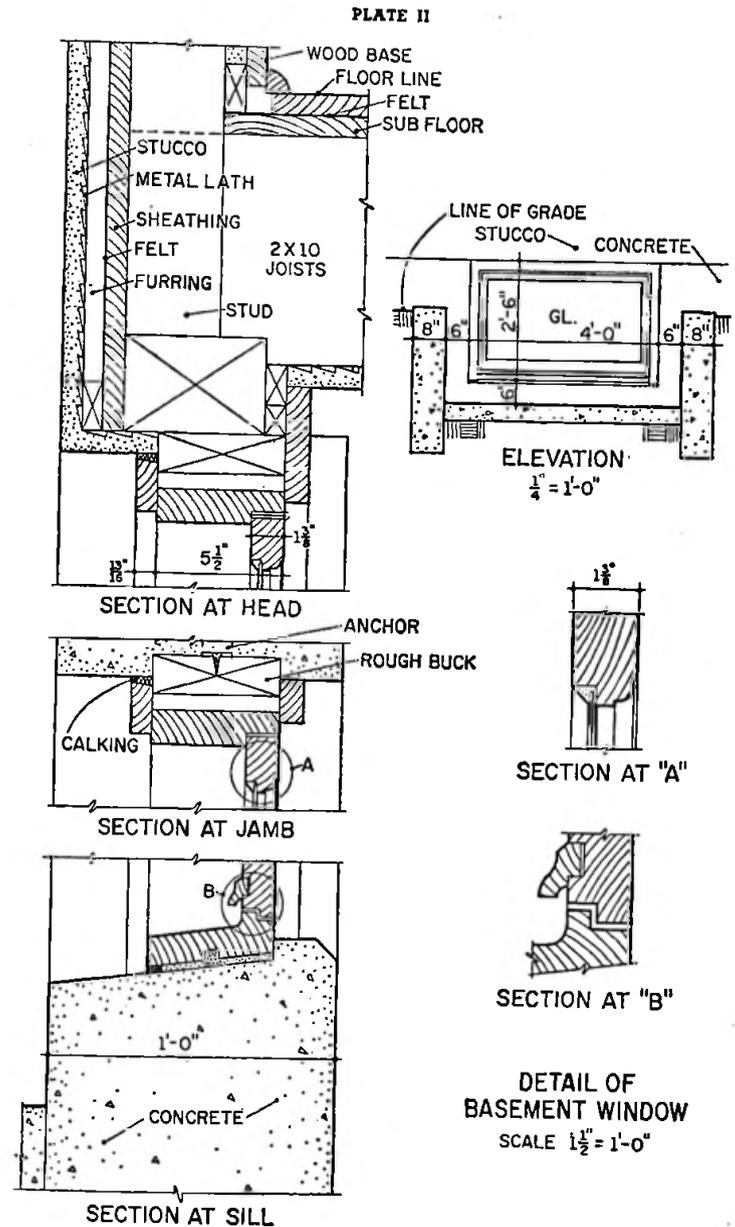
34. **Plate I, Exercise IV: Various Indications.**— In Plate I, Exercise IV, are shown various standard indications or symbols that are commonly used in connection with electric lighting installations. These indications or variations depending upon the procedure of the individual office will be seen on all drawings of buildings in which electric lighting is employed.

Two examples of windows in elevations, also three examples of interior doors, are shown in this exercise. These are to the scale of $\frac{1}{4}$ -inch to the foot.

PLATE II, TITLE: DETAIL OF BASEMENT WINDOW

35. **Basement Windows.**—Features of primary importance in both the design and the construction of a building are the frames for the windows and doors. It is necessary that you have a thorough knowledge of the way they are made. You will then be able to show them intelligently on the small-scale plans and elevations of the working drawings as well as to detail them on a larger scale for the guidance of the workmen in the mill in getting them out. This knowledge can be obtained from experience and from the study of the ICS texts on *Carpentry* and *Millwork*.

36. In commencing the construction of a building from the $\frac{1}{4}$ - or $\frac{1}{8}$ -inch scale working drawings, the first details that will be called for by the contractor are those of the basement doors and windows, since they are set in the basement wall and are, therefore, the first frames required.



37. **Procedure in Drawing Plate II.**—The details in Plate II are to be drawn to the scale of 3 inches to the foot, or one-quarter full size. The plate as given in the text is shown at the scale of $1\frac{1}{2}$ inches to the foot. All the dimensions on the drawing will, therefore, be twice the size of those shown. The elevation is to be drawn at the scale of $\frac{1}{2}$ -inch to the foot, which is twice the scale given in the text. From the elevation you can see that this window is 2 ft 6 in. \times 4 ft 0 in. and is partly above grade and partly below, and therefore requires an areaway. The elevation in the text shows a section through the areaway. This section shows that the walls and floor of the areaway are constructed of concrete.

38. Cover the surface of the drawing board with a piece of heavy paper, and then tack a piece of transparent bond paper 16 in. \times 22 in. on the board. Lay out the border lines, as in Plate I, but instead of drawing the four rectangles *a*, *b*, *c*, and *d*, leave this space clear. Place the floor line, which is shown in the section at the head of the window, 3 inches below the top border line. Place the outside line of stucco $2\frac{1}{2}$ inches from the left border line. The inches mentioned so far are actual inches that may be found on the inch scale. Having established the lines just drawn, lay out the remainder of the drawing, using the 3-inch scale only. The dimensions of the various parts of the detail are marked on the plate for the convenience of the beginner, but, as a rule, they do not appear on a practical detail. Measuring off dimensions on the illustration at $1\frac{1}{2}$ inches to the foot, and laying them out on your drawing at 3 inches to the foot will give you excellent practice in the use of the scale. The perspective view of a similar basement window, shown in Fig. 5, will help you to understand the meaning of the lines in Plate II.

39. Starting with the head of the window, lay off $\frac{7}{8}$ inch at the 3-inch scale for the stucco, $\frac{3}{4}$ inch for the furring, $\frac{7}{8}$ inch for the sheathing, and $3\frac{7}{8}$ inches for the studs, which is the actual size for a 4-inch stud. When making a working detail,

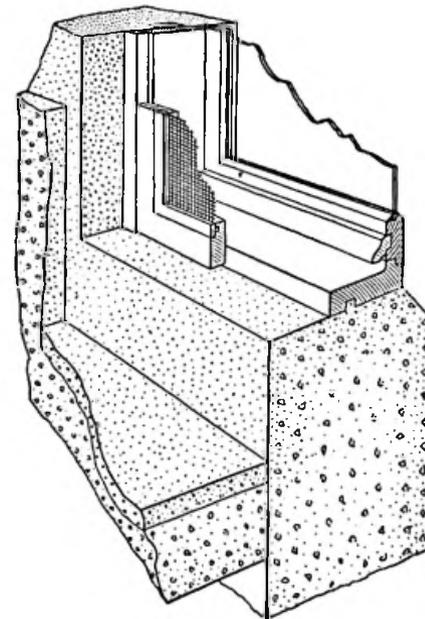
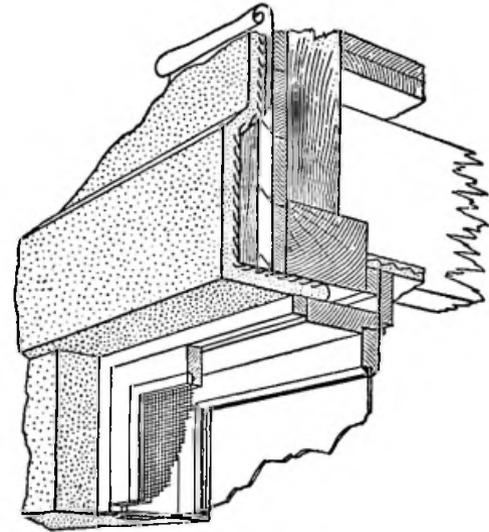


FIG. 5

the draftsman should ascertain the market sizes of timbers before laying out details of lumber.

Two layers of flooring, each $\frac{1}{8}$ inch thick, are shown on top of the joist. The joist, which has an actual depth of $9\frac{1}{2}$ inches, is shown extending out to the sheathing by a line which is broken because the joist is assumed to be on the far side of the stud. The bottom line of the joist will be 1 inch below the top of the sill, and the plastering on the under side of the joist is $\frac{3}{8}$ inch thick. The stucco is shown as being $\frac{3}{8}$ inch thick. Draw in the stucco, sill, and joists with firm, clean lines. As shown in the symbols given in Plate I, Exercise I, stucco is shown by dotting where it is in section. The sheathing, being wood in cross-section, is hatched with freehand lines slightly curved, as shown in Plate I, Exercise I.

40. The head of the window frame in Plate II is made by laying off the horizontal dimensions as shown on the section at the head. Lay off these dimensions with a sharp pencil. Then, with the triangle on the T-square, draw light, vertical lines through these marks. Make the staff bead $\frac{1}{8}$ inch thick, the head of the frame $1\frac{3}{8}$ inches, and the rabbet in the head, which receives the sash, $\frac{1}{2}$ inch. The inside piece is kept about $\frac{1}{2}$ inch above the sash opening to avoid the knuckle of the hinge. The sash is made of $1\frac{1}{2}$ -inch material, and when finished measures about $1\frac{3}{8}$ inches. A section through this sash is indicated at *A* so as to give you a clear idea of its shape. Draw the broken line just below the sash to terminate the section.

You should you encounter no difficulty in drawing the plan of the jamb, since most of the vertical lines necessary for this plan can be projected downward by using your T-square and triangle.

The sill of the window is sloped to shed rain water. The wooden sill is scaled off and drawn as accurately as possible. The rabbet in the sill is shown at a larger scale at *B*.

The elevation is drawn at $\frac{1}{2}$ -inch scale. When all the lines have been carefully located, draw them in firmly in pencil and put in the indications of materials according to the system of symbols

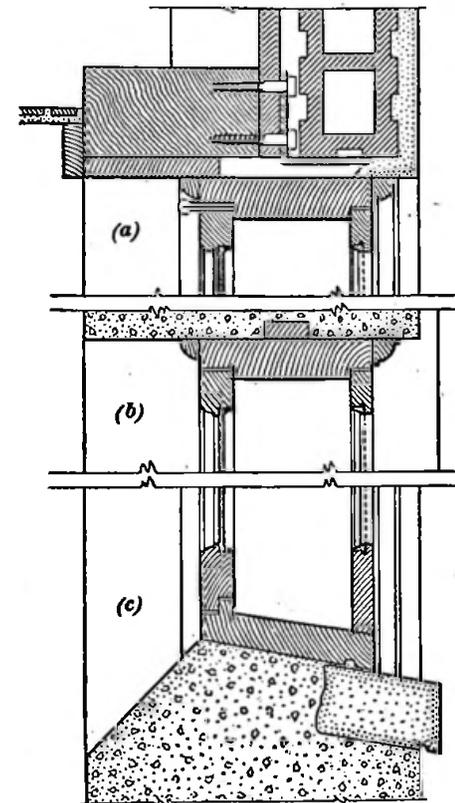


FIG. 6

given in Plate I, and as shown in the plate. Finally, make the lettering; this should be done with great care so that the drawing may not be spoiled. Include dimensions on your drawing.

41. Your pencil drawing when completed is to be sent to the Schools for criticism and correction. Include on your drawing the title of the plate, your name, class letters and number, and the date.

This drawing can be made as a full-size detail by drawing it on a large piece of paper at four times the size of the 3-inch

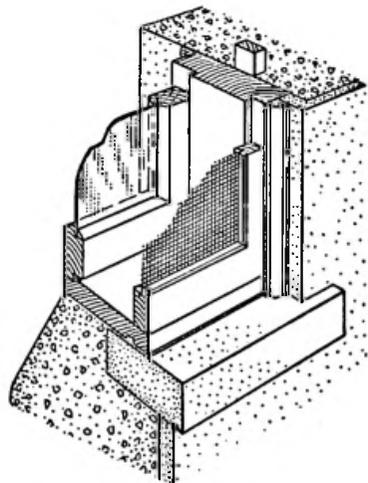


FIG. 7

scale plate. When lettering Plate II, the scale should be lettered on the plate as 3" = 1'-0". The plate shown in the text is at the scale of 1½ inches to the foot.

42. A basement window in which a mosquito screen is used is shown in Fig. 6. The wall above is of terra cotta and is plastered. The terra cotta is supported on an angle-iron lintel that is fastened to the wooden sill by lagscrews. In (a) is shown the head, in (b) the plan of the jamb, and in (c) a section through the sill. A perspective view of the sill and jamb of this window is shown in Fig. 7. In the plan of the jamb at (b) and in the view in Fig. 7, notice the wood blocking that has been provided for nailing. This blocking would be installed as part of the formwork for the concrete.

**PLATE III. TITLE: DOUBLE HUNG WINDOW
IN FRAME WALL**

43. Plate III consists of one exercise, which is a working detail of an ordinary double-hung window in a frame wall. In

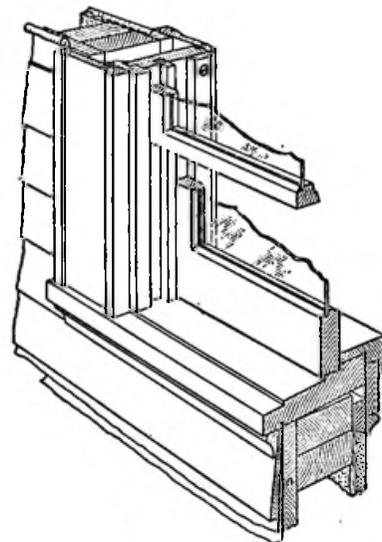
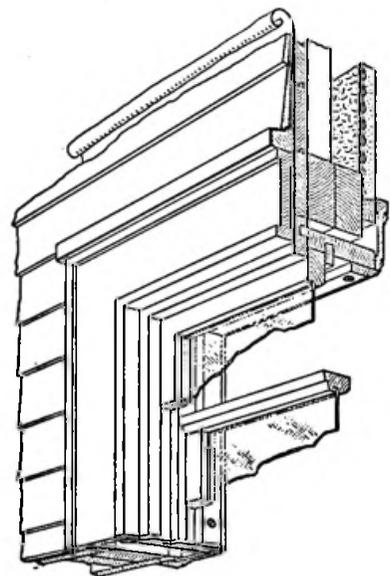


FIG. 8

Fig. 8 is shown a perspective view of a similar window. Notice that in Fig. 8 the window frame is shown with a weight box, while in Plate II the window is operated by sash balances which take up much less room than the weight-boxes and for this reason are more widely used.

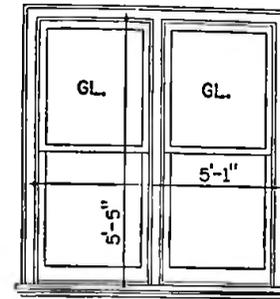
This plate is to be drawn carefully in pencil on transparent bond paper. Make the border lines according to the diagram in Plate I. The space used will include the four spaces shown.

With the exception of the elevation in the upper left-hand corner of the sheet which is to be drawn at $\frac{1}{2}$ -inch scale, this exercise is to be drawn at the scale of 3 inches to the foot, or twice as large as shown in the text.

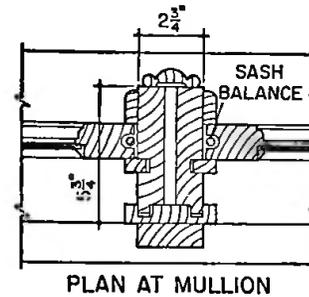
44. In drawing Plate III, draw a light vertical line $2\frac{3}{8}$ inches, actual size, from the left-hand border line. Draw a horizontal line $2\frac{5}{8}$ inches below the top border line. The intersection of these lines will locate the upper left-hand corner of the elevation which is to be drawn at $\frac{1}{2}$ -inch scale. The remainder of the plate should be drawn at 3-inch scale. Using the scale, there should be no difficulty in making this drawing. In this exercise, all the dimensions should be measured off from the illustration with the scale of $1\frac{1}{2}$ inches to the foot, and laid off on the plate at 3 inches to the foot. Facility in the use of the scale, which will be found of great value in drawing, will thus be cultivated. Carefully observe the thickness of the lines in the illustration, and make them a little stronger in the plate. Use your T-square and triangle in projecting dimensions from one section to another.

Lay out the width of the studs in the section at the head and carry the outside lines down to the sections through the jamb and the sill. The same is done with the sheathing and gypsum board. The lines outlining the section and plan may be made heavier, as shown in the illustration of Plate III. This makes a better looking drawing and is a device that is used by skillful draftsmen. Draw in the lettering, giving the names of the different plans and sections of the window. Include the dimensions shown in the text.

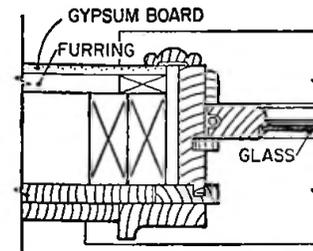
PLATE III



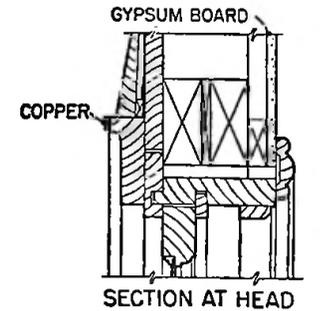
ELEVATION
SCALE $\frac{3}{4}$ " = 1'-0"



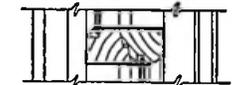
PLAN AT MULLION



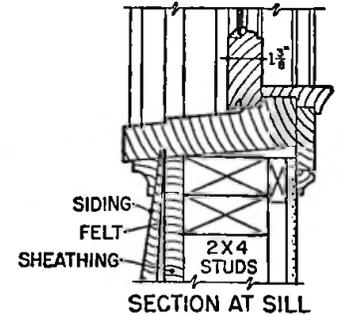
PLAN AT JAMB



SECTION AT HEAD



SECTION AT MEETING RAILS



SECTION AT SILL

DOUBLE-HUNG WINDOW
IN FRAME WALL
SCALE $1\frac{1}{2}$ " = 1'-0"

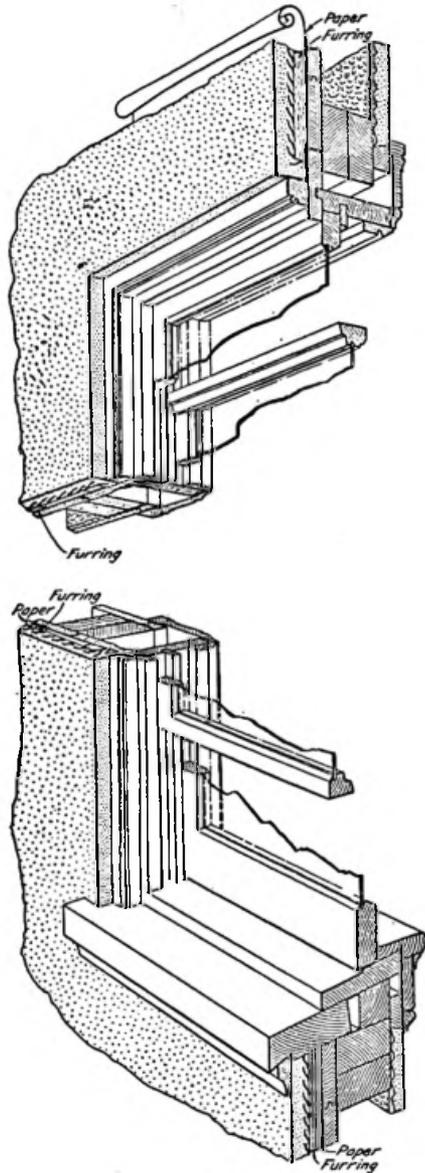
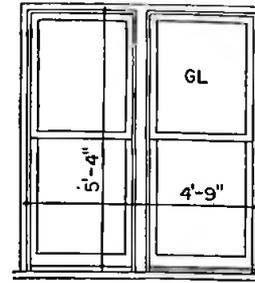
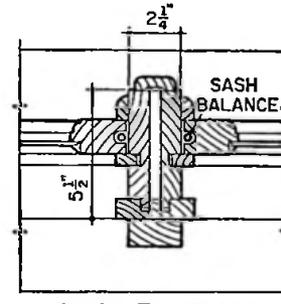


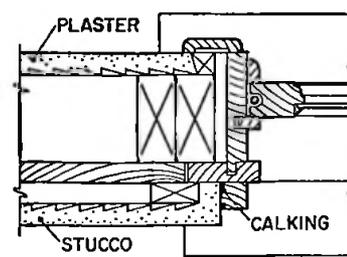
FIG. 9



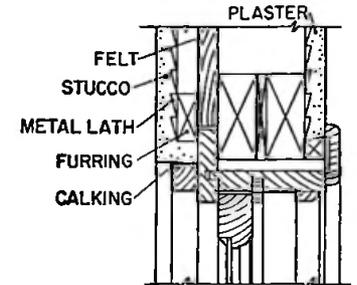
ELEVATION
SCALE $\frac{1}{4}'' = 1'-0''$



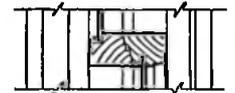
PLAN AT MULLION



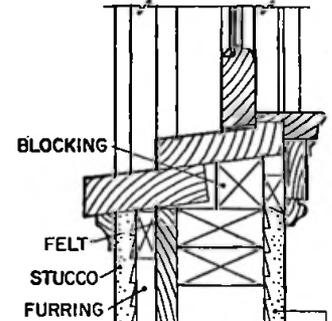
PLAN AT JAMB



SECTION AT HEAD



SECTION AT MEETING RAILS



SECTION AT SILL

PLASTER ON
METAL LATH

DOUBLE-HUNG WINDOW
IN STUCCO WALL

SCALE $1\frac{1}{2}'' = 1'-0''$

FIG. 10

A neat drawing in pencil on transparent bond paper complete with all dimensions and lettering is to be sent to the Schools for criticism and correction.

DETAILS OF VARIOUS TYPES OF WINDOWS

45. Double-Hung Window in Stuccoed Walls.—When the outside of the frame of a building is finished with a coating of stucco, the window frames differ slightly in design from those used in houses covered with siding or shingles. A window in a stuccoed wall is illustrated in Fig. 9 by means of a perspective view, and in Fig. 10, which is a detail of a similar window showing the use of sash balances. The differences in the window frames will be evident if Fig. 9 is compared with Fig. 8. The outside architrave is omitted in Figs. 9 and 10, and a blind stop is used. Furring strips are nailed on the sheathing, and the wire lath and the plaster or stucco are applied over the furring. The plaster is finished against the face of the outside casing. The sill in the detail is made double, the lower part being called the sill and the upper member the subsill.

It is suggested that, for practical experience, you make a detail drawing of a double-hung window such as the one shown in Fig. 10. This drawing is not to be sent to the Schools for correction.

46. Double-Hung Window in Brick and Stone Walls.—In Fig. 11 is shown a working detail of a box-frame window suitable for use in a stone or brick wall. The general design and construction of the frame and sash are similar to that shown in Figs. 8, 9, and 10. Notice that this window frame is fitted with sash weights, which although not as widely used as in former years are still used in some localities. Window frames in masonry walls are fitted with box frames, which enclose the weights that run up and down in the boxes. The complete box is necessary since otherwise mortar would get into the space occupied by the weights.

It is customary to set window frames in brick walls during the erection of the wall, thus facilitating the plumbing of the

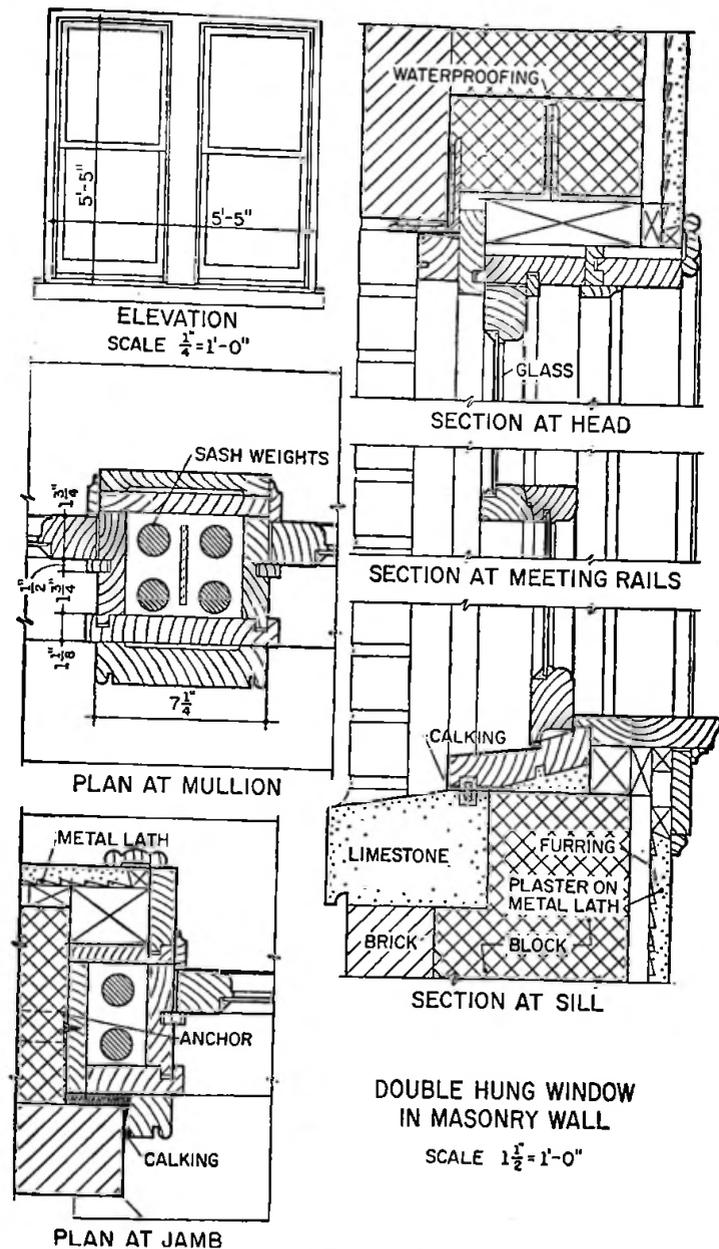


FIG. 11

brick jambs. Care should be taken to brace the frames in order to keep them plumb and level while the wall is being built around them.

The wood sill, made of 2-inch plank, rests on a stone lug sill. The grooves in the stone and wood sills are fitted with a metal bar or weather-break set in mortar, thus forming a windbreak. A brick lintel that extends over the window opening is supported on a steel angle-iron. The block over the frame is also supported on angle-irons. The outside casing extends up behind the lintel and forms a windbreak behind the lintel since it eliminates any continuous horizontal joint at the head.

The window frame proper extends back to the inside of the inside casing and the sill. The inside casings have grooves in sides and head into which the jamb lining or casings fit. The stool rests on top of the sill and blocking that is provided for its support.

The casings are fitted around the window openings and are mitered at the upper corners. The staff bead or hanging stile is made square in section, as shown, when screens are to be placed against it. The joint between the staff bead and the brick wall should be completely calked in order to make a weather-proof joint.

In masonry walls, window frames often are not set until the building is roofed and prepared for the plastering, or has the plastering completed. There are two reasons for this, the principal one being the difficulty experienced in setting jamb stones and lintels while the frame is in position, and the second that, even with all due care, the frames are likely to be more or less damaged during building operations and are never so true to line, level, and plumb as those set in place after the walls are completed. In Fig. 11, however, it would be necessary to build in the frames as the wall was constructed.

47. **Screens.**—Screens and blinds fitted to a frame in a masonry wall are shown in Fig. 12. Where blinds and outside screens are both used, a special piece *a* may be nailed to the pulley stiles, and upon this a strip, or track, *b*, which receives the screens *c*, is fastened. Space must be left between the face

of the screen and the inside face of the blind for the rod that is fastened to the slats in the blind, and for the hardware when the ordinary blind fasteners or adjusters are used.

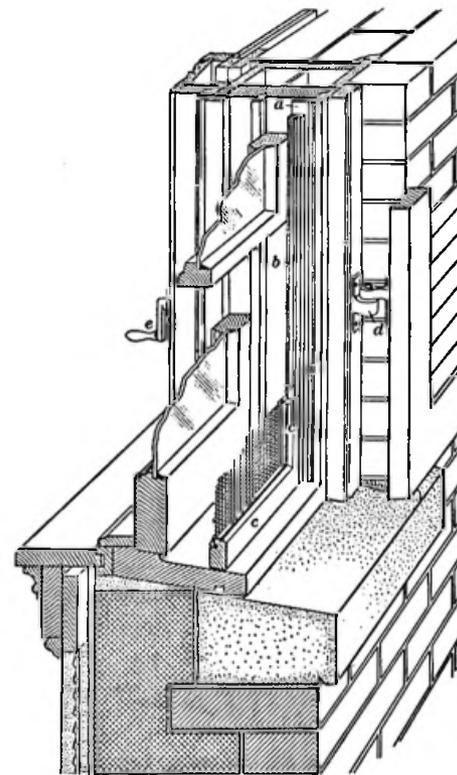


Fig. 12

The screen *c* consists of a hardwood or metal frame, with a wire mesh stretched tightly over it. The screens are provided with springs that are concealed in the grooves at the sides and will remain stationary in any position.

48. **Blinds and Shutters.**—Blinds are made with slats, either fixed or movable; shutters are solid and generally paneled. Both blinds and shutters are usually made $1\frac{1}{2}$ inches in thickness

and hung on L-shaped hinges, which allow of their clearing a reveal or an outside architrave, and which permit of their lying flat against the wall of the house. They are fastened by blind fasteners or by blind adjusters. Devices by means of which the blinds or shutters may be opened or closed from within the house, without the necessity of opening the window, hold the blind firmly in any desired position. A device of this kind is shown at *d* and *e*, Fig. 12. The box *d* contains a worm gear that is operated by turning the crank *e*, thus opening or closing the blind.

49. Storm Sash.—Storm sash are sometimes provided for windows and are made generally of material $1\frac{1}{2}$ inches thick and are hung in the rabbet that is occupied by the blinds when closed. The blinds are either removed or left open while the storm sash are in place.

50. Casement Windows.—Casement windows are those which have sashes hinged at the sides and that swing in or out like doors. French windows are casement windows having two sashes with meeting stiles down the center. They are generally carried down to the floor and are high enough to be used as doors. Casement and French windows are difficult to construct so that rain will not beat in, but they are very effective from the standpoint of design.

51. A fairly satisfactory detail of a French window is shown in Fig. 13, showing the most effective treatment of the sill and jamb, which are the weak features of these windows. The sill should be made of $2\frac{1}{2}$ -inch material in which a rabbet is formed. The rabbet intercepts rain that is blown against the joint of the sash and the sill. If, however, water should be forced into the joint it would fall into a gutter *a*, which is plowed in the sill and which is drained, in turn, through the holes *b*, which are about $\frac{3}{8}$ inch in diameter and about 2 inches apart. The drip mold *c* on the bottom rail of the sash also aids in stopping rain that may be blown against the bottom joint and forms a drip for water that washes down the face of the sash. The jambs, instead of having straight rabbets like those of a

door, have semicircular channels worked into them, as shown at *d*, into which a half-round projection on the stile of the sash works.

The sash in casement windows should be made thicker than for double-hung sash, as there is more strain upon them because of their being hung on one side. For small casements $1\frac{1}{2}$ inches is a sufficient thickness and $2\frac{1}{2}$ inches or more for large sash.

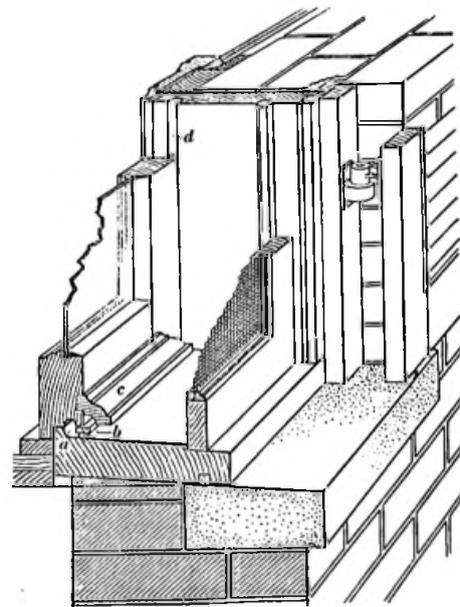


FIG. 13

In Fig. 13 an outside mosquito screen is shown. It is made in two parts with vertical meeting stiles and covers the entire opening. Blinds can be used on these windows in addition to the mosquito screen if shutter workers are provided, as shown.

52. Metal Frame and Sash.—In Fig. 14 are shown scale and half full-size details of a window consisting of a metal frame and sash in a wooden building. The methods of attaching the metal work to the building by means of screws is clearly shown in view (*a*) and the shapes of the various parts of the steel sash and frame are shown at half full-size in view (*b*).

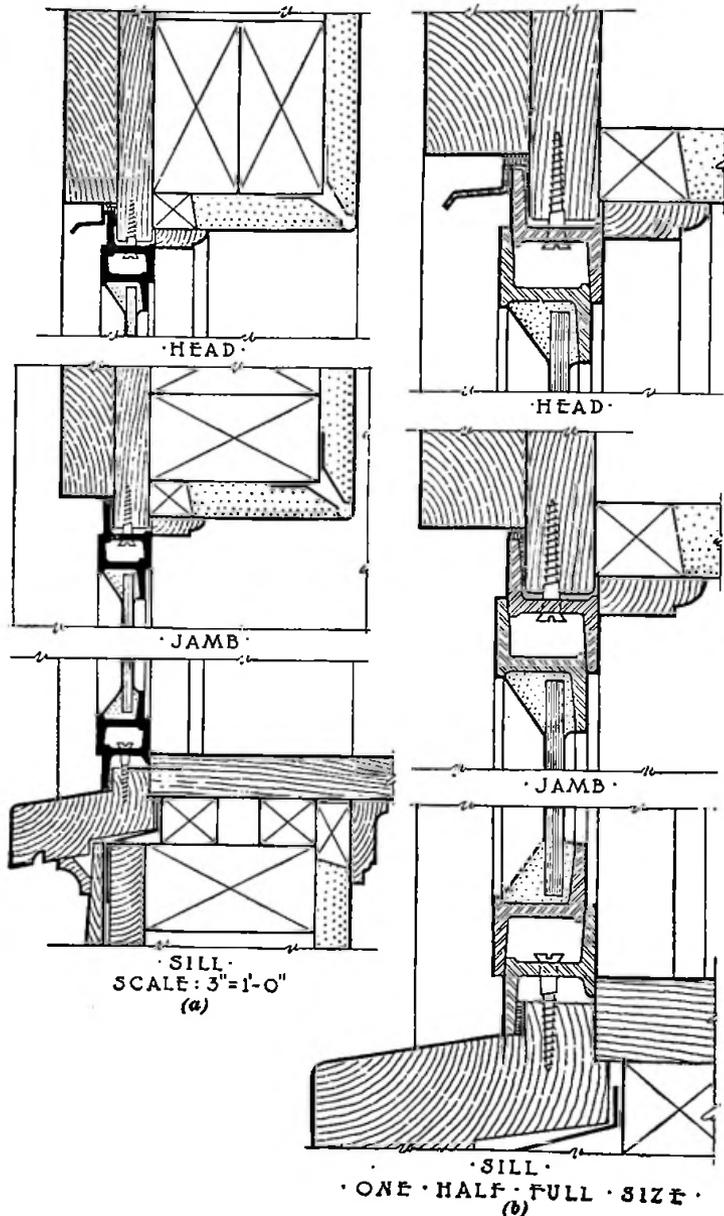


FIG. 14

In Fig. 15 a part of this window is shown in perspective, which will help the draftsman visualize the window while making the drawing.

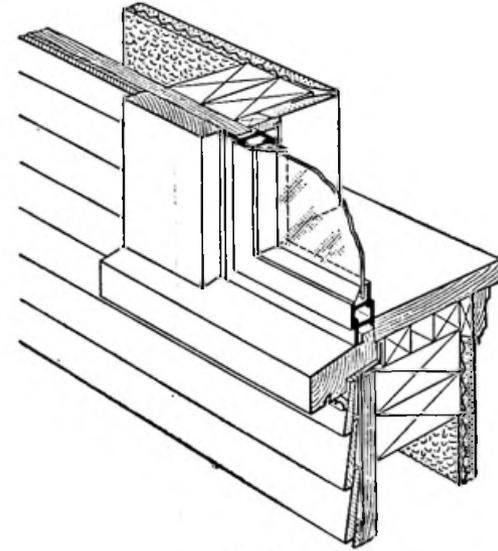


FIG. 15

DETAILS OF DOORS

53. Outside Door and Frame in Frame Building.—In Fig. 16 (a), (b), (c), and (d) are details of a doorway in a wooden wall, and in view (e) a perspective view of the doorway, which will show the relation of the detail to the finished doorway, is shown. Similar reference letters in different views refer to the same part. A vertical section through the head is shown in view (a). The double studs across the head, the sheathing, the siding, and the inside plastering are shown in the usual manner. The top, or head, of the frame is shown at a and is rabbeted to receive the top rail of the door b. The outside trim is at c and is set up from the soffit of the door frame to form a rabbet for the screen door d. On top of the outside trim is a drip mold e covered with sheet metal. At f is the inside trim with a back band g. The trim is nailed to the ground h.

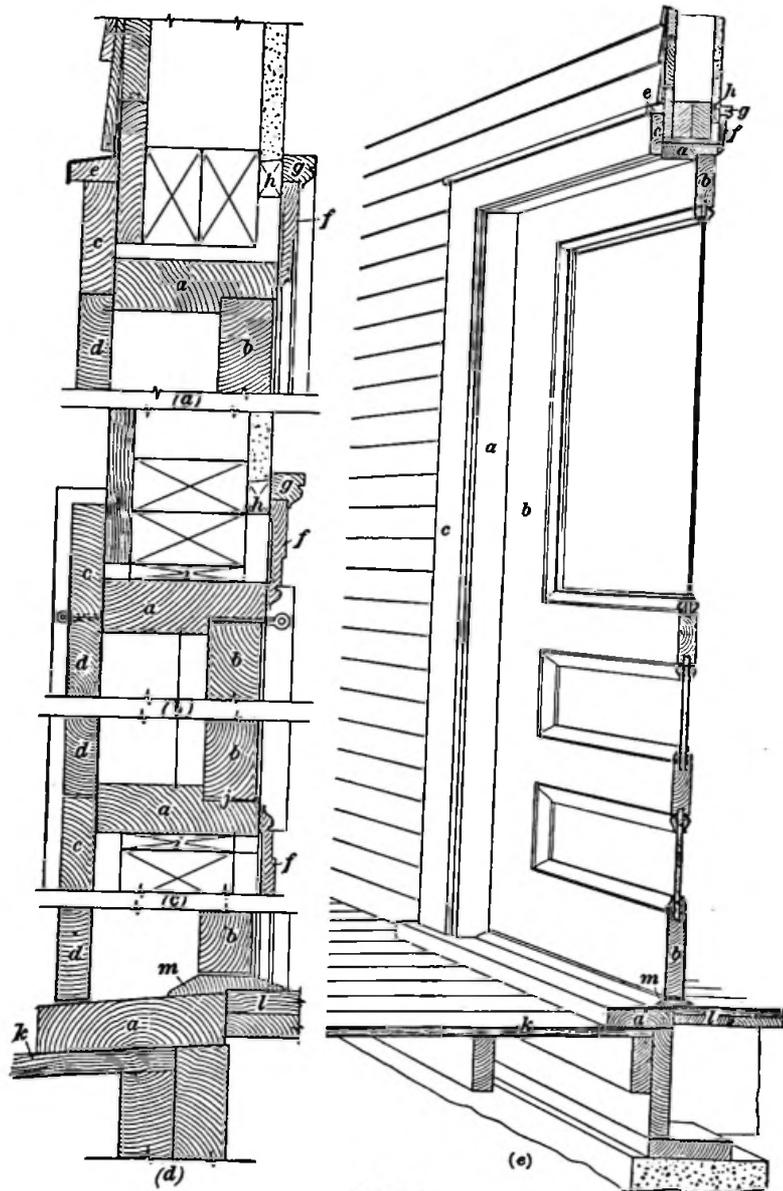


FIG. 16

In (b) is a section through the jamb or side of the door. The frame is shown at *a*, and is rabbeted to take the door *b*. This stile of the door is fitted with hinges on which the door swings. Blocking *i* is wedged in between the door frame and the studs, and nails are driven through the frame and blocking and into the studs, thus fastening the frame in position. Blocking is placed back of the hinges so that the weight of the door will be supported by the studs rather than by the door frame.

In (c) is shown the other stile of the door. The particular feature shown in this section is the bevel on the edge of the door at *j*. This bevel is sometimes necessary so that the door will open freely.

In (d) is a section through the sill of the door. The sill *a* of the door frame rests on the floor *k* of an outside porch. The inside floor of the building is at *l*. A saddle *m* of yellow pine or oak is fitted over the joint of the floor *l* and the sill *a*.

54. Outside Door and Frame in Masonry Wall.—In Fig. 17 (a) is shown a detail drawing of a door and door frame in a masonry wall. The frame *a* in (a) is generally set when the building is nearly finished and is made somewhat smaller than the masonry opening. It is then blocked with rough lumber or studs *b* that are securely fastened to the wall and support the frame. The frame is double-rabbeted to take the main door on the inside and a screen door on the outside. The staff bead *c* forms a finish for the corner and should be fitted tight against the masonry jambs to make a weather-tight joint. It is frequently made with a quirk *d*, which conceals the joint with the masonry. The inside trim, or architrave, is shown at *e*. A transom sash, which is a common feature over outside doors, is shown at *f*; the transom bar *g* forms the head of the door and the sill for the transom sash.

The door *h* is shown with heavily molded panels on the outside and with a lighter molding on the inside panels, which will correspond to the moldings of the interior doors. The outside moldings *i* are called raised moldings, as they project beyond the face of the door. The interior moldings *j* are called flush moldings, because they do not project beyond the face of the door.

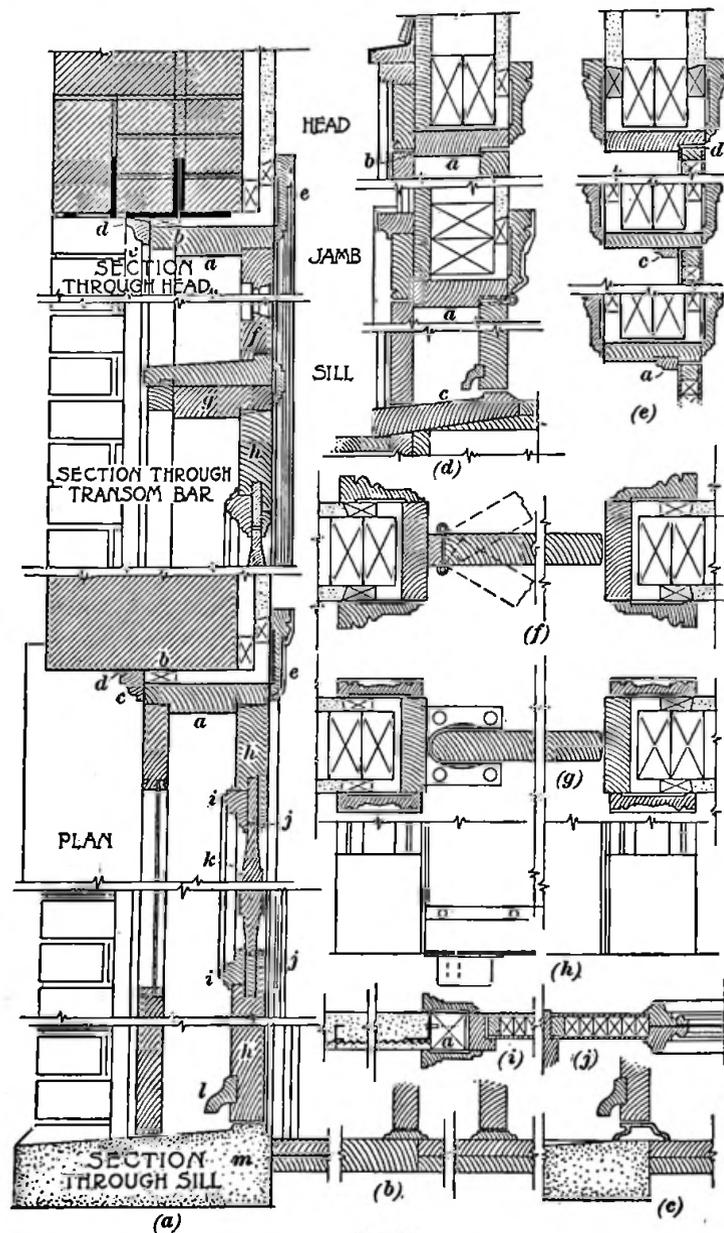


FIG. 17

The panel *k* is known as a raised panel on account of its having a raised face worked on it, whereas a plain panel is of uniform thickness throughout.

A drip mold *l* is set into the bottom rail of the door to protect the joint of the door with the sill from wind and rain. The stone sill *m* has a saddle worked in it which projects above the floor level. Ordinary wooden saddles, or thresholds, used with interior doors and with exterior doors with wooden sills are shown in (*b*). A metal saddle is shown in (*c*).

55. Outside Door and Frame in Frame Wall.—In Fig. 17 (*d*) is shown a detail of an outside door and frame such as is used in a frame building. The frame *a* is rabbeted on the inner edge to receive the door and a rabbet is formed on the outer edge to receive a screen door by setting the outside architrave back from the face of the frame $\frac{1}{2}$ inch, as at *b*. The sill *c* is of wood and has a saddle worked on its inner edge.

In (*e*) are shown sections of frames for inside doors in 6-inch partitions. The stop *a* is let into the face of the jamb, and the stop *c* is nailed to the surface of the jamb, though it may be fastened to the jamb by adjustable screws. At *d* the frame is shown with a rabbet worked in the jamb to take the door in the customary manner.

56. Double-Acting Doors.—In Fig. 17 (*f*) is a double-acting door and frame. The door is hung on double-acting spring hinges. In (*g*) is shown a double-acting door operated by a double-acting spring floor hinge, which is let into the floor as shown in (*h*). At the top of the door a plain pivot is used.

57. Doors in 2-Inch Partition.—A method of trimming a door in a 2-inch solid plaster partition is detailed in Fig. 17 (*i*). The buck, or rough frame, *a* is fastened to the angle-iron uprights of the partition, and the door frame is fastened to the buck.

58. Doors With Glass Panels.—In Fig. 17 (*j*) is detailed a section through the stile of a door with a glass panel surrounded by a raised molding. The molding is divided on one side of the

door and the glass is held in position by nailing the small portion of the molding in place.

59. Drawings of some or all of the details shown in Fig. 17 should be made for practice and a good knowledge obtained of details and the methods of representing them. They should not, however, be sent to the Schools for correction.

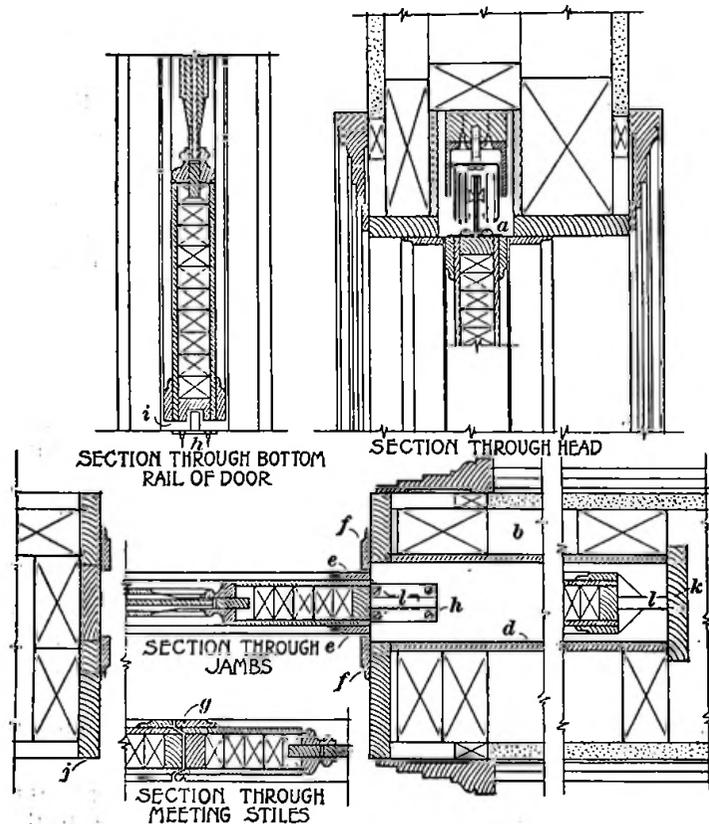


FIG. 18

60. Sliding Doors.—Sliding doors differ from ordinary doors chiefly in the method of hanging them. Generally, they are hung with overhead hangers that are fastened to the top of the door and run on a single steel track. Sometimes they are

hung on adjustable hangers, with roller or ball bearings, which run in tubular tracks, as shown at *a*, Fig. 18. Frame partitions for sliding doors are from 10 to 13 inches in thickness, depending on the thickness of the doors and the sizes of the studs. If the partition is not a bearing partition, the studding at *b* and *c* may be 2 inches in thickness, as shown at *b*. If, however, the partition supports floorbeams or a partition above, the studding on one side of the partition is made 4 inches in thickness, as shown at *c*.

The pockets, into which the doors slide, should always be lined, as shown at *d*, so as to keep out dirt and plaster. They should also be provided with a back piece *k* against which the bumper *l* may strike. The doors should be provided with rubbing strips *e*, which are applied to the four edges of the door on both sides, so that the door cannot rub against the stops. The stops *f* should be applied to the jambs and head and should be adjustable. A special joint *g* is formed at the meeting stiles. The edge of one door is let into the edge of the other door so as to preserve the alinement of the doors when closed, and so that there will be no opening between them. A cast-iron guide *h* is screwed to the floor just inside the pocket and works in a slot formed in the bottom edge *i* of the door. This keeps the doors from swinging sidewise.

Sliding doors are usually designed in pairs, but a single door may be made to slide in the same manner as double doors when the jamb on the side opposite a single pocket is made as shown at *j*.

PLATE IV, TITLE: DETAILS OF ENTRANCE DOORWAY IN BRICK WALL

61. Plate IV shows details of an entrance doorway at the scale shown at the bottom of the plate, and consists of vertical sections through the door and the side light. In Plate V is shown an elevation of the same doorway drawn to a smaller scale, together with two vertical sections, two partial horizontal sections, and full-size sections through two moldings. In actual practice, the details of the doorway shown in Plate V would be made first, and those in Plate IV would be made afterward.

However, in this case, Plate IV is to be drawn first, as it is easier to make the drawings at a large scale, and they will give a clear idea of the construction of the doorway. The information and experience gained in drawing Plate IV will be of great value in drawing Plate V.

In Fig. 19 is a partial perspective view of the doorway. Portions are cut away so as to show vertical and horizontal sections through the door. This illustration will enable the draftsman to visualize the doorway, and to understand the relation between the drawings and the constructed doorway. It should be referred to frequently while drawing Plates IV and V.

The drawing as given in Plate IV is made to the scale shown, and is to be drawn at the scale of 3 inches to the foot. The student has been instructed from time to time to make clear, sharp lines and clean intersections, and the results of practice in doing these things should appear in this plate. The various sections should be drawn in light lines at first until all are laid out accurately. The drawing can then be cleaned by rubbing lightly with art gum, after which it can be drawn in firmly in good lines. All the dimensions shown on the plate should be shown on the drawing and the figures should be kept uniform in size by the use of guide lines limiting the height of the whole numbers and the fractions.

The space required for Plate IV is 8 in. \times 10 in. In drawing the plate lay out the sheet with the border lines as shown in Fig. 3. Draw faint vertical and horizontal lines through the middle of the space inside the border lines. Draw the vertical line *ab* shown on Plate IV and lay out distances to the right and left of this line according to the dimensions shown, using the scale of 3 inches to the foot.

A horizontal line, 5 inches actual measurements above the center horizontal line, is shown at *cd*. Lay off all the horizontal lines measuring down from the line *cd*, using the scale of 3 inches to the foot. Locate the lines by the dimensions, where they are given, and by the scale where dimensions are not shown. Portions of the drawing that come between the horizontal broken lines are omitted. The dimensions are, however,

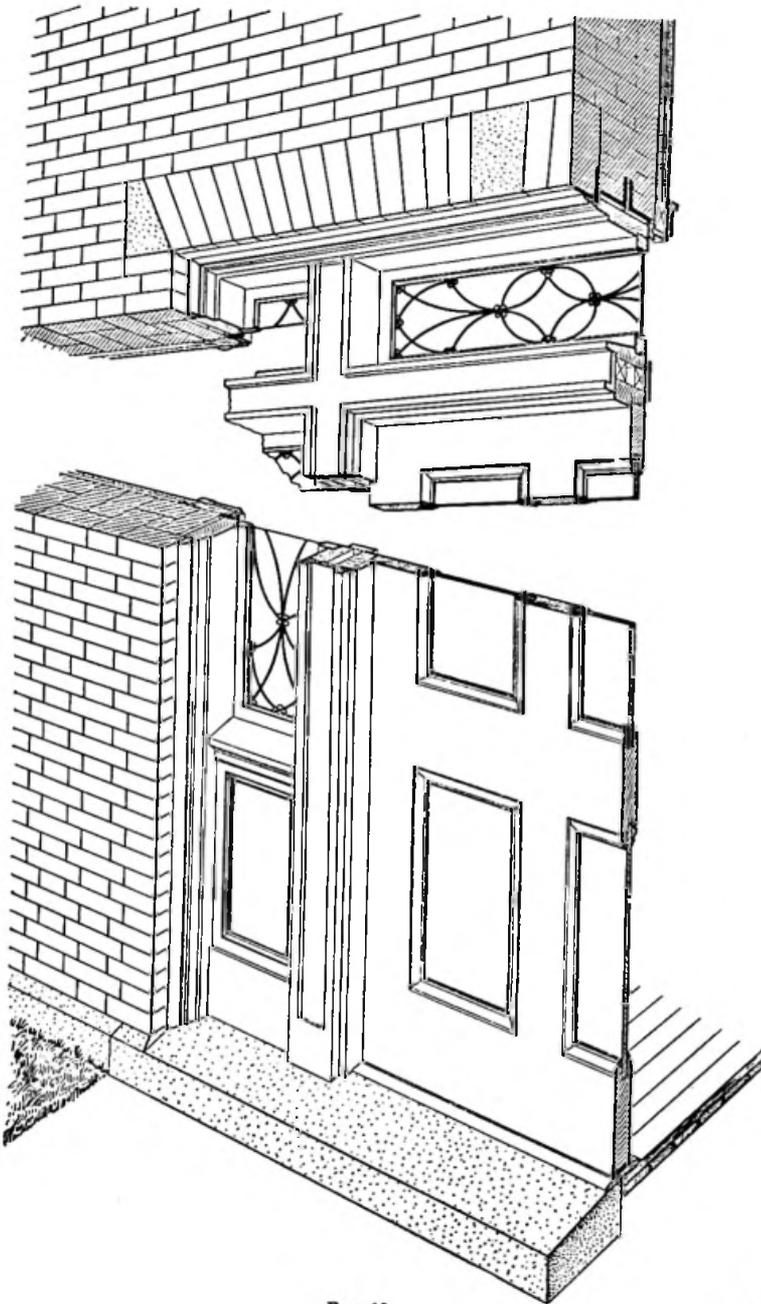


FIG. 19

given as though the parts were fully drawn. Examples of this practice are the dimensions $9\frac{1}{4}''$ and $5' 7''$ in Section *A*, and $12\frac{3}{4}''$, $4' 7''$, $1' 4\frac{1}{2}''$, and $7\frac{1}{4}''$ in Section *B*. These dimensions must be marked on the drawings, even though the distances measured on the drawings do not correspond with the dimensions.

In drawing Plate IV, first draw the section through the head in Section *A*. This section through the head should be laid out very carefully, following the dimensions marked. The horizontal dimensions are shown in the section through the door, and these dimensions should be used where they apply. After the section through the head has been laid off carefully and accurately, project downward the lines that are needed in the sections below. These lines should be drawn faintly, as only parts of these lines will be used on the final drawing. These parts can be drawn in firmly later, when needed.

When Section *A* has been completely laid out in faint lines, go over the entire drawing lightly with a piece of art gum, and erase all dirt and most of the lines. Leave the lines so that they can be barely seen. Proceed to draw in the drawing finally, covering the faint lines, and make the final lines firm, and of even thickness. Make all intersections and corners clean. Then draw the proper indications of materials as shown on the plate. Draw Section *B* in the same manner, taking the section through the side lights and the panels below. While working on Section *B*, cover the finished drawing of Section *A* with paper in order to keep the finished drawing clean.

Section *A* consists of three smaller sections, one through the head, one through the transom bar, and one through the sill. These smaller sections are separated by broken lines, as shown.

The sections through the transom bar in Sections *A* and *B* are almost alike. In Section *A* the top of the door is shown, and in Section *B* the top of the side-light sash is shown.

In Section *B* are shown sections through the sill under the side lights and through the bottom rails of the two panels.

The moldings around the panels in the door are as shown at *F* in Plate V. The moldings around the panels under the side lights are shown full size at *E* in Plate V.

When Plate IV has been drawn in a satisfactory manner, place a clean sheet of transparent bond paper over it, and make a fresh, clean tracing in ink. Both drawings should be carefully drawn, using guide lines for lettering all tracings. All the dimensions should be shown and both drawings sent to the Schools for correction.

PLATE V, TITLE: ENTRANCE DOORWAY IN BRICK WALL

62. **Directions.**—Plate V shows an elevation of the doorway, two vertical sections, two horizontal sections at the scale given on the drawing, and two full-size moldings. The vertical sections *A* and *B* have already been drawn at a larger scale in Plate IV, but, with the exception of sections *E* and *F*, which are to be drawn full size, Plate V is to be drawn at a scale of 1 inch to the foot, or one-twelfth actual size.

In drawing Plate V, first draw a faint vertical line midway between the edges of the sheet. This line will be the line *ab* in Plate IV. Draw the vertical line *cd*, 1 foot 7 inches to the left of line *ab*. The line *cd* is the axis, or center line, of the doorway. Draw the line *ef* 5 inches, actual measurements, above the lower border line. This line will be the line of the finished floor. Measure the horizontal lines of the doorway from this line. Lay out the vertical lines to the right and left of the line *cd* as shown. In all cases use the scale of 1 inch to the foot.

One-half of the elevation is of the interior, and one-half is of the exterior, of the door. When the straight lines of the elevations are completed, project lines downward, and begin the horizontal sections *C* and *D*. Some of these projection lines are shown in the plate. In Figs. 20 and 21 are shown two horizontal sections through the doorway, corresponding to sections *C* and *D* in Plate V, at the same scale as used in Plate IV. During the drawing of Plate V these drawings should be referred to frequently, as they give detailed information regarding the construction of the parts shown.

The curved lines representing the leaded glass on the elevation will be drawn after the sections are completed.

IV should be very helpful in drawing sections *A* and *B* in Plate V.

In drawing the brick arch above the brick opening in the elevation of the doorway, drive a pin through the drawing paper into the drawing board at the point where the line *cd* intersects the line *ef*. Place a straight edge against the pin so that it extends through the upper left-hand corner of the brick opening and draw the short slanting line marking the left-hand side of the arch. This line will be the face of the stone against which the brick arch rests. The height of the arch is $10\frac{3}{4}$ inches. From the stone, along the top of the arc, mark off fourteen spaces for the fourteen bricks, which measure 36 inches. The distance between the fourteenth mark and the point *c* will be one-half the width of the keystone of the arch.

Draw fourteen lines from the marks toward the pin. These lines extend from the top to the bottom of the arch and represent the joints between the bricks forming the arch.

63. Freehand Work.—The lead work in the ornamental glass on each side of the door and in the transom sash is generally drawn freehand, as are also the moldings on the drawing.

In drawing one of the side lights, lay out the axes, or center lines, *ab* and *cd*, Fig. 22, so that they bisect the rectangle in both directions. Then lay out the points *e* and *f* using the scale. The curves *ei*, *gi*, and *ea* are next drawn.

64. Transferring.—After drawing the three curves so that they appear to be satisfactory, place a piece of tracing paper over the upper part of the rectangle, trace the three lines through in lead pencil, and draw the lines *gh* and the upper part of the axis *ab*. Reverse the paper by placing it with the lead-pencil lines against the paper on which the drawing is being made, so that the axis line will coincide with the axis line on the drawing and the points *g* and *e* will be over the points *h* and *f*. Mark the backs of the three curved lines with the pencil, pressing firmly so as to press some of the lead off onto the drawing. Remove the piece of paper, and the lines *af*, *hi*, and *fi* will appear

faintly on the drawing but in the correct positions. These lines can then be strengthened with the lead pencil.

There will now be lines on both sides of the piece of paper and, by reversing properly, the lines *e'i*, *f'i*, *g'i*, *h'i*, etc. can be transferred and afterward drawn in firmly. By this process these symmetrical lines can be drawn with great accuracy. The remaining lines *ci*, *ci'*, etc. can be drawn in a similar manner. The side light on the other side of the door can be transferred, using the same pieces of paper, and both side lights will be of exactly the same design. This method of transferring should be diligently practiced, as it is used in the offices of good architects.

65. Drawing Moldings.—Making drawings of the full-size moldings will be excellent practice in the use of freehand drawing. As a method of practice in making these moldings it is recommended that a piece of tracing paper be held over the moldings shown in the exercise, and the drawing of the curves in these moldings practiced. After control of the hand has been obtained, moldings can be drawn on the plate. They should be drawn with light lines with a soft pencil, such as HB or F, so that they can be erased if not successful. When the molding is satisfactorily drawn, it may be drawn in firmly.

A pencil drawing and an ink tracing of Plate V are to be sent to the Schools for criticism and correction.

66. Practice Recommended.—It should not be considered a hardship to do a great deal of drawing of the kind shown in these plates. It is this kind of work that will be required in architects' offices, and the better the draftsman can do it the more valuable his services will be. All of the lettering and dimensions shown on the illustration should be put on the drawings with the greatest care before sending them to the Schools for criticism.

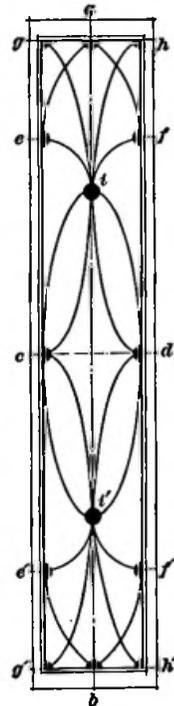


FIG. 22

PLATE VI. TITLE: DETAILS OF WOODEN CORNICES

67. **Directions.**—Plate VI shows different types of wooden cornices that are suitable for residences. This plate is shown at $1\frac{1}{2}$ -inch scale in the text. You are to draw this plate at 3-inch scale in pencil on a sheet of transparent bond paper having a size of 16 in. \times 22 in.

68. The cornice shown in (a) is a comparatively simple one and is applied to a frame wall consisting of 2×4 studs, sheathing, felt, and siding. Blocking is provided between sheathing and fascia to give a slight projection to the fascia. The architectural effect in this cornice is provided by the molded wood gutter which is attached by screws to the fascia behind. Notice that the front of the gutter is slightly lower than the back edge, so that if the gutter overflows it will do so over the front edge. An air space is provided between the gutter and the fascia by the use of cast-iron washers. This air space is intended to prevent water from melting snow and ice from backing up under the shingles.

In starting to draw this cornice you should first draw the wall studs, then the plate, which consists of two 2×4 's, the roof rafters, which consist of 2×8 's at an angle of 30° , and the ceiling joists, which are 2×6 's and are horizontal. You will note that the shingles have an exposure of $4\frac{1}{2}$ -inches to the weather and that the starting course of shingles is always doubled. The siding as shown has an exposure to the weather of $5\frac{1}{2}$ -inches. All this work should be put in with light lines. The drawing can then be finished by putting in the lines firmly, making them of different thicknesses, as shown in the illustration.

69. The same general procedure that you followed in drawing the cornice in (a) may be followed in drawing the cornice in (b). The cornice in (b) consists of a small fascia and eaves mold. Notice the copper hanging gutter, 5 inches in

diameter, which is supported by adjustable brackets. The detail in (b) is more complete than the one in (a), since it shows not only the frame construction but also the insulation and the room finish which is plaster.

The cornice in (c) is for a much flatter roof than the ones in (a) and (b). In fact, the pitch, which is 2 inches to the foot, is too flat for wood or asphalt shingles and so a built-up roof with a slag topping is used instead. The cornice has a projection of approximately 3 feet. The soffit of the cornice and the exterior wall is finished in stucco applied to metal lath on wood furring strips. In this cornice, notice the continuous screened opening that has been provided for ventilation and which allows air to circulate above the insulated ceiling.

70. Since one cornice is to be drawn at a time, the part that you are not working on should be protected by being kept covered. All of the lettering and dimensions shown on the illustrations should be shown on your drawing and your drawing when finished should have the appearance of the illustration. If any of your drawings do not look clean and neat when first drawn, place another piece of tracing paper or cloth over each soiled drawing and make a neat, clean tracing.

These drawings should be carefully studied while they are being drawn. It should never be forgotten that the drawings are not merely lines but that they show the arrangement of various materials to form parts of buildings in such a way that architects, builders, and mechanics can understand them. For Plate VI, a pencil drawing is to be sent to the Schools for criticism and correction.

CORNICES

71. In Fig. 23 is a classic cornice fitted against a brick wall. The plate is anchored to the wall by long bolts having plates of metal on the bottom and nuts and washers on the top where the bolts project through the top of the wooden plate. Wood bricks in the section and in the elevation are built

into the wall at frequent intervals and the cornice blocking is nailed to them. The lookouts extend through the wall and are nailed to the attic joists when possible. Dentils are shown in elevation and in section. Blocking is securely nailed to the lookout and supports the crown mold and front of the cornice. The first row of slates is doubled, shorter slates being used beneath as shown.

PRACTICE WORK

REMARKS

72. In the following pages are given a number of illustrations showing various important details of buildings. The beginner in architectural drawing will find it profitable to study these drawings carefully, and, as an additional means of self-development, it is recommended that he practice drawing as many of them as possible.

CHIMNEYS AND FIREPLACES

73. **Detail of Chimney.**—An example of the arrangement of parts in a chimney is shown in Fig. 24, which is a chimney built in with the side wall of a brick building. In (a) is shown a front elevation of the chimney; a section through the center lines of the fireplaces is shown in (b). Between these views are shown horizontal sections, or plans, of the chimney at each floor, in the cellar, and above the roof.

In the upper stories are shown the fireplaces *b*, *c*, and *d*, and in the basement, or cellar, the ash-pit *a*, which receives the ashes from the fireplace *b* through the ash door shown in the section (b). The ash-pit is provided with a cast-iron door through which the ashes are removed. A flue *e*, shown in dotted lines (a), reaches from the basement floor to the top of the chimney. At the bottom of this flue, near the floor on the side of the chimney, is shown an iron door for cleaning out the flue. At *f* is an opening into the flue *e* designed to receive a smoke pipe from a heater or furnace. The flue *e* runs up past the fireplaces *b*, *c*, and *d* and is then bent toward the center of the chimney.

74. **Flues.**—The flues from the fireplaces are shown by dotted lines extending from points above the tops of the fireplaces to the top of the chimney. The brick partitions between chimney flues are called *witthes*. As shown, the flue from any fireplace must pass on the side of the fireplace above, but the flues are deflected above the last fireplace and brought together so as to make the chimney, where it extends above the roof, in as compact a form as possible. The bends in the flues should be as gradual as possible so as not to check the flow of smoke and gases up the flue.

The double dotted lines indicate that the flues are lined with terra cotta. These flue linings should be carefully cut to miter, or fit together at the bends, so as to form a smooth channel. Flues having slight bends are considered preferable to perfectly straight flues, as the bends prevent rain and sleet from falling into the fireplace, and also tend to check the downward passage of currents of cold air. Smoke flues are sometimes formed in brickwork without linings, in which case the walls of the chimney should be 8 inches in thickness. The interiors of such flues should never be plastered, as the plastering is disintegrated by the heat and will fall off. When flue linings are used, the chimney walls need be only 4 inches in thickness. Where linings are not used, a 4-inch brick partition, or *withe*, should be built between the flues. The building codes of many cities require that all chimney flues be lined with fireproof material such as terra-cotta flue linings.

75. **Details of Fireplace.**—The design of chimneys and fireplaces is one of the most difficult problems that the draftsman has to solve. An example of a properly constructed fireplace as it would appear in a good drawing is shown in Fig. 25. This illustration shows a plan, a one-half elevation, two sections *A-A* and *B-B*, and a section showing a practical throat damper. The projection of the chimney into the room is called the chimney breast. The height of a fireplace should be about 2 feet 6 inches to 2 feet 8 inches above the finished floor, its depth from 16 to 24 inches, and its width from 2 to 5 feet. A properly designed fireplace should have sloping sides, as shown at *a*.

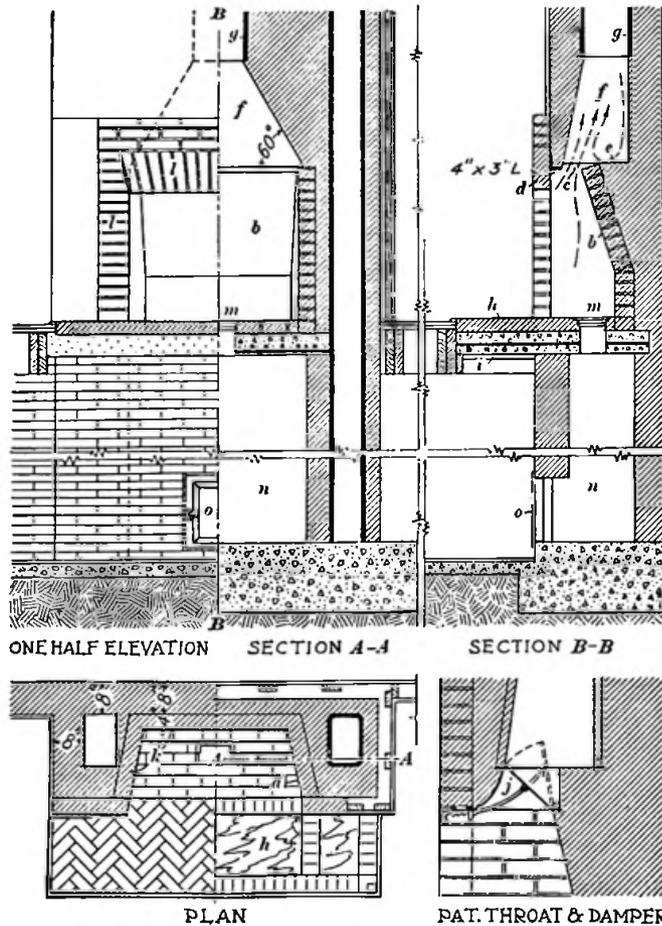


FIG. 25

with a slope of about 3 inches in 1 foot, as well as a sloping back *b* to reflect heat into the room.

The back *b* should slope forward and form the throat *c*, which should be from $2\frac{1}{2}$ to 4 inches in depth, and of the same width as the fireplace opening. The total area of the throat should not be less than that of the flue lining. The throat should be at least 2 or 3 inches above the top of the opening of the

fireplace, as shown at *d*, and as near the front of the fireplace as possible.

The smoke shelf *e* is an important feature. It prevents air from rushing down and forcing smoke into the room when the fire is started.

The smoke chamber *f* is formed by drawing the brickwork together at an angle of 60° on the sides, until it is reduced to the dimensions of the flue lining. The lining *g* is then started, being supported by the brickwork, as shown.

The hearth *h* is supported on a concrete slab *i*, which extends from the back of the chimney to a header. It is built of concrete, but may be finished in tile, marble, or brick. The hearth should extend at least 12 inches on each side of the fireplace opening so as to catch embers that may fall out of the fire.

Patent throats and dampers *j*, which are used in good work, are made of cast iron with a properly shaped throat and a hinged damper that can be adjusted to regulate the draft. These devices serve also as supports for the brickwork of the front of the smoke chamber.

76. Finish of Fireplace.—Firebrick, soapstone, and metal are used for the back and sides, or lining, *k*, Fig. 25, of the fireplace. Firebrick forms a most efficient non-conductor and, when laid up neatly, forms an excellent lining. Cast-iron linings are made in ornamental patterns, which are used where it is intended to use grates. These linings should be backed with firebrick.

The facings *l* may be formed of brick, marble, or tiles, and the hearth should be finished to correspond.

77. Ash-Trap.—An ash-trap *m*, Fig. 25, is shown opening into a chute that leads to an ash-pit *n* formed in the body of the chimney in the cellar. This pit is finished with a clean-out door *o* through which the ashes are removed.

INTERIOR DETAILS

78. **General.**—For many buildings it is not customary to make special detail drawings for the base, door, and window trim, molding, doors, and other items of interior finish. It is more economical to buy such items from woodworking mills that manufacture them in standard, or stock, designs. These designs are shown in catalogs that are issued by some of the larger mills. In more elaborate houses in which the architect wishes to have special moldings, it is necessary for the architect to furnish details showing his requirements. The draftsman should practice drawing out such details, following the models given. He will thus improve himself as a draftsman and increase his knowledge of the methods of presenting ideas by the use of lines.

79. **Stairs.**—The design of stairs require a great deal of skill, and too much study cannot be put on this subject. In Fig. 26 is a detail of a staircase similar to that used in the residence which will be drawn while studying *Architectural Drawing, Part 2*. In the plan the plastering of the wall is shown dotted at *a*. The two lines *b* inside the plaster represent the molded upper edge of the wall string.

The steps are shown by two lines, one of which is broken. The solid lines *c* represent the extreme projection of the nosing of the step, and the broken lines *d* show the faces of the risers. The risers are numbered from 1 to 16. The bottom treads *e* have curved outlines. A newel *f* is shown standing on the curved end of the lower step, and the hand rail *g* is shown curving into it. A few of the balusters *h* are shown by dotted lines. The hand rail runs to a newel *i* situated over the sixteenth riser. From this newel the railing *j* continues on the second floor until it strikes a half newel *k* against the wall, as shown in the Side Elevation. This elevation shows various details of the stairs, including the construction of the steps. The risers are tongued into the treads as at *l*, and the treads into the risers at *m*. The portion inside the broken line is cut away and part of the stairs is shown in section. The carriages *n* are the rough-timber supports that are put under the steps to give them stiffness.

In this section is seen the partition *o* of the toilet room beneath the stairs. At *p* is shown the trimmer beam at the top of the stairs, together with the framing of the platform. At *q* is the trimmer at the other end of the stair opening. Both of these trimmers are doubled as shown.

The outside string *r* is shown curving down and mitering into the base *s*. At *t* is the header which extends between the trimmers and forms the side of the opening.

80. There is only one way to learn how to draw and that is to practice continually. While you are required to send in only a few of the drawings given, you will serve your interests best by making all the drawings shown.

81. **Doors.**—Where there are several different styles of doors in one building, a drawing, or "door sheet," devoted solely to doors and their details is sometimes made. Such a drawing is shown in Fig. 27.

Interior doors are shown at (*a*), (*b*), and (*h*). Styles (*e*), (*f*), and (*g*) would be used for exterior doors. On these exterior doors, notice the drips which are similar to the drips shown on the sash in Plate II and on the door (*a*) in Fig. 17. Styles (*c*) and (*d*) may be used as exterior or interior doors. The upper panel of the door in (*d*) may be of wood or glass.

The door most commonly used for contemporary interiors is the "slab," or flush, type, shown at (*h*). This is invariably a veneered door, as shown by the construction in the section G-G. The veneered construction prevents warping or twisting and is economical in the use of hardwoods since it allows thin layers of such woods to be applied to a core built up of cheaper woods. Where the hardwoods are used for exterior doors, veneered construction with waterproof glue is employed. The solid construction shown at A-A, B-B, and F-F indicates that these doors are of white pine and that they will be painted.

The Dutch door shown at (*c*), which consists of separate upper and lower doors, was originally used primarily as an exterior door on farmhouses. On summer days the upper section could be kept open and the lower section closed to keep out

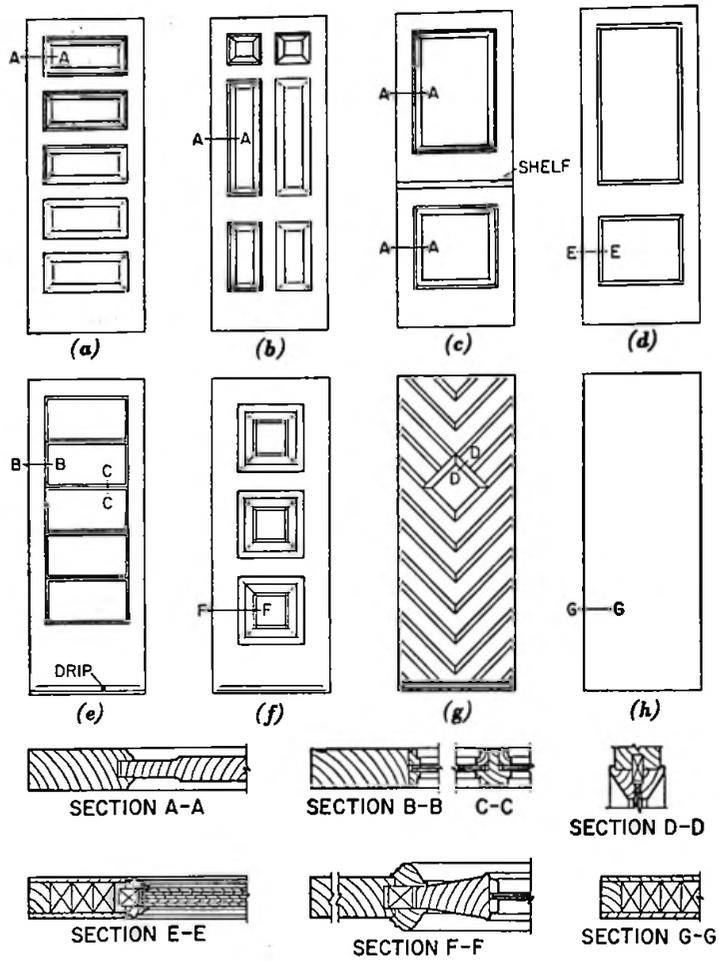


FIG. 27

chickens, dogs, and cats. The Dutch door today is used for stables and offices and for check rooms.

82. **Door Schedule.**—In many plans, schedules of doors are given. The schedule consists of a list of doors of different patterns and sizes. The doors are numbered on the floor plans,

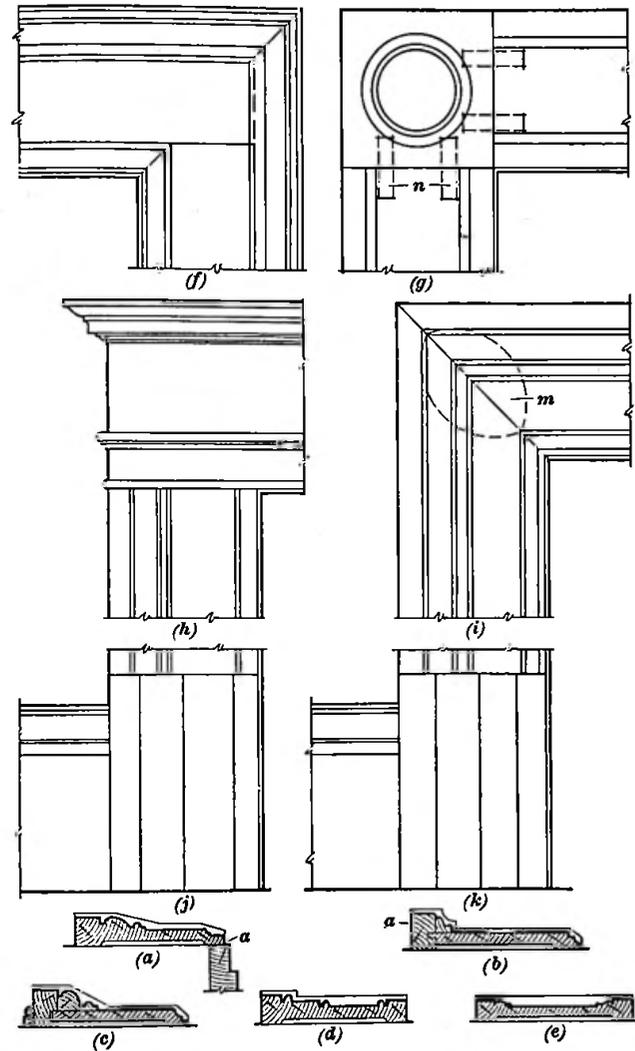


FIG. 28

83. **Windows.**—The windows, too, are numbered on the floor plan and a schedule of windows giving descriptions of the various numbers is also made. These schedules are drawn at convenient positions on the plans or elevations.

84. **Door and Window Trim.**—The finish of doors and windows is called trim, casing, or architrave. The simplest form of trim consists of a board 4 or 5 inches in width mitered around the opening. The trim of doors and windows is capable of very elaborate treatment, in which columns, pilasters, cornices, and pediments are used and in which elaborate carving may be employed. A few simple trims are shown in Fig. 28.

The casings shown in (a), (b), and (c) are used for mitered effects such as shown in (f) and (i). In (a) the casing is made of a single strip of wood, and the back is plowed out in order to prevent warping and twisting. The trim of a door is generally set back from the face of the door frame about $\frac{1}{4}$ inch, as at a, so that the butt, or hinge, when let into the face of the jamb will not cut through the trim.

In (b) is a casing that is built up of three pieces, the piece a being called the back band. The flat member of the trim is let into the back band and a molding is planted in the corner. This construction permits the use of thin stock in making the trim, and the wood is not liable to curl or warp.

In (c) a similar trim is shown having back molding set against the back band and scribed against the face of the plaster. The back molding is often carried around the trim of a door or window and across the top of the chair rail, base, or wainscoting. Casings, sometimes called pilaster casings, are shown in (d) and (e). They are generally used with corner blocks as shown in (g). The casings are butted against the blocks and are sometimes joined together by means of round dowels glued in, as shown at n.

Mitered casings made of one strip of wood are generally mitered together as shown in (i). A hardwood spline, or tongue, m should be inserted into grooves cut in the ends of the casings by a circular saw. The spline should be set with the grain at right angles to the miter cut and glued in place. When the trim is built up of two or three pieces, as in (b) and (c), the joint is best made by butting the flat face of the casing and mitering the moldings as in (f). This method of joining casings prevents the opening up of the joint due to shrinkage, which is so common with plain mitered joints.

85. Among other forms of casings, or trim, is that shown in (h), Fig. 28, which consists of pilaster casings on the sides of the opening and a simple form of entablature over the head. This entablature is formed of a plain board with a small mold bradded or glued to the face and a small cornice molding mitered around the top. This form of trim is known as cabinet trim.

In the details of windows previously given are shown examples of window finishes. Where the wall is thin, the casing is stopped on a stool with an apron and bed mold below. Where

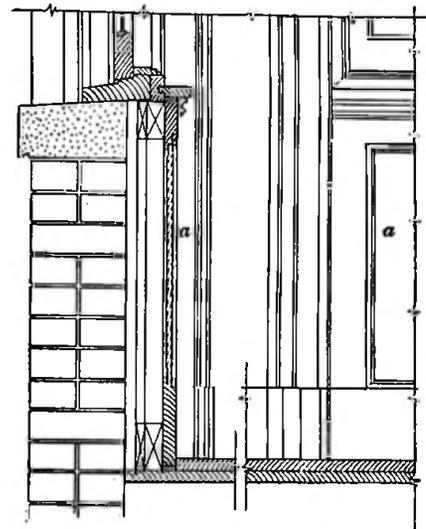


FIG. 29

the wall is thick, as in masonry walls, jamb casings are required to fill the space between the box and the face of the plaster. When the casings are carried to the tops of plinth blocks, the trim is like that of a door.

86. **Panel Backs.**—Where the wall is very thick, the part under the window frame and between the jambs of the masonry opening is sometimes made thinner and the recessed surface under the window frame is paneled as shown in Fig. 29. The jamb casings and the trim of the window extend to the floor. The paneled surface a is called a panel back. The panels may be of solid wood or plywood.

87. **Plinth Blocks.**—Plinth blocks are placed at the bottoms of casings as shown in Fig. 28 (*j*) and (*k*). This treatment is generally used with door casings and with the casings of windows that are carried to the floor. The use of plinth blocks

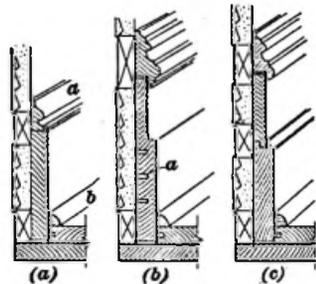


FIG. 30

avoids the necessity of carrying the fine moldings of the casing to the floor, where they are apt to be filled with dirt, and provides a sufficient thickness of material to receive the base. Plinth blocks are usually shaped to match the profile of the casing, and in Fig. 28 the sections of casings in views (*a*), (*b*), etc have profiles of plinth blocks shown on them. In the case of a pilaster casing (*e*) the plinth block may be a plain rectangular board, and the casings (*a*), (*b*), and (*c*) they may be elaborately molded, but should have no fine moldings or quirks.

88. **Bases.**—Bases, baseboards, or skirtings, are boards fitted against the walls at their intersection with the floor. In closets and unimportant rooms, the base consists of a $\frac{1}{2}$ -inch board with a simple molding *a* on top, as in Fig. 30 (*a*). A quarter-round molding *b* is frequently fitted into the angle of the base and floor so as to conceal the crack that will appear if the base shrinks. Where there is a double floor, the base is set before the finished floor is put in place and the floor is fitted against the base as shown in (*a*), (*b*), and (*c*).

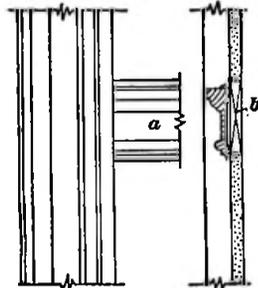


FIG. 31

In (*b*) is shown a more elaborate base formed of a molded board with a rich molding rabbeted on top. A still more elaborate base, consisting of three pieces, is shown in (*c*). Suitable grounds are shown for nailing these various bases in place. The base is sometimes sawed lengthwise through about one-

half of its thickness, as shown at *a* in (*b*), to prevent warping and twisting. Housekeepers object to bases with projecting moldings, as they catch dust; it is therefore desirable that the moldings should have as slight projections as possible.

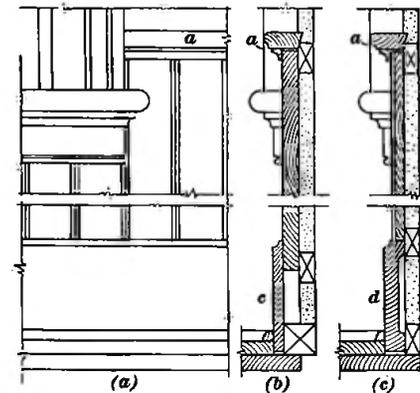


FIG. 32

89. **Chair Rail.**—A molded band, or chair rail, *a*, Fig. 31, is sometimes applied to plastered walls to prevent the backs of chairs from marring the plastering or papering. It should be about 4 or 5 inches in width and should be placed about 3 feet above the floor; the projection should be less than that of the door and window casings against which it runs. Suitable grounds *b* should be provided for nailing the chair rail to the wall. A loose mold is placed on top to cover the plaster joint.

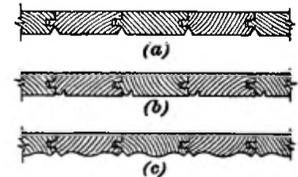


FIG. 33

90. **Wainscoting.**—The wall is sometimes covered for its whole height, but more often to a height of 3 or 4 feet, with a wainscoting. This wainscoting may be made of marble or wood and in its simplest form consists of matched boarding crowned with a simple cap mold, Fig. 32. The matched boarding may have a V joint as shown in Fig. 33 (*a*), a beaded joint as in (*b*), or a molded face like that shown in (*c*). This board-

ing, which is also called ceiling, is nailed to grounds by blind nailing in the same manner as flooring. By other treatments of the faces of the boards, various interesting effects can be obtained. A cap mold *a*, Fig. 32, is always placed on top of the boarding and is scribed to fit closely against the plaster wall.

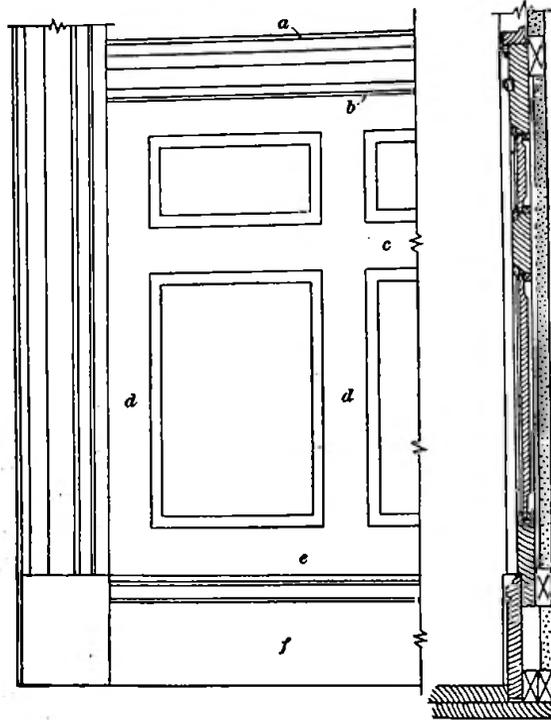


FIG. 34

The cap should not, as a rule, project beyond the casing. A base as at *c* and *d* is sometimes run around the bottom.

Paneled wainscoting should be constructed with the same care as is used in making doors. In the best work the rails and stiles are veneered and the panels made up of five thicknesses of veneer. The panels are glued up with the grain of one layer at right angles to the grain of the next layer. Paneled wainscoting should be put together at the shop and brought to the building in

lengths ready to fit into position. In Fig. 34 is shown a detail of a paneled wainscoting with the cap *a* and a small molding *b* let in to form a frieze. At *c* is a rail, at *d* the stiles, and at *e* the bottom rail with a base *f*. The panels should be put in as shown in Fig. 35. The molding *a* is glued to the stile, or rail, *b*, which is rabbeted to receive it. The panel, having been filled and varnished or painted, is set in from the back and secured in place by means of strips of wood nailed to the stile. The panels should not be glued or nailed in place, but left free to swell or shrink. The plastering behind the wainscoting should be kept free from the wainscoting. This is accomplished by omitting the finishing coat and sometimes the brown coat of plastering.

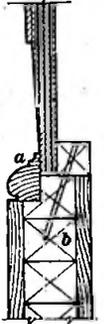


FIG. 35

91. In drawing any of the above details, the draftsman should become familiar with the standard methods of assembling the various parts. He should also know the stock sizes of materials of different kinds. The drawings that he will be called upon to make are in reality instructions given to the contractors and mechanics, from which they must obtain accurate and dependable information that will enable them to estimate costs and to construct buildings.

While learning to draw, it will be well to study the trades and trade processes and the various materials that it will be necessary to know about in order to make practical working drawings.

KEY TO CRITICISM

The following symbols are used to indicate criticisms and suggestions on the student's drawings in Elementary Architectural Drawing, Freehand and Ornamental Drawing and Architectural Drawing. When a letter is placed on the corrected plate the meaning of this letter can be found in the following list.

- | | |
|--|--|
| a. Inclination of letters not uniform. | (5) Practice use of French curve. |
| b. Letters not well formed. Study Arts. 2 to 10, 5893B. | (6) Use black drawing ink. |
| c. Letters not uniformly spaced. | (7) Not enough contrast in weight of line. |
| d. Practice lettering frequently. | (8) This is good work but you can do better if you take more time. |
| e. Sizes of spaces unequal. Read Arts. 21 and 22, 5893B. | (9) Excellent work. |
| f. Compare your work with model in text. | (10) Facility in freehand drawing comes with practice. |
| g. Height of letters irregular. Use guide lines. | |
| h. Letters too large. | A. Dimension lines omitted. |
| i. Letters too small. | B. Dimensions incorrect. |
| j. Use vertical guide lines for your letters. Guide lines should be drawn at random. | C. Dimension arrows incorrectly placed. |
| k. Numerals should be printed not written. | D. Lines not parallel. |
| l. Numerals not well formed. | E. Intersections poor. |
| m. Foot and inch marks not well formed. | F. Compass work poor. |
| n. Line too heavy. | G. Line should be dotted as it represents a part not seen. |
| o. Line too light. | H. Line should be dotted, as it represents a part cut off. |
| p. Line uneven. | I. Wrong symbol used. |
| q. Line not black enough. | J. Carelessly drawn. |
| r. Line should be drawn with instruments. | K. Size too large. |
| s. Line should be dotted. | L. Size too small. |
| t. Line should be broken. | M. Not projected properly. |
| u. Broken or dotted lines uneven. | N. Section lines omitted. |
| v. Should be full line not broken. | O. Section lines not evenly spaced. |
| w. Freehand curved lines not well drawn. | P. Lines omitted. |
| x. Arrow heads not well formed. Use closed type arrow heads. | Q. Dimensions omitted. |
| y. Lines are to be drawn freehand, without the use of instruments. | R. Incomplete. |
| z. Compare your work with attached drawing. | S. Drawing not to scale. |
| (1) You can do better work. | T. Similar lines should have the same thickness. |
| (2) All sides of figure should be equal. | U. Symbol omitted. |
| (3) Not required. | V. Lettering omitted. |
| (4) Erase blots. | W. Use single line. |
| | X. Avoid flat spots when drawing curves. |
| | Y. Avoid angles when drawing curves. |
| | Z. Quality of line should be clean, crisp and uniform. |

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