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Introduction

Among woodworkers, kitchen cabinets are the poor step-sister of the furniture world – the homely one with a sixth-grade education who processes fish for a living and always seems to have that smell.

“He builds cabinets,” sniffed one of my wood-working friends, referring to an acquaintance a few years back. The statement was nowhere near as straightforward as those three simple words might suggest. He spoke with a pained expression, lowering his voice to a near-whisper when he got to “cabinets.” Apparently this was some kind of shameful secret; building cabinets made the acquaintance – well, you know...not a real woodworker.

“Why would I want to build plywood boxes when I could be building 18th-century highboys?” remarked another woodworking friend, this time in the late 1990s. The question was rhetorical, more a way of announcing that he’d broken into the East Coast market for period Americana and thereby escaped the obscurity of the rural workshop where he’d spent years building cabinets, millwork and furniture for his regional market.

Kitchen cabinets are the Nestlé’s Chunky Bar to the highboys’ Godiva signature truffle – a species of work beneath those with higher skills and refined taste.

This snobbery doesn’t just stem from an abhorrence of sheet goods joined with biscuits or Domino

fasteners and screws. It also reflects the residential kitchen’s longstanding identity as a woman’s realm. When it comes to work done by men outside of the home versus that done by women inside, the outside world, in public view, wins every time.

There’s no real controversy in this claim, at least as it applies to much of Europe and North America during the 19th and 20th centuries. In middle-class homes of the 19th century, especially that century’s early years, kitchen work was typically done by servants; migration from rural areas to cities in response to industrialized production and changing markets had translated to plentiful domestic help. For women of the working class it was common to combine meals and lodging with employment in the homes where they cooked, cleaned, laundered clothes and tended fires.

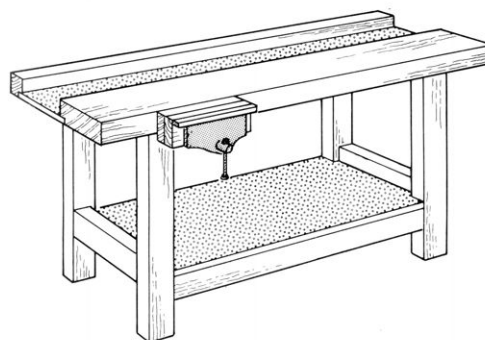
But as factories proliferated, demanding more and more workers, servants began to leave their employers’ homes. As some explained to family members and friends, factory work, however hard or monotonous, was vastly preferable to domestic work because it came with boundaries that too many housewives refused to acknowledge. There was an end to the workday, whereas domestic workers could be called on at any time, day or night, and bore the brunt of their employers’ bad moods. “A man knows what he wants, and doesn’t go beyond it,” wrote one young woman who had gone to work in a jute mill, “but

a woman never knows what she wants, and sort of bosses you everlastingly... I tell every girl I know, 'Whatever you do, don't go into service. You'll always be prisoners and always looked down on.'"¹ I wouldn't use this sexist quote to illustrate the flight of domestic servants to factories were it not typical of the sentiments expressed by many of the writer's contemporaries.

When servant help became hard to come by, middle-class women were forced to resume cooking and cleaning for their families – tasks that had now become not just low-status, thanks to their long association with women of the working class, but completely unfamiliar. Imagine being expected to make a dovetailed drawer when you have never used a handsaw. That's a reasonable comparison to finding yourself responsible for cooking a Sunday roast when you've never handled raw meat, let alone tended a wood-burning oven.

Many of these women newly bereft of domestic aid were educated and read widely. Through lectures and articles in women's magazines they found a champion in Catharine Beecher and her sister, Harriet Beecher Stowe, who wrote "Uncle Tom's Cabin"; the sisters came from a family of social reformers led by their father, New England Congregationalist minister Lyman Beecher. Motivated by a mission to educate women and improve the conditions in America's homes, the sisters leveraged the higher value placed on men's work in the fields of business, government and education to elevate the standing of work done by women in the home. How? Simply by pointing out that domestic labor, so easily taken for granted when it was done by cheap hired help, formed the foundation of all work recognized as valuable, not just to the family, but to local commerce, the state and even the nation.

In the preface to their 1869 book "The American Woman's Home," the Beecher sisters traced the problems faced by middle-class women to the lack of appreciation for "the honor and duties of the family state."² They had an insightful fix. Instead of assuming that women should be born knowing how to clean and boil a calf's head, prepare quince jelly or bake bread from scratch and berating them when they proved unable to do these jobs proficiently, they



Bench basics. The benches I grew up with were simple affairs like this one from Robert Wearing's book "The Solution at Hand."



From the past. A simple and solid bench, built to the plan in André-Jacob Roubo's 18th-century "l'Art du menuisier."

would share the latest advice about diet and household management based on research done by experts in Europe and the United States. They fleshed out these principles with methodical instruction for all household tasks, right down to the construction of a hydrostatic couch for the sick, a vessel with a disturbingly similar appearance to that of a coffin.³

This wasn't so different from the way Christopher Schwarz spearheaded the elevation of the workbench – in the 1970s and '80s, typically a sturdy table of simple design, fitted with a vise – into a focal point of study, expertise and craft based on research into centuries-old methods that have since garnered international interest.

The bottom line, as the Beecher sisters appreci-

ated, is that any occupation important enough to warrant formal training will be respected; the fact that people must be trained to do it validates its importance.

As the sisters and an ever-larger squadron of kitchen scientists wrote and lectured their way around the country, the building and appliance industries coalesced as major economic forces based on an understanding that the kitchen was a potentially lucrative source of business.⁴

Fast-forward to the 1960s, when the kitchen began to open up to family and friends. Tiny pass-throughs between kitchens and dining rooms morphed into open peninsulas with breakfast bars.

Gradually it became less uncommon for men to participate in everyday family cooking. I witnessed this shift personally. Around 1965 my mother, who did all the cooking in our house when we were little, was hospitalized for a few days with pneumonia. Our father, who worked in public relations, was left taking care of us at the end of the day. He probably took us out for hamburgers at least one night, but the only dinner I actually recall was the one he prepared at home: tuna salad.

There was just one problem with Dad cooking dinner, even allowing for the fact that tuna salad is more a matter of mixing than “cooking.” Like those 19th-century housewives who were clueless about cooking calves’ heads or shopping for sirloin, Dad did not know how to make a meal. He managed to find the can opener and a mixing bowl and spoon. He knew that tuna salad was made with mayonnaise; salt and pepper were also good guesses. But after mixing those basics together he said he really didn’t know how to make the dish, so he was going to add a little of every seasoning in the kitchen. In went a spoonful of curry powder, along with some ketchup and mustard. Soy sauce couldn’t hurt; nor could Worcestershire. Tabasco would add some zing, and he followed those with a dash of every herb and spice in the rack. It was the best tuna salad I’d ever tasted.

But by the late ’70s, our father had become an accomplished cook. After being introduced to a less gendered division of household tasks by the hippies who came to live with us circa 1968, he’d start-

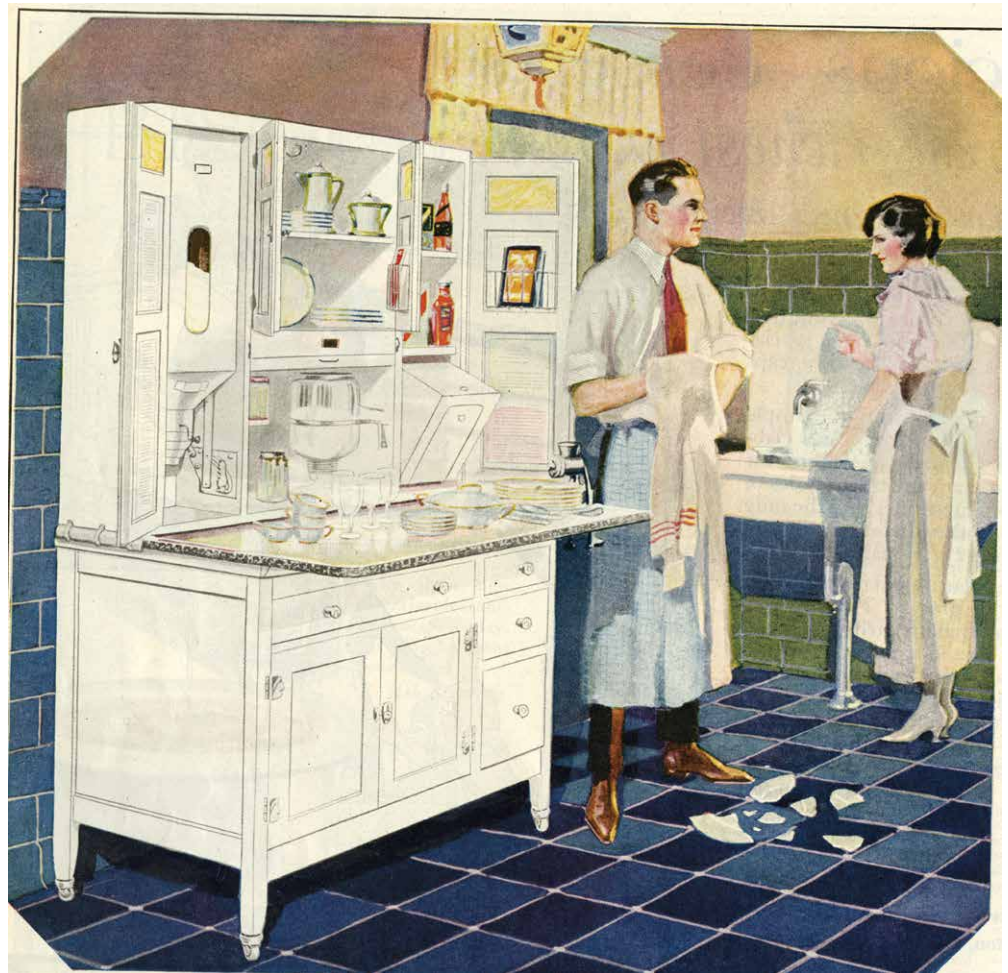
ed to bake bread and make churned ice cream from scratch. When our parents split up and our mother took my sister and me to live in England, he bought a series of international cookbooks published by Time-Life. I remember on visits home during summer breaks his pulling gorgeous loaves of yeasty bread from the oven, parchment collars supporting their lofty sides. Our mother had bought an ancient butcher’s block for \$10 a year or two earlier. It was 2’ thick, made of hard maple blocks set vertically, their edges locked together with dovetails. She’d spent weeks sanding out the deep scores and gouges in its 3’-square end-grain top. It was the centerpiece of the kitchen, where Dad chopped piles of vegetables to steam with fresh herbs and serve on brown rice. Cleaning up the kitchen after dinner – washing dishes by hand, taking kitchen scraps out to the compost pile and thoroughly sweeping the floor to control the population of cockroaches that would otherwise invade any south Florida home once the “exterminator” had been cancelled – had become one of his satisfying, self-imposed rituals.

The 1990s saw a new development: the kitchen as a sociable space completely open to the public areas of the house. Most influential in this shift was kitchen designer Johnny Grey, nephew of British cookery author Elizabeth David. Trained as an architect, Grey was brought up visiting his aunt’s kitchen and began writing about a phenomenon that many had experienced but not bothered to analyze: When guests come over, everyone wants to be in the kitchen. Grey’s 1994 book, “The Art of Kitchen Design” (Cassell), provided a history of kitchens that restored the kitchen’s centuries-long role as center of the home and relegated the shrouded kitchen of the 19th and 20th centuries to an anomalous historical blip.

Most furniture makers who build cabinets do so for the same reason as our predecessors built cofins in addition to tables and chairs: They offer a source of income that helps even out the road between freestanding furniture commissions. It’s easy to look down on built-ins when your livelihood doesn’t depend on woodworking, or when you are retired, your woodworking venture is subsidized

Kitchen bliss. Advertisement for Sellers cabinets in *Ladies' Home Journal*, June 1921. The accompanying text reads, "Have you pictured it in your mind, June Bride – that first tasty dinner in the new home? ... How anxiously you will prepare the good things– on your snow-white Sellers Mastercraft – the housekeeper's unfailing friend.... And then, after it is over, hubby will follow you to the kitchen to help you with the dishes. What matter a few smashed pieces?"

COURTESY OF MANUSCRIPTS SECTION,
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by a spouse's income or you've tapped into a vein of market popularity. Not everyone is so fortunate.

How did the lowly kitchen cabinet become a friend to many who trained as furniture makers, imagining we'd spend our days hand cutting dovetails and French polishing meticulously inlaid cutlery canteens? The answer has as much to do with publishing, advertising and banking as with wood and tools. Ultimately it boils down to the commodification of the home.

Home ownership today is light years away from that of 200, 100 or even 70 years ago, when the people who owned what's now my acre of semi-rural land cut down some trees, dug up some rocks and built themselves a simple board-and-batten-sided cabin worthy of Snuffy Smith. Today a massive industry surrounds home ownership, from Realtors (that term is trademarked and officially requires

an upper-case "R") and appraisers to title companies, banks and building inspectors. There has been a radical shift over the past century in how many of us think of our homes: A home no longer simply represents shelter and a central base for family. It's the largest financial investment most of us will ever make – one that, with luck, may increase our wealth at a rate far greater than that of inflation.

As with any investment, we're urged to put ourselves in the hands of expert advisers. And there's an army of them out there. Take the wildly popular hosts of home improvement shows on HGTV – that cast of smiling, perfectly groomed characters eager to instruct you in the magical art of transforming a hovel into an "urban oasis" or liberating yourself from the corporate rat race by hitching a ride on the house-flipping bandwagon. Take the legions of salespeople at home stores, who will gladly guide

you through one cabinet display after another until you're dizzy from over-exposure to CNC-routed fretwork, dedicated mixer cabinets with lift-up stands and decorative wine racks. Take the web-based magazines with their daily examples of designer ideas to "steal" and big-name-brand "hacks" or that modern means to keep yourself forever in debt, the home equity loan, advertisements for which have long encouraged us to treat our houses as ATMs.

To be a contemporary homeowner is to feel an almost moral obligation to spend money on your house. Never mind how your friends may judge your taste on seeing you still have that Laura Ashley Dandelion wallpaper from 1983; there's a sense that if you're not religiously "updating," you may be losing financial ground.

One result of this mindset is that customers are generally more willing to shell out big bucks on something they believe will increase the value of their house than on a piece of freestanding furniture. In some locales, built-in cabinets even fall into a different category in the world of sales tax: "improvements to real estate." People rationalize them as an investment. That artisan-made sideboard? Arguably a frivolous buy in comparison.

Of course, you can only get the value of a kitchen remodel out of a house so many times. Property values in most regions don't increase at anything like the rate that would be necessary to cover the tens of thousands spent on kitchens. And then there's the troublesome fact that new cabinets installed as part of a kitchen update undertaken to help sell a house are routinely ripped out by new homeowners, only to be replaced by something more in line with their own taste. Never mind the so-called green design professional who encourages you to tear out your laminate counters and replace them with a "sustainable" composite incorporating recycled glass (or whatever the "green" product du jour may be). The preoccupation with updating results in a mind-boggling amount of waste. These are real-world caveats that some of us point out to prospective clients as we urge them to think about what they really want and need, as distinct from what other experts (and friends, and relatives) are telling them they should want.

That said, who doesn't occasionally long for a change of scene, a shift in tone? There are ways to rework your kitchen without spending a fortune or adding significantly to your local landfill. The first requirement is simply to think. In this process, context, broadly understood, is your friend – where you are in life, what resources you have access to in terms of money, interesting materials, or time, the architectural style of your home and so forth. For the past two decades I have made my living largely by working with clients turning limitations into creative opportunities. This book offers a variety of examples, in addition to guidance in designing and furnishing the kitchen.

I embarked on my woodworking career at the age of 21, expecting to support myself by designing and building custom furniture. I'd completed the first year of a City and Guilds of London Certificate in Furniture Craft and was looking for a workshop with living accommodations that would be affordable to someone who wasn't yet making minimum wage. In the course of this search I ended up working for Roy Griffiths, an artist who had started a design-build kitchen cabinet company called Crosskeys Joinery in Wisbech, Cambridgeshire. Roy quickly disabused me of the romantic notions I'd had about making a living by traditional handcraft. In Roy's shop, good design, efficient fabrication and a high-quality final product reigned supreme. Although we made our cabinets with wooden face frames, drawers and doors, and hung the doors on solid-drawn brass butt hinges, we built our carcasses from melamine-coated sheet goods, the parts joined together with shop-made plywood splines. Toe kicks were recessed. Doors and drawers were inset, with drawers running on mechanical slides. Working for Roy was a valuable education in the realities of running a business. When the cabinets for a particular kitchen were finished, fitters delivered them to the jobsite. I never saw my work again.

Roy's business placed little emphasis on the satisfactions of craft for his employees, though he made up for this in various ways – by encouraging a respectful and friendly atmosphere, expressing his appreciation and paying everyone on time.

In my next woodworking job, these values were shuffled around somewhat. This time I was working for a country workshop run by a pair of business partners. They made kitchen cabinets, but custom furniture commissions made up a hefty percentage of their business. They were no less focused on the bottom line – a necessity in any business – but their operation was smaller than Roy’s, and traditional methods of joinery and finishing were central to their brand.

In this shop we built kitchen casework out of panels made by gluing together tongue-and-groove pine made for subflooring, an attractive material that allowed the owners of the business to describe the cabinets honestly as being made from solid wood. We built our drawers with hand-cut dovetails at the front and fitted them on wooden runners with kickers supported by back rails let into the cabinet sides. Here, as at Roy’s business, toe kicks for kitchen cabinets were recessed. Doors and drawers were inset, with doors hung on butt hinges. This experience provided me with further lessons in running a professional shop.

My third experience of working in someone else’s shop was at a company in Vermont that built striking contemporary furniture, primarily for offices on the East Coast. I don’t remember any kitchen cabinetry being built while I worked there, but the casework – bookcases, desks, credenzas – was built using methods that were readily transferable to kitchens. We built case goods out of MDF panels covered with gorgeous architectural veneers and edges finished with heat-sensitive veneer banding. We joined the parts with biscuits (my first experience of biscuit joinery) and wood screws. When I started working there, we used biscuits for drawer joinery, though the foreman added router-cut dovetails to the repertoire soon after. We hung the drawers on Accuride full-extension ball-bearing slides and used European hinges for doors (my first experience of those, as well). All of our doors and drawers were full overlay, with precise architect-specified margins between them.

I mention these three shops by way of illustrating the variety of materials and methods appropriate to building cabinets. These are just three examples in

a field that supports and also benefits from the development of ever-changing equipment and joinery systems, adhesives and composite materials. There is no “right” way in this work; what’s best for you (and if you’re a professional, your clients) may strike your neighbor as laughably inefficient. My current method for building basic kitchen cabinetry, which draws on lessons learned from all of the shops where I’ve worked and goes several steps further in terms of materials and techniques, is outlined in Chapter 3. It combines materials and techniques from the world of traditional furniture making with some conventional (and some less conventional) methods from the universe of kitchen cabinet shops and allows for enormous variations in style, in addition to being adaptable to built-ins for other rooms such as offices, living rooms and baths.

And to those who consider “cabinets” an inferior species of work, I say enjoy building your Shaker side tables, Federal hunt boards or sculpted credenzas. I’ve learned to relish the diversity of styles and construction methods I’m fortunate to work with as someone who mixes kitchens with freestanding furniture commissions. It’s an honor to work with people who trust that I will listen to their ideas and create a room where they will spend time preparing meals every day.

A Trio of Influences on my Thinking About Kitchens

1978, Newington Green, London

My boyfriend and I moved to a post-war working-class housing project where the flats had been condemned, at least temporarily, as unfit for habitation. Thanks to a housing co-op, we were allowed to rent one of the flats for several pounds a week, the only place we could afford. The flat would have been considered wretched by middle-class standards, but we were thrilled to have somewhere to live.

The kitchen intrigued me. It was a small room, I’d say no more than 6' wide (including the space occupied by cabinets) by 10' long, with a few built-in cabinets – extremely simple affairs made of plywood with plywood doors and drawer faces. There

was a small stove – tiny by American standards – and a sink with a drainboard. Most fascinating of all, the room was designed to be used without a fridge. A cupboard on the exterior wall was fitted with shelves and had a screened opening directly to the walkway outdoors – a larder! For most of the year, at least in those days, the temperature outside stayed within a relatively small range; in winter it didn't go much below freezing, and in summer it rarely got above the low 80s. A masonry building with concrete floors and walls stayed cool enough to store fresh vegetables, eggs and cheese for two or three days. Storing milk was not a problem; milkmen still routinely delivered bottles to the doorstep. We didn't worry about keeping beer cold; no one seemed to have beer at home – that was what pubs were for. Nor did we worry about keeping ice cream on hand; we bought our Wall's Cornetto at the corner shop and ate it while sitting on a park bench enjoying a rare bit of sun.

1996, Bloomington, Ind.

I stopped by a jobsite in town to visit a carpenter friend. He was part of a crew working on the restoration of a miniaturized Second Empire-style mansion built by a tinsmith in the late 19th century. The job included excavating part of a crawl space to make it deep enough for modern mechanicals, but the opening and existing headroom were too tight to accommodate any large power equipment. As a result, my friend and his fellow carpenters were digging the subsoil out by hand and removing it by the bucketful passed from one man to the next.

I was stunned. It was the last decade of the 20th century and we were in an economically thriving city in the United States. Did people really still work in such seemingly medieval ways?

As I thought about the bucket crew over the next

few days, it occurred to me that efficiency is relative. Perhaps a different contractor would have enlarged the opening and excavated the nearby ground to create an opening large enough for heavy equipment. But that would have increased the disruption of the site and might have required adding a support beam to the wall above the crawlspace opening, in addition to more work to put the side yard back together. Compounding the potential complexity, the work was taking place on a narrow lot with very limited space between the clients' house and the neighbor's.

After working in cabinet shops where the emphasis was as much on efficiency as on high standards, it hit me that in some circumstances, doing things step-by-step the old-fashioned way might in fact be most efficient.

1996, Greene County, Ind.

I drove out to the countryside on a hot summer day to see another house where my carpenter friend was part of a crew working on the restoration of a Civil War-era I-house. As he took me into the kitchen, which was nearly complete, I was transfixed by the sight of a tall, narrow, painted cabinet. It had a single door – a simple frame and flat panel – and was hung on brass butt hinges inset in a face frame.

The cabinet shouldn't have struck me as special. I'd spent several years making similar doors in English shops, then later in the shop I'd shared with my former husband when we ran our own business. But I recognized that we were relatively quixotic in a local market dominated by slab-built furniture and kitchens with raised-panel doors; my eyes were scarred by the tyranny of red-oak-everything I saw in new construction. This cabinet was a revelation: There really could be alternatives to the prevailing "professional standards" of design and construction.

Techniques

Three Ways to Mount Drawers

1. Wooden Slides

Traditionally, drawers have slid on wooden runners: strips of wood tenoned into horizontal rails at the face of a cabinet. In casework where a drawer will not be guided by the cabinet's sides – for example, when the cabinet has a face frame that protrudes into the drawer opening – the runners are fitted with guides to keep the drawers from sliding left or right and binding as they're closed.

Wooden runners have several qualities to recommend them:

- They work wonderfully when drawers are well-fitted. When it comes to fine furniture, they're the gold standard, not least because it takes finesse to make a drawer fit snugly while not so tightly that it's a challenge to open and close.
- Their only cost is your labor.
- The drawer front is the finished face.
- They let your drawer sides and joinery shine without intrusion by metal hardware.

At the same time, wooden drawer slides are less than ideal in some respects:

- They don't allow for full extension. Once you pull the drawer out to a certain point, it will sag and can fall out of its opening.
- A well-fitted drawer can stick in humid weather where humidity fluctuates significantly.

For decades, cabinetmakers have had access to mechanical slides, the features of which have improved steadily. Today there's a variety of options offered by manufacturers such as Blum, Accuride, Salice, Knappe & Vogt and more. I cover just a couple here.

Mechanical slides have a few advantages over traditional wooden runners, even if they lack the cachet that comes with a piston-fit drawer. They're quiet, smooth-running and allow you to pull a drawer out fully without danger of it tipping its contents all over the floor, or worse, falling out and being damaged.



Age-old elegance. A traditional dovetailed drawer that slides on wooden runners in a table made by Kent Perelman. The guides at each side are precisely in line with the opening and perpendicular to the table's face. The runner itself is just wide enough to accommodate the thickness of the drawer side. The table is fitted with traditional wooden drawer stops that go immediately behind the face. The runners and side guides have been waxed to promote smooth movement.

An earlier generation of full-extension hardware.
A drawer in a simple set of kitchen cabinets fitted with Accuride side-mounted ball bearing slides. This kitchen uses Accuride model 3832. One part of the slide is screwed to the interior of the cabinet; the other, visible here, to the drawer. The slides telescope to allow for full extension, which makes a drawer's contents completely accessible.



2. Side-mounted Ball Bearing Slides

Side-mount ball bearing slides, such as those made by Accuride, are affordable, dependable and hardwearing. They come with a huge variety of optional features, among them a detent (helpful in cases where you want to use whatever is on the pull-out surface, such as a keyboard, without the drawer or tray closing when you touch it); extra-heavy load capacity; specialty slides for file drawers, lateral files, and so forth. Other advantages include:

- They're extremely easy to install in casework. You can put them almost anywhere you want, mounting the support to the cabinet side or using mounting plates to attach the hardware to the cabinet's front and back.
- They only impose one constraint on the dimensions of your drawer – the width of the drawer must be at or just a hair under the precise width between the slides once they've been installed. Beyond this, you can use these slides on drawers that are deeper (from front to back) or shallower than the slides, depending on your application.
- It doesn't matter how your drawer bottom fits into the drawer, i.e. whether it's flush at the bottom surface, fitted in slips, or slid into grooves in the drawer front and sides.
- While this flexibility may not sound so impressive in principle, it can be a life-saver in rare circumstances where you need the combination of affordable price, full extension and flexibility in drawer construction that such hardware allows.

These slides allow the drawer to be removed simply by disengaging a lever. To replace the drawer, slide it carefully into position – if you don't align the parts perfectly, you can damage the slides – then push until you hear a “click.” Now pull the drawer out and close it fully to check the fit.

Before you install set screws, the slides are adjustable up and down in addition to forward and backward, thanks to slots on both parts – the part that goes on the drawer and the part that goes in the cabinet. Some models also have screwdriver-adjustable cams.

As for drawbacks, side-mounted ball bearing slides are not completely silent; there's a metal-on-metal sound when the arms of the slides are closing or opening, but it's minor. These slides also take up some width. This space varies somewhat, depending on the model; most require 1/2" on each side. As a result, in most applications, you need to cover the front of the drawer with an applied face. This face can be inset, as shown here, half overlay or full overlay.

When choosing these or other mechanical slides, read the specs and installation instructions to make sure the slides are compatible with your design.

My least favorite feature of these slides is their visibility. Although they come in different finishes (many lines are available in white, black and stainless, in addition to zinc), they do detract from the pristine beauty of a nicely finished drawer side – at least, when the drawer is open. When the drawer is closed, the slides are invisible.



The bee's knees – with exceptions. *A drawer on Blum Tandem undermount slides, which are invisible other than a little lever just behind the drawer face (not visible in this photo). While Blum Tandem drawer slides work well in many applications, there are times when ball-bearing (or other) slides are the best choice for the job.*

3. Self-closing Undermount Slides

Since about the turn of the millennium, cabinetmakers have had access to a type of slide that combines full extension and smooth, silent operation with almost complete invisibility. The Blum Tandem is the most widely known version, but as soon as other manufacturers saw how popular the new design was with cabinet manufacturers and their customers, they began devising their own variations on the theme.

Not only are these slides silent, smooth-running, full extension and invisible, when fitted with the right locking devices (available from the same suppliers as the slides themselves), they offer a new dimension in adjustability over previous kinds of drawer slide hardware. You can move the drawer face up or down, forward or backward, tilt it to make it flush with the face frame and move it from side to side – a boon when you're dealing with inset drawer faces in particular. These features come with some strict requirements:

- There are precise dimensional requirements: Drawers must be just the right width and depth (front to back)

to fit specific slides. These and other specifications are laid out in a handy instruction guide published by hardware manufacturers.

- There needs to be a 1/2" recess beneath the drawer bottom so that the sides and front will conceal the runners.

- You need to drill a couple of holes at the back of the drawer for the tilt mechanism.

- Because the position of the slide hardware is fixed in relation to the drawer sides (it has to go below the drawer bottom), you need to be more precise in positioning the hardware inside the cabinet than you do with side-mounted ball bearing hardware. You must also leave more clearance in height than with side-mounted hardware, which can eat up space, depending on other elements of a cabinet's design.

As with the side-mounted slides, there will be a bit of space on either side of the drawer with undermount hardware. This space works out to about 5/16" on each side. An applied drawer face hides the gaps.



Hidden ingenuity. Here's a 12" Blum Tandem undermount slide in the closed position. The slide incorporates a frame for attachment to your cabinet; built into this frame is a full-extension runner with parts that allow for tilting the drawer to fine-tune the fit. The smaller piece is a locking device. (This is an older example. New locking devices are wider and allow for horizontal adjustment.) The locking device is screwed to the underside of the drawer, then clicks into place on the slide when the drawer is inserted.



Further exposed. Here the slide is partially extended to show some of the mechanical parts. Blum Tandem slides incorporate a soft-close feature; when you give the opened drawer a push, it closes most of the way, then at about 1-1/2" from full closure this mechanism comes into play, pulling the drawer home. The soft-close feature has two advantages: First, it closes the drawer for you. Second, it keeps the spring from snapping the drawer back forcefully, which would pose a risk to children's fingers.

A Quick Guide to Sizing Drawer Parts When Using Blum Tandem Slides

1. Choose your slide model and length

Note: The following instructions are for Blum Tandem 563 slides. The drawer width requirements are slightly different from those for model 569.

The slides come in 3" increments, starting at 9" and running up to 30", but the most commonly used length is 21", because it's the size that works with standard 24"-deep base cabinets. Why not use a 24"-long slide? A standard 24"-deep cabinet won't accommodate it. The slide lengths are nominal, not actual; they refer to the depth of the drawer you'll build, not the length of the slide. The slides themselves are a little longer than their nominal size, to accommodate the adjustment features.

2. Decide the thickness of your drawer box parts

The thickness of your drawer parts will affect the length of the drawer's front and back, so it's a good idea to decide this element early on. My preferred thickness for most applications is 1/2", because it looks finer than, say 5/8" or 3/4". That said, if you're starting with 4/4 stock and are just going to be turning the unneeded thickness into chips, you may prefer to keep your parts thicker to save material and time. For this exercise, I'll use 1/2" as the thickness.

3. Determine the other dimensions of your parts

If you're using Blum Tandem slides, you'll need to apply a face to the drawer front to conceal the spaces around the drawer box. The face can be inset, half- or full-overlay. Here, I stick to the drawer box, separate from the face.

You need to consider three primary dimensions in determining the size of your drawer: width, depth (front to back; in this case, the depth of the drawer corresponds to the length of the slide) and height.

A. Drawer depth from front to back (i.e., length of sides)

For this exercise, we're going with a standard 21" (nominal) drawer slide. Because I'm going to build the drawer with through dovetails, my sides will be the full (nominal) length of the drawer slide: 21".

The same would apply were I putting the drawer together with biscuits; the sides would need to come all the way to the front of the drawer box, with the front and back fitting between, for maximum strength (i.e., to resist coming apart when pulled forward).

If you plan to use half-blind dovetails such as those produced by many router jigs, you will need to subtract the amount of wood left at the front and back from the overall length of the slide to determine your drawer sides' length.



Translating instructions to real life. *This large drawer for storage containers has relatively high sides to keep the containers and their lids from spilling over the edges. The width between the face frame stiles is what the slide instructions call the “opening width.” Because of the way Blum Tandem slides are engineered, there will be a little gap between the outside of the drawer (at left and right) and the edges of the face frame.*

B. Height

Because the runners are designed to sit between the drawer sides and are $\frac{1}{2}$ " high, the height of your drawer will need to factor in this $\frac{1}{2}$ " below the drawer bottom plus the thickness of the bottom, plus however much vertical clearance you need for the contents you plan to store in the drawer. Let's say you're building a drawer for a food processor, a blender and a few other small kitchen appliances. The first question: Can you take the appliance apart to reduce the height you'll require?

Now add your net height requirement plus the drawer bottom thickness plus the $\frac{1}{2}$ " required by the slides to get the net vertical dimension. *Note that the drawer sides don't have to come up to the top of the contents. For many applications, it's more convenient to have lower drawer sides, as they make moving bulky objects in and out of a drawer easier. For appliance drawers, I often make the sides, front, and back just high enough to keep the contents from sliding out – in this case, 4". But the net vertical dimension is still determined by the height required by the contents.

You'll need at least $\frac{9}{16}$ " below the drawer sides and $\frac{1}{4}$ " above them, i.e. a total of $\frac{13}{16}$ " in additional height, to determine your minimum vertical opening.



Seen from below. *This drawer is made with dovetails and has an applied face.*

Let's say I'm going to use a $\frac{1}{2}$ "-thick bottom for this drawer because these appliances and the others I'm going to store in it are relatively heavy. This means I need: 10" plus $\frac{1}{2}$ " (drawer bottom thickness) plus $\frac{1}{2}$ " (slide requirement) equals my net vertical dimension, i.e. 11".

Now I'll add the $\frac{13}{16}$ " of space for clearance below and above to yield the minimum vertical opening: 11- $\frac{13}{16}$ ".

If I'm putting this drawer at the bottom of a three-drawer stack in a cabinet with a traditional face frame and drawer rails, this means the distance between the bottom cabinet rail (i.e., the top edge of the bottom face frame member) and the first drawer rail (i.e., the lower edge of the bottom-most drawer rail) must be at least 11- $\frac{13}{16}$ ". Of course, I can make this distance larger if I have space and aesthetics demand it, but I cannot make it smaller.

You need to go through the calculations above to lay out the vertical components of your cabinet (unless you just want to space your drawers based on how the faces will look, rather than trying to plan for particular objects that need to be stored). Once you've done that, if you decide it would be most convenient for your drawer box to be just 4" high (even though the space

it will fit into will be at least 11-13/16" high), go for it. That's the dimension I'm going to use here.

So now we know that our sides will be 4" x 21".

C. Width

The width of your drawer box's front and back will be determined by (a) the type of joinery you plan to use, (b) the thickness of your drawer parts and (c) the width of the opening.

For example, if you're making your drawer with biscuits, the front and back will fit between the sides. If you're making your drawer with dovetails, the front and back will run the full width of the drawer.

The width of the opening is the width between the cabinet sides, or, if you're using a face frame, between the face frame stiles. *Note: If your face frame stiles protrude into the carcass, you will either need to shim out the sides by the amount of that protrusion so that the drawer slides will sit flush with the inside edge of the face frame or use a rear mounting bracket.

What matters ultimately in determining the width of your drawer box is, to quote the Blum installation instructions: "Inside drawer width must equal opening width minus 42mm (1-21/32") for TANDEM to align and function optimally."

If you're using biscuit joinery, this makes it easy to figure how long the front and back need to be, because the length of the front and back is precisely equal to the "inside drawer width." Say your drawer opening (the opening between the face frame stiles) is 15". Your "inside drawer width" will be:

Drawer opening of 15: minus 1-21/32" equals 13-11/32".

If you're using dovetails, the calculation takes an additional step:

Drawer opening of 15" minus 1-21/32" equals the inside drawer width of 13-11/32", as above. Now you need to add the length for the pins, which will be the same as your drawer sides' thickness. So if the sides are 1/2" thick, the whole calculation will be:

Drawer opening of 15" minus 1-21/32" plus (2 x 1/2") equals 14-11/32". Because 21/32" is just a hair over 5/8", and because, as I mentioned above, I'm using



Alternative attachment. *Rear mounting brackets allow for installation in cabinets with face frame stiles that protrude into the carcass. In this case, the drawer slide is screwed to the cabinet at the front, then slotted into the rear mounting bracket which is screwed to the back of the cabinet.*

drawer sides that are 1/2" thick, I can take a shortcut and simply subtract 5/8" from the opening width in calculating how long my drawer box front and back should be.

Here's my finished cutting list, based on 1/2"-thick stock for a drawer box 4" high made with through dovetails:

Sides: 2 @ 1/2" x 4" x 21"

Front and back: 2 @ 1/2" x 4" x 14-3/8".

I will cut my parts to length and do the joinery with the back at the same width as the front, then rip it to fit over the drawer bottom after I've cut the grooves in the front and sides.

The Blum Media Center at blum.com has installation guides for all hardware. Look for "runners" then go to the Blum Tandem sections (<https://www.blum.com/us/en/02/90/>). Always make sure that you're following the instructions for the specific model you are using.

Techniques

Two Jigs to Install Blum Tandem Drawer Slides

As with most innovative hardware, there's a range of accessories you can buy to ease installation. When I first started using Blum Tandem slides, I bought both of the jigs available at the time: one for drilling the hole at the back of the drawer, the other for the front corners, where the locking devices fit. Before long the locking device design had gone through not one, but two phases of improvement; as a result, one of the jig's holes has become obsolete. I no longer use it.

Each passing year seems to bring new jigs for installing this hardware to market. I've come up with my own system, which works well and allows for some variations in slide installation depending on whether the drawer faces are inset, half overlay or full overlay.

The first is a quick depth-setting jig for the slides. For full overlay drawers, the slides should be mounted 4mm, or just over 1/8", behind the front of the face frame.

For cabinets with drawer faces fully inset, make your jig the thickness of the drawer face (typically 3/4") plus the recommended 4mm, i.e. approximately 7/8". For faces that are "half-overlay" (i.e., faces that are rabbeted around the edge so that only 3/8" of the thick-



Get to work. Here's the depth-setting jig in action: Simply hold it against the face frame at the side of the cabinet so that the slide is inset by the desired amount (in this illustration, where the drawer faces were full overlay, the slides were inset 4mm).

Shop-made jig. My high-tech depth-setting jig: a piece of scrap the thickness of whatever inset I need, plus the 4mm the hardware manufacturer recommends.



ness is proud of the face frame, with the remaining face thickness inset), your jig will be 3/8" plus 4mm, or approximately 1/2".

The kitchen in these images (opposite) has half-overlay drawer and doors, so I made a depth-setting jig 13mm thick, or just over 1/2".

Before screwing the drawer slides in place, I make up another quick jig to support the drawer slide and hold it square to the face while I screw it in place. This works like a charm provided that your cabinet floor is square to the face. "Jig" may be a little fancy for this bit of apparatus; it's really just a piece of scrap wood or

plywood cut to length so that when the bottom of the piece is standing on the cabinet floor, its top comes just above the drawer rail. It will work equally well if your cabinet doesn't have drawer rails; just cut your support piece long enough so that when your slide sits on top of it, it's where it needs to be.

Step One

Start with the top slides in each cabinet. These will use the longest piece of plywood scrap. It's best to use the widest piece you have available, for maximum consistency in the height from front to back. If you don't have a piece at least 8" wide, use two – one toward the front, one toward the back. In the picture at top, the slide is resting on the scrap and set to the necessary depth (behind the face frame) using a jig like the one at left, but made with a setback of 13mm. (I'm not showing the setback jig, because it would obscure the front of the slide.) When I'm installing these, I rest the drawer slide on the support "jig" (i.e., plywood scrap) and push it to depth using my depth-setting jig. You can hold both the depth-setting jig and the front end of the slide to keep it from falling with one hand; the other hand holds the drill, then screws the slide in place.

At this stage it's best to attach each slide through the elongated screw holes – one toward the front, one toward the back – to give yourself a bit of depth adjustment. Once you have the drawers in place you can finish up with set screws.

Step Two

After you've installed the top slide on each side of the cabinet, you can either re-use the scrap slide supports in any other cabinets with drawers at the same height, or cut them down for the next drawer, as shown in the next picture. The slides should be just above the face frame rail, if there is one. The height isn't all that critical; just keep in mind that the front of the slide needs to be above the rail, not below it, in order for the hardware to work (duh!). Also, the higher you mount the slide in the cabinet, the less vertical space you'll have available for the contents of the drawer.

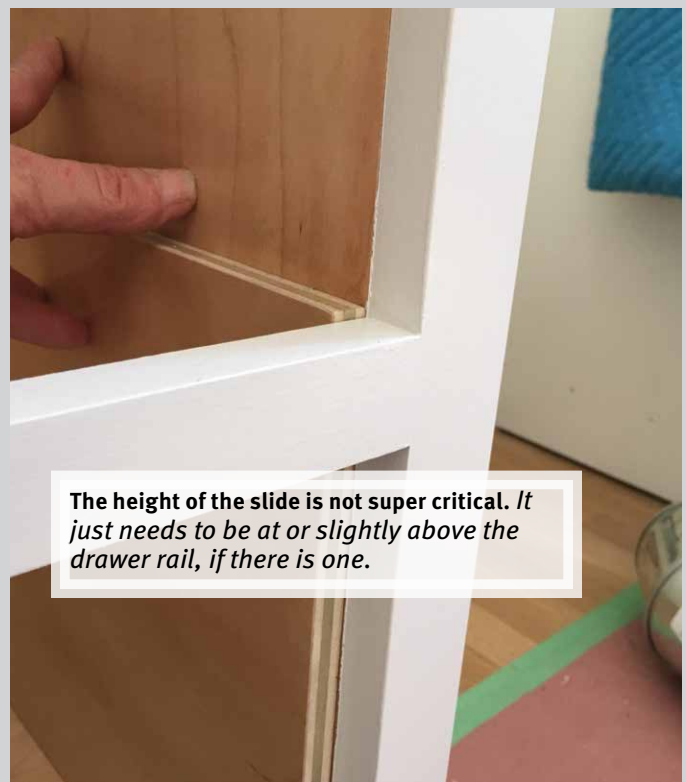
You can keep cutting your slide support scraps to whatever length you need as you get lower down in the cabinet. You won't need them for the bottom drawer in most cases, as the slides can just sit on the cabinet floor. In this case, just set the slide depth using the depth-setting jig, then insert the screws.



From the top. With this method the top slide goes in first. This way, you can reuse the plywood support for the drawers below; just cut it to the appropriate length as you go.



Move on down. Here the second slide is being screwed in place.



The height of the slide is not super critical. It just needs to be at or slightly above the drawer rail, if there is one.





Shelf paper. Knowing she wanted most of the upper cabinets to be open, Jenni searched for colorful shelf paper that would complement the kitchen's funky vibe.

Case Study 6.4

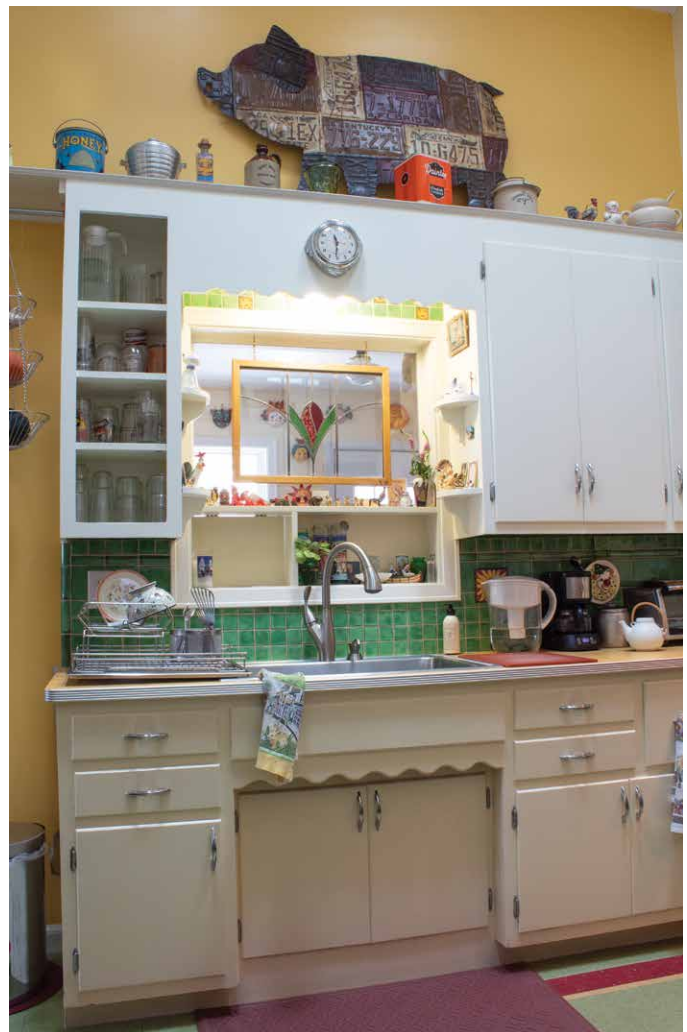
Add to Existing Cabinets

Jenni Wilkinson and her partner bought their 1953 bungalow in 2001. The kitchen was a dark, cramped room at the middle of the house. A wall hid the kitchen from the entryway and dining room, as was typical when the house was built. On the bright side, the kitchen still had its original built-in cabinets. “Of course you’ll want to get rid of those,” remarked their architect, who was also a friend, on seeing the room for the first time. Jenni laughed.





Split personality. To elevate the vibe of the entry area, which doubles as the hangout spot for guests while these homeowners work in the kitchen, I made a cabinet with two faces – a dark-stained curly cherry back with a black border and copper footrest on the guest side (above), and a pair of shelves plus a drawer on the host side for the kind of stuff you want close to hand when serving drinks (at left). I based the design on an old radio cabinet spotted at an antiques shop north of Indianapolis.



Grandma's kitchen. With a bit of TLC from Jenni, a new counter and new sink, the original cabinets function well. The window over the sink now looks through a laundry room to the trees outside.

Handy pans. Jenni came up with the design of this pan holder after seeing the hooks from Cooks Standard on the internet. The simple open box incorporates vertical storage for cutting boards, small trays and lids. Not visible here is the brass back Jenni fabricated for this narrow section of wall where a doorway had originally opened to a hallway; she used an old piece of sheet brass that had lined the edge of an architectural door – a bit of architectural salvage she'd been carting around since the early 1980s.

New cabinets patterned on old. I built the cabinets to the left of the stove to the same basic specs as the original ones, with door stiles and rails sized to the same widths, the same radius around their edges, and salvaged hinges and door pulls. Behind this retro façade, the carcasses are made from easily cleaned prefinished maple veneer-core ply and full-extension, self-closing drawer slides. The gaps below the upper and lower drawers result from the faux drawer rail between the bottom drawers and those above them; to gain the necessary vertical space for storing the large items my clients wanted to have in these locations, I had to make the rail part of the bottom drawer face.



As someone who had lived in old houses her entire adult life, with a grandfather who worked as a carpenter, she grew up with a love for reuse and restoration. The old cabinets were one of her favorite things about their new home.

Over the next several years they remodeled their home extensively, inside and out, finishing with the kitchen. They vaulted the ceiling to give the room a more spacious feeling and added two north-facing skylights, as well as an opening in the wall to the living room, which faces south. They removed the wall between the kitchen and the entryway to the

house, opening up the kitchen, because they love to entertain. Jenni restored the original cabinets on the sink wall and had a small section of base cabinets built to match to the left of the stove; they also added upper cabinets, some salvaged and others made to order.

One of the kitchen's most notable features is the floor, which Jenni and her partner laid themselves, basing the colors and border pattern on vintage examples. For an extra flourish they made a pinwheel medallion in the tiny hallway between the kitchen and rooms at the back of the house.



Artful flooring. Vinyl composition tile (VCT) need not be boring. With careful layout and a sharp utility knife, the homeowners turned these durable and affordable 12" tiles into a floor that's fun as well as practical.



Tricky business. Two drawer faces and an intermediate rail combine to make one drawer with extra vertical capacity for large pots.

Service Providers & Sources

- General contractor: Jenni Wilkinson
- Cabinetmaker: NR Hiller Design
- Tile: Handcrafted Tile Inc., Phoenix, Az. (hctile.net)
- Tile setter: Tom Stocker, Bloomington, Ind.
- Vinyl composition tile: Armstrong (armstrongflooring.com)
- Additional salvaged upper cabinets: Habitat ReStore (monroecountyhabitat.org)
- Retro metal counter edge stock: Eagle Aluminum (eagle-aluminum.com)
- Laminate counters: Laminated Tops (laminatedtops.com); Wilsonart, Maroochy Brush #4745-60 (wilsonart.com)
- Stove: Capital, Santa Fe Springs, Calif. (capital-cooking.com)
- Hood: Spagna Vetro from Euro-Kitchen Inc., Hayward, Calif. (euro-kitchen.com)



Movement. To accommodate the dramatic slope of the ceiling in some areas of the room, I widened the top section of the new crown moulding to allow for scribing. Although the fit was snug when we installed the cabinets in 2014, the crown has shrunk a little over the years, opening up a small gap. (These photos are from 2018.)

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Baker's cabinet. The small cabinet to the left of the fridge is a turn-of-the-century baker's cabinet based on one in a photo of Tasha's great-grandmother, Maud Hamar, in a cooking class around the same time as this original kitchen was built. A framed print of that photograph hangs on the wall at the right of the fridge, the perfect meta-accessory.

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Case Study 8.3

Former Servants' Quarters

Tasha Vorderstrasse and Brian Muhs, owners of this 1915 flat in Chicago, are scholars with a passionate interest in material culture. When they bought their home in 2014, they wanted to replace the kitchen's hodge-podge of modular particleboard cabinets and makeshift furniture with something more sensitive to the flat's history. They had spoken with other builders, most of whom urged them to demolish the wall between the kitchen and dining room, the very thought of which was anathema to them.





Interpreting original cabinet details. The cabinet at far right in this view is original to the kitchen. Although its face frame extends to the floor, my clients wanted the new cabinets to have recessed toe kicks. To relate the new design clearly to the old, I extended the face frame stiles to the floor and recessed the kicks between them.

The original upper cabinets' sides go all the way to the counter, but the clients decided against this detail for the new cabinets. We also reduced the width of the face frame stiles for the new cabinets to avoid wasting space. I made the new shelves adjustable and mounted the new drawers on full-extension slides instead of wooden runners; again, this decision was the product of careful discussion.

The latches and bin pulls are salvaged.

The narrow table to the left of the stove, so skinny that we called it "the giraffe," hides the radiator while providing additional workspace. It's topped with soapstone.

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Mahogany counters and an unconventional table. An antique scroll saw table paired with old stools makes a compact spot for breakfast or coffee. The counters are solid mahogany with a dark stain and oil-based polyurethane finish.

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The flat still had many of its original architectural features – leaded glass windows, wonderful hallway built-ins, a barrel-vaulted dining room ceiling and original bathrooms, to name a few. Most surprising was the intact arrangement of a suite at the back that had originally been the servant's quarters. A swinging doorway from the dining room led into the kitchen: turn hard left for a sweet little bathroom with a tiny clawfoot tub and corner sink, diagonally left for the servant's bedroom. Enter the kitchen proper and there's a pantry on the exterior wall – perfect for keeping foodstuffs cool, and fitted with a handy pass-through for ice deliveries. Even

the original hard maple floor in the main part of the kitchen was still in good condition.

Luckily, the pair of original cabinets flanking the doorway to the dining room was also still there. I incorporated many of their details into the new cabinets. This kitchen has a number of idiosyncratic elements, such as two different counter heights and discontinuous upper cabinets (the narrow spaces between which will admittedly be a bear to paint when the time comes). Each of these details resulted from protracted discussion, with the clients as the final arbiters, which is as it should be.



Unconventional hinge installation. The original cabinets have inset doors with 2-1/2" ball-tipped butt hinges, but unlike most installations in the United States, the hinges were mortised into the door stile alone and simply screwed to the edge of the face frame. I replicated this detail in the new cabinets.

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Service Providers & Sources

- Backsplash: Heritage Tile (heritagetile.com)
- Stove: Wedgewood, restored by Savon Appliances (savonappliance.com)

Stove repairs: Retro Stove and Gas Works (retrostoveandgasworks.com)

- Fridge restoration: Antique Appliances (antiqueappliances.com)
- Design and cabinetry: NR Hiller Design; Duncan Campbell, retired director of the graduate program in historical preservation at Ball State University, worked on wall repair, cabinet installation and painting
- Cabinet hinges: Rejuvenation (rejuvenation.com)
- Latches and bin pulls: salvaged
- Sink: salvaged