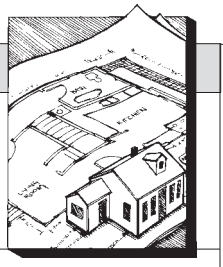


Sleight Of Hand

by Gordon Tully

Six years ago, when I bought my first (now-discarded) CAD system, I thought drafting skills would soon be as obsolete as wizardry with the slide rule. Maybe so for large offices, but not for those of us who do residences and renovations. I still use steam-age hand drafting, helped by some tricks and equipment that improve my efficiency. Here are a few of my favorite tools and tricks gleaned from several decades of drawing.

Tool Notes

Most of my tools are listed in the accompanying box ("Equipment and Supplies"). Some, however, are worth a few extra words.

Triangles. Check any triangle before you buy it to be sure it is square. Very carefully draw a sharp vertical line off a straightedge; then rotate the triangle 90 degrees against the straightedge and draw another line very close to the first one. If they aren't absolutely parallel, look for another triangle.

Sheet size. It's nice to use sheets that are multiples of 8½x11, because they are modular with ordinary paper when folded, and because 8½x11 and 11x17 are standard copier sizes. I draw details and schedules on 11x17 sheets and bind them in a book separately from the main drawings. This book can also include the specs, which gives them a fighting chance of being used on the job.

Copier. This has become an important timesaver. It allows me to use pasted-up opaque originals; to superimpose one drawing on another; to create transparent originals with borders and title boxes; and to change the scale of a drawing. For example, draw one inked sheet with the job data (project, firm, date box, revision box, sheet number box) and borders. Copy this sheet onto mylar or vellum sheets with the copier (make sure the copier glass is clean!); these transparent versions then become the "originals" for the project (see illustration, next page).

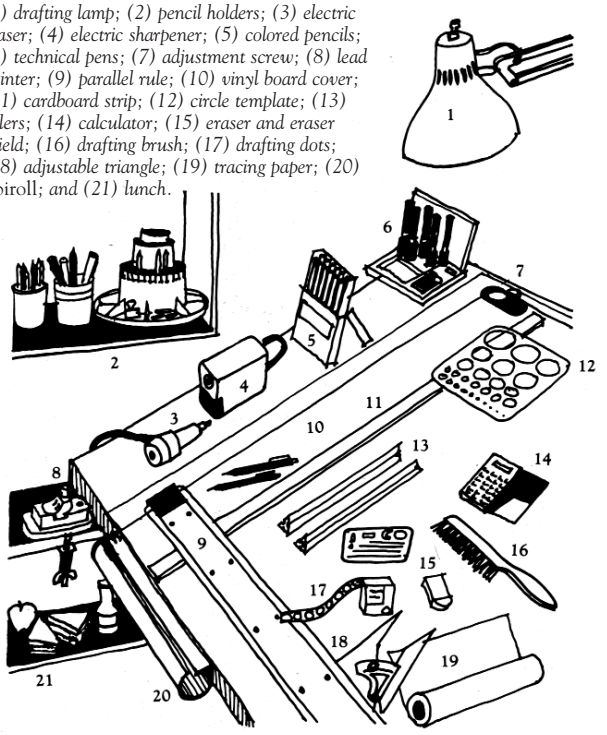
Working with either the transparent originals or photocopies of the same on opaque paper, you can manipulate the drawings in any number of ways. For instance, for work that doesn't need editing and won't be run through the Diazo printer, you can simply tape opaque copies of the work onto an opaque bordered sheet, and copy for a new version. You can subsequently add to that drawing by taping new features onto little "clouds" or strips of paper, or cover or change features already drawn by taping paper over them. If you keep your hands clean when you tape and make sure you tape all edges to keep them from showing up, the subsequent copies will look as clean as the originals. If you want to end up with mylar or vellum again, you can simply photocopy from the opaque versions back onto the new medium.

I also frequently copy schedules and title blocks onto sticky-back transparent sheets, which I then apply to a drawing. (Sticky-back detail drawings don't work because you can't edit them.)

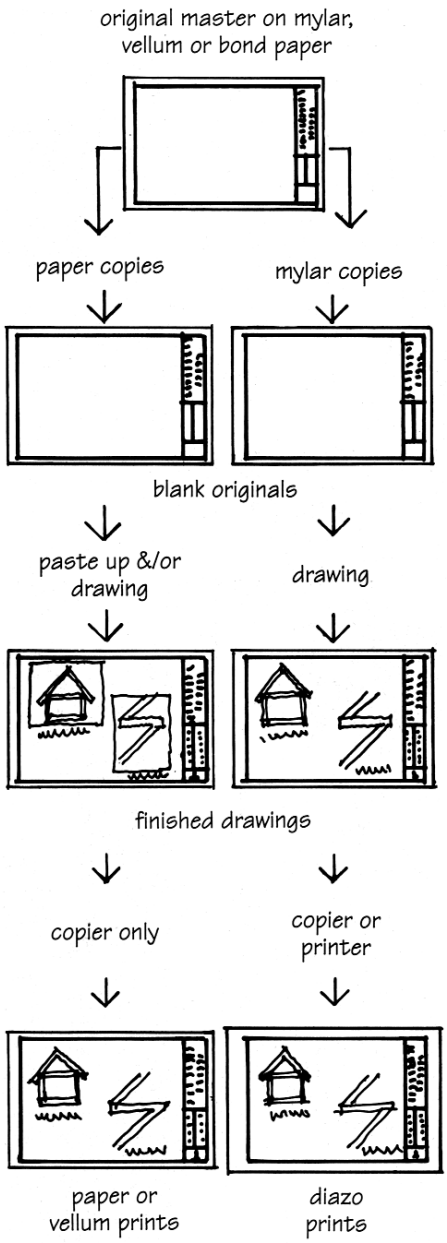
Drafting dots. These little circles of tape solve the problem of having your tools snag the corners of drafting tape pieces. They come in a dispenser; you just peel them

The Author's Essential Tools

A tableful of drafting tools — most store-bought, a couple improvised — makes drafting go as smoothly and quickly as possible. They include: (1) drafting lamp; (2) pencil holders; (3) electric eraser; (4) electric sharpener; (5) colored pencils; (6) technical pens; (7) adjustment screw; (8) lead pointer; (9) parallel rule; (10) vinyl board cover; (11) cardboard strip; (12) circle template; (13) rulers; (14) calculator; (15) eraser and eraser shield; (16) drafting brush; (17) drafting dots; (18) adjustable triangle; (19) tracing paper; (20) Spiroll; and (21) lunch.



The Photocopier As A Drawing Tool



With a photocopier, you can take a blank master on any type of paper and create more blanks for revised drawings on any other type of paper. By taping on changes, you can also revise almost any drawing. Just keep your fingers and the copier glass clean.

off — no cutting off little pieces! Use new ones each time.

Drafting pencils (lead holders). In some types of lead holders, for example the popular *Koh-i-Noor* brand, the clutch grasps the lead well above the tip of the lead. Thus, the exposed lead is longer than you think, so you break leads more often; and there are few things more infuriating than breaking a lead. The *Caran D'Ache* holders I use are lighter and better balanced, and grab the lead right at the end of the clutch.

Mylar vs. paper. Drawing on a transparent medium is a basic technique of architectural drawing, because it allows you to trace or draw over, and therefore edit, an earlier version. Graphite lead on vellum or another tracing paper is the traditional standard.

Plastic lead on Mylar is more expensive, but has many advantages. It is very transparent and can be erased almost indefinitely (as long as you don't use abrasive erasers). Ink on Mylar can be erased easily with a wet vinyl eraser.

However, if you have a heavy hand like mine, some plastic leads may tax your patience, since they are much weaker than graphite and break easily. Finding one you like may take some experimentation; personal preferences about "feel" play a strong role. I just switched from Dixon Type R to Type N, which seems to break less often. But you can't draw meticulously with plastic; if you want fine detail, use graphite leads on paper.

Lines drawn with plastic lead have another advantage: They are matte, and are therefore much easier to see than graphite lines, which reflect light. You cannot use plastic lead on paper, however, because it won't erase. Conversely, graphite on mylar smears badly and glares even worse than on paper.

Tracing paper and Mylar both allow you to see through to and trace a drawing below, although the view is much clearer through Mylar. When doing an elevation, you can place the plan underneath to see exactly where windows or a break in plane occurs. Sliding a blank sheet of Mylar between the two sheets will prevent the lines on the lower sheet from transferring onto the back of the upper one.

You can also slide elements around under a transparent drawing to see how they fit. For example, you might slide a drawing of a house around under a site plan until you have the location and orientation just right.

Choosing leads. If you make blueline prints from your drawings, you'll discover that a Diazo printer reads the real density of the lead, and not the apparent density (or surface opacity, as it is called in the trade). The copier does just the opposite. A line drawn with an R3 pencil, for instance, might look black to you and to the copier, but it will look gray to the printer. To register a dark line for Diazo printing, draw gently with a soft lead, rather than pressing down harder with a hard one.

For drawing lines you don't want to show on final print, *Mars* Non-Print lead is invisible to a Diazo printer; while *Berol* Non-Photo blue is invisible to a copier. Each is invaluable for initial layouts and notes to yourself.

Some Tricks

There's no use doing things the hard way. In drawing as in building, knowing a few tricks can save you much time and aggravation.

Aligning a drawing. You must frequently reset the parallel rule so that it aligns with horizontals already drawn on the sheet. If properly installed, the parallel rule makes this easy. At one of the upper corners there should be a fitting that clamps down on the wire. If you loosen this, and if the wires are not too tight, you can then adjust the parallel rule to match the lines of the drawing, fine-tuning it after the sheet has been taped down. Then reclamp the wire and you are in business. You can also use this adjustment to draw with the rule in a slightly tilted position, if you have a lot of tilted parallel lines.

To give yourself a reference point to align a drawing later, always begin a drawing by making two short orientation lines with your parallel rule at the far right and left edges of the drawing. When you remove and remount the drawing, these lines will let you quickly adjust the parallel rule to the drawing.

Subdividing. Often, such as when drawing stairs or shingle courses, you need to draw a number of equally sized segments that do not match the measurements on one of your scale rules. The standard trick here is to find a scale on one of your scale rules that is close to the right spacing, then angle it diagonally until you get the right number of divisions. Draw a line along the scale, make tick marks off the scale divisions, then draw the needed horizontals or verticals through these intersections.

If you are using the same spacing elsewhere, you can set your adjustable triangle to the angle of the tilted rule, lay the rule against the triangle anywhere you wish on the drawing, and make your tick marks as before. You can also turn the adjustable triangle perpendicular to convert horizontal divisions into vertical ones.

Drawing circles. I never use a compass. For circles up to 3 inches in diameter, I use a circle template. For slightly larger circles, there are templates of half-circles. But for any circle bigger than 3 inches, the easy way is to make a hole in a strip of thin cardboard for your pencil, then stick a pin in the cardboard the proper distance away (that is, equal to the radius of the circle you want to draw). Keep the cardboard strip narrow so you can see what you are doing when you set the pin point on the drawing below. A nice feature of this system is that you can use the same pencil to make circles that you use to draw the adjacent lines.

Profiling. Profiling — making some lines heavier than others — is an important way to make a drawing more legible. But it's confusing if not done in the right places. Dark lines are appropriate at the following places:

- outside edges of objects in elevation
- outside edges of objects in section
- overhangs in elevation
- outlines of steel and other elements you want to call out
- color changes in the building (when drawing elevations)

For example, you might emphasize the glass in a window and the line between window trim and siding; but you should not emphasize the interior details of the trim.

You should never profile:

- inside corners
- unimportant details
- too close to another profile (for example, don't profile the bottom of the eaves, edge of the roof, and bottom of the gutter — choose one or two of these)

Using the back of a drawing. Whenever possible, you should use both sides of a transparent drawing. Examples of stuff that belongs on the back:

- on electrical or mechanical drawings, the basic outlines of walls (keep them light and monotonous, so the technical work stands out)
- darkening in (pocheing) walls; *Prismacolor* #903 True Blue is perfect for pocheing when you want detail to show through; use black *Prismacolor* or ink for opaque pocheing
- furniture
- gridlines
- textures, such as shingles and bricks
- dotted lines showing demolition
- symbols and detail references

The obvious advantage of having these things on the back is that when you make changes on the basic drawing, you don't have to erase these elements. ■

Gordon Tully is an architect practicing in Arlington, Mass

Equipment And Supplies

These are the items I use regularly:

Big tools:

- 36x80 drafting board (really a solid core door) covered with vinyl, pitched at 1.75:12
- 54-inch *Spiroll.* This is a proprietary gizmo that allows you to roll large sheets you are working on over the front edge of your drafting board without reducing them to confetti against the board's sharp edge. You don't need this unless you are drawing on sheets more than 18 inches top to bottom, since you can reach the top of a small sheet without dropping it over the front edge.
- 54-inch *Mayline* parallel rule
- Two *Luxo* lamps, one at each side above my drafting board. Use only the heavy-duty type, with metal or porcelain sockets, which can take 100-watt bulbs.
- Photocopier that can handle 11x17 sheets. Preferably one with continuous scaling feature. As explained in the main article, a good copier gives you incredible flexibility.
- *Diazo* printer, to make blueline drawings (not blackline) from transparent drawings. This is a big-ticket item appropriate mainly for those who do lots of drawing. Try to find a used one, or simply use the local printer.

Small tools:

- *Caran D'Ache* lead holders (drafting pencils with removable leads)
- Triangular architect's scale
- Triangular engineer's scale
- 8-inch adjustable triangle
- Thin eraser shield
- Drafting brush
- Circle and bathroom templates
- Template of triangles, hexagons, and rectangles
- Electric eraser
- Plug-in electric pencil sharpener
- *Eagle Turquoise 17* clamp-on "lead pointer" (sharpener for the drafting pencils with removable leads)
- A foam "stab-me" lead cleaner stretched around the sharpener
- Scientific calculator ($13) for trig functions, stair, and area calculations
- Push-pins
- Jeweled-tip technical pen set (buy on sale)
- X-acto knife

Expendables:

- Vinyl erasers and machine erasers (no abrasives!)
- Drafting dots (dots of drafting tape in a roll in a box)
- Wooden drafting pencils
- Various drafting leads
- Colored pencils
- Rolls of white tracing paper of various widths
- Pads of 916H vellum, various sizes, some gridded 8 to the inch (50¢ per 8½x11 sheet!). The grids are slightly inaccurate.
- Mylar sheets of various sizes, 4-mil, matte both sides
- Narrow strips of thin cardboard taped to the drafting board to hold the parallel rule off the table surface (keeps the drawings clean)
- Press-on lettering, patterns, and textures
- Tree stamps