http://www.phantasmechanics.com/Imagine.html

Halloween : Just Imagine!

Note: This is a lengthy document, and you may wish to save it and print it for reading at your leisure.

It takes each and every one of us to make our ideas real. It seldom comes easy. Our process works because as individuals, we approach the idea differently, but together, we share a single vision.

-from *Disney Imagineering: A Behind the Dreams Look at Making the Magic Real*
(This book is recommended reading, and is currently available in a paperback version from your local Disney Store)

Introduction

We all have memories of past Halloweens that set off our desire to decorate. For most of us, the fascination began when we were children. Whether it was the joy of dressing up in costume, the quest for candy, the scary fun of our night-time rounds as trick-or-treaters, or that strange attraction to the very things we feared, for some reason we eventually wound up involved in the pursuit of making the scariest holiday into a hobby.

It might seem that the Christmas season offers the most promise for creative visual decoration, what with all the glittering items stocked by a myriad of vendors across the nation in seemingly endless variety. However, upon examination, the darkened theater provided to us by Halloween holds more dramatic possibilities for the dedicated decorator than any other holiday season. It offers mystery, suspense, and the kind of

cathartic release which can only come as the after-effect of a good scare. There is the subtle interplay of light and shadow; the gothic presence of a fantastic history which we have never witnessed, but are about to; the tension born of connections between what we cannot see and what we imagine might be hiding just beyond reach - all of this provokes a fascination in our intended audience, and in ourselves. *Halloween is drama, pure and simple.*

This document is presented in hopes of inspiring you to take your participation in the season to a new and more rewarding level. Perhaps you have never done anything more complicated than carving a pumpkin, or hanging up carefully chosen decor. Nonetheless, your imagination was at work, you had to wield a few simple tools, and you had to make decisions. This is the heart of imagineering.

Some might argue, "I am not an artist! I am no good at anything that requires creativity!" This is nonsense. You have imposed your own vision on an event. Arguably, you are already an artist, because one of the main functions an artist performs is that of the *selector.* The artist chooses what to represent, how to represent it, and then proceeds to act on those choices. Anyone who is sufficiently motivated can discover the meaning of art, which might be simply stated as the ability to observe, interpret, and finally to represent that interpretation visually. This is the crux of the magic in art, and one of the best ways to achieve creativity is to broaden your experience by learning to use as many tools of the trade as possible. *Creativity, after all, is really ability led by imagination.*

Later in this document, you will be exposed to a few simple tools and ideas, and provided with some exercises which are intended to help you learn to use them. You will be asked to try things you may have never attempted before. If you have experimented with electrical devices, or picked up a soldering iron to build one, don't be afraid to give these exercises a try. They are presented as confidence builders, intended to augment your experience, and add to your enjoyment of what can become a fascinating hobby.

We will begin with a brief overview of the process of imagineering, and then look at a practical approach for the creation of a modest home haunt based upon that process.

What Is Imagineering?

The process of making imaginative special effects come alive in the real world involves the application of theatrical concepts. When Walt Disney decided to bring his two-dimensional screen entertainment into three-dimensional space for an audience to explore, he enlisted his experts in the domain of film production to use their knowledge of staging, set design, lighting, music, and acting in the creation of amusement park attractions. From this venture, modern imagineering was born*.

Imagineers conceive of an attraction as a staged event, and evolve its concept and execution accordingly. They create a story into which the audience is drawn by means of total immersion in a carefully designed simulation. Instead of presenting a play on a defined stage that separates the audience from the action, the attraction surrounds the viewers, eliminating the divider between the audience and the drama. As a result, guests become members of the cast, and the story becomes *theirs.*

The imagineering approach begins with a premise, known as a *back story,* which explains the 'who-what-when-where-why' of the attraction in a few concise paragraphs, along with a few raw concept drawings. Next, a *script* is developed, based upon this outline sketch. In this context, a script is not merely the words and actions of players, but a verbal exposition of the entire process required to unfold the drama for the guests. With a completed preliminary script in hand, imagineers then proceed to the design stage. This includes plan drawing, model-making (allowing designers to test arrangements of props and sets with little difficulty), sound design (music and effects), lighting plots, a time track (determining the flow and pacing of the presentation) and detailed revisions to the script as the story evolves. When the design is finalized, full-sized props and settings are constructed. Detailing and set dressing bring the attraction to completion, and testing begins. When the entire show is working to the satisfaction of the imagineers, the attraction is opened to the public.

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* The roots of Walt Disney Imagineering (originally known as W.E.D. Enterprises) go way back to the turn of the century, and rest with what must be the very first simulator-type ride, built in 1901 at the Pan American Exposition in Buffalo, New York. It was the brainchild of a frustrated college student named Frederic W. Thompson, who "designed it one night while hunger kept him awake" (quote from *The Great American Amusement Parks* by Gary Kyriazi; out of print, but recommended reading). It was known as 'A Trip to the Moon,' and was a combination of motion platform ride and walk-through attraction, a Jules Verne-ish fantasy, and a tremendous success. This same young man, after forming an alliance with Elmer 'Skip' Dundee, went on to build the grandfather of the modern theme park, known as Luna Park, on Coney Island in 1902.

Imaginative Haunting in Practice

We refer to the Halloween imagineer as a *phantasmechanic.* Feel free to use the term if you wish. The work of the phantasmechanic includes the following steps, as suggested by the imagineering process described above:

- Imagine a theme, setting, or story-line to unify the project. Develop a 'script' that embodies the concept.

- Get a mental picture of how this might be presented in the space you have to work with. Make sketches or models of your ideas and decide on a visual style to unify them. Make decisions in advance regarding possible safety issues relating to your attraction space.

- Decide upon the actual props and actors you will include to carry out the theme of your attraction, and decide what role each will play in the finished production.

- With a combination of props, actors and setting decided upon, consider the role of lighting and sound, and movement. Begin development of any technical systems you will need to make these work for you.

- Construct and carry out tests of your systems. Make sure they are capable of safely and reliably doing what you want them to before you assemble the final versions to go into your setting. This is the time for the inevitable revisions, and perhaps even a few compromises.

- Build the attraction, and execute a dry-run or 'dress rehearsal', and correct any problems that develop.

- Open the attraction to the public.

It may at first be difficult to see how these steps might all apply to a simple front-yard haunt, but they will work for an attraction of any size. Let's examine each step of this simplified imagineering process individually, so that we may better understand what is involved:

Imagine a theme, setting, or story-line
to unify the project. Develop a 'script'
that embodies the concept.

When most people think of Halloween decorating, they envision a typical dwelling embellished with accents that make use of symbolic images to convey a sense of the season. Purchasing commercially available props is tempting, but a great deal of interest may be added to a decorated home by the process of developing a theme, and constructing original props and settings to support it.

To begin with, we encourage you NOT to rely on existing haunts as a blueprint. Don't copy, *originate.* This notion is going to make a few people uncomfortable, because it seems to ask for a great deal of forethought, and presents the specter of a real task. We

assure you, however, that great personal rewards can come from the completion of an entirely original project.

Here are a few examples: Perhaps your real interest is in the fall season, as much as Halloween itself. You may decide that your decor should embody the charm that attracted you to Halloween as a youngster. Maybe you have a fascination with gothic novels and their settings, or the moody environs of ghost stories which give small glimpses of things unseen. Or, if you favor a more bold approach, you might choose to present an assembly of plainly visible, startling characters based upon favorite stories or legends, capable of stopping traffic, or even generating controversy.

Like any other hobby, Halloween decorating builds inspiration upon inspiration. For the model railroader, the hobby may begin with a simple circular layout; and later, driven by a personal interest in small, old-fashioned towns, the hobbyist might integrate the initial hardware investment into a full, permanent layout. Not only will the railroad layout have grown, it will have also become embellished with items that were not initially in the hobbyist's mind at all: miniature models, landscapes, and an overarching theme. All of the new additions will have been selected due to criteria which 'came on board' as the participant's interest expanded. For the Halloween decorator, a display might begin with a house themed with a small array of Jack O' Lanterns and luminaries clustered thoughtfully around the yard, and eventually grow to an electronically-controlled animated display, in which the earlier decorations merely serve as accents, retained because of the solid first impression they produced when the hobby first began. Not only that, but the theme created by the initial simple decor has probably survived and influenced the larger, more complex props - a headless horseman, for example, holding his Jack O' Lantern head in one arm as it blinks at passers-by, while he waves with the other free hand. This is merely an example of how a theme can unify what one is doing, and give it a focus.

The concepts of **story** and **script**, as mentioned above, are essential. *Story* is the background concept for your haunt. It does not have to be spelled out explicitly, but guests should be able to infer at least a bit of it after visiting the attraction. Your *script* should begin with the facade of your haunt, and carry on until the patrons have left the your exhibit. With any luck, the effect of both aspects will remain with them as a lasting impression long after they leave.

There is probably no better example of this than the *Haunted Mansion* as designed by Walt Disney Imagineering for the Orlando Magic Kingdom. Patrons entering the themed area see a large house at the end of a brick lane. Initially, it seems completely normal, if a bit weathered. As the guests get closer, smaller details come into view, such as the bat on the weathervane atop the roof. At night, a light can be seen to pass across the windows of a glassed-in solarium. At last the patrons realize that this house is most likely haunted. On their way in, they pass a graveyard, and move into the story itself, which is quite immersive. After the journey through the haunt, the guests exit, passing substantial crypts in a picturesque architectural setting. As they depart the premises, the scenery gradually changes to suggest a departure into an altogether different locale. A

visit to this attraction is highly recommended to those who wish to learn more about imagineering an effective haunt, as it explains more about story and script in a 15-minute object lesson than could be said here in many thousands of words. Concisely put, however, the simple section of the back story revealed to guests is: *The house is most definitely haunted, and the Master Spook wants you to be the next ghost in residence.* The script tries to convince you to participate in this fantasy by showing you just how much *fun* that experience could be. The result is *entertainment that brings guests back for more.*

A disjointed haunt with a lot of unrelated effects and scenes may scare people, but it will not be as memorable, or produce as strong an impression as a themed attraction. Everything your guests see is important. Prioritize the story-line and concept. Set aside the first work session for brainstorming the theme alone. The following sessions will be spent in working out the story and script. Involve friends and family in the process and the results will be better.

Story and script can arise from ideas in taken from literature and movies - or even better, from a collaborative effort or an individual writer's original work. When creating a script, put yourself in the 'riders' seat' and visualize what your guests would experience.

If you are fortunate enough to be working with a team (which is highly recommended) walk through your mental model by describing it out loud, acting it out with gestures and improvised sound effects. Watch for your collaborators' responses, and make notes. Break your script up into episodes, so that the story may be told more easily in individual units, or scenes. Get it down in writing, and then do not depart from it. Appoint one person to oversee the execution of the theme/story/script concept as it applies to later stages. Avoid the situation of having a group of autonomous supervisors who plan their sections of the attraction without reference to the central idea, or else you will have chaos, and the effect of your haunt will be severely compromised. Encourage your staff to understand what is possible through a cooperative effort. You will need to use all the diplomacy and people skills you possess, but you will be rewarded by the results.

Get a mental picture of how this might be presented in the space you have to work with. Make sketches or models of your ideas, and decide on a visual style to unify them. Make decisions in advance regarding possible safety issues relating to your attraction space.

After settling upon a story and script, the phantasmechanic is left in consideration of the venue, or facility. For those who are involved in enhancing the Trick-or-Treat

environment of their neighborhood, the venue is usually an ordinary dwelling. For those involved in charitable organizations, it probably consists of whatever property might be acquired in the form of a temporary donation or rental. For the professional, it could be just about anything, from an empty tract of land offered for purchase, to an existing haunted attraction that drew attention as a 'fixer-upper'.

First Impressions Are Very Important!

The initial impression guests receive when they first approach an attraction provides a frame for the script that will unfold before them as they participate. Far too many haunts neglect the appearance of the facade, which has the essential role of building the apprehension of what is to follow. The show properly begins outside, and even if what lies within is rather modest, pre-conditioning will definitely enhance it.

Starting Small, Practically Speaking

Let's examine possibilities suggested by the beginner's typical first venue - the home haunt. In most cases, there is nothing even remotely frightening about the average suburban house. There's almost always a front yard, usually a driveway, and often a garage which may be left open to view - elements that make up the stage upon which the haunt must be built. To convert this ordinary setting into a movie stage would be prohibitive to all but the most dedicated and wealthy builders. (We'll assume that we aren't in possession of the huge flats required to convert the facade of our home to Baron Von Frankenstein's castle, or Norman Bates' abode.) What happens when we take away the possibility of reliance on these expensive props, but keep the demand for drama? We are left with a simple stage, creative lighting, and a few props.

In order to consider what the best use of your limited resources might be, think about how the haunted yard might be viewed. There are basically three possibilities. Your initial scene may be:

1) Seen for a few seconds (or longer) by passers-by in automobiles

2) Seen for a minute or more by onlookers from the sidewalk, or

3) Seen from within for several minutes by Trick-or-Treaters or Guests

If you decorate for Halloween, you *will* be visited. You will need to provide an 'audience space' that suits your show. Practically speaking, the following suggestions apply to the above scenarios:

1) If you expect that most of your traffic will be drive-by, your approach to decor should be aimed in that direction. To keep your yard from being abused, limit prop placement to windows and the front porch.

2) If you can afford to accommodate walk-up traffic, you'll obviously need to limit access to your yard, and provide a viewing area, which typically would be limited to the sidewalk in front of the house. It is important that guests are kept from accessing areas where props are placed. A sturdy, decorative fence is one of the best methods for achieving this. This barrier may be subjected to abuse, so be prepared to repair it from year to year.

3) If you wish to allow guests to approach your door, the walkway should also be railed in some manner. In this case, your guests are walking onto your stage, and become participants in the show. This inevitably requires your personal presence to keep things in order. Limit this level of participation to Halloween night, unless you have the time to police your haunt during the season.

Decide upon the actual props and actors you will include to carry out the theme of your attraction, and decide what role each will play in the finished production.

With a combination of props, actors and setting decided upon, consider the role of lighting and sound, and movement. Begin development of any technical systems you will need to make these work for you.

Picture the following, expanded from the example above: A passing car slows, attracted by a patch of Jack O' Lanterns. In the center of this is a darkened figure, seated upon a horse. As the car approaches, the equestrian figure is suddenly bathed in light, and is seen to be a headless horseman, holding his Jack O' Lantern head. He exclaims, 'Happy Halloween!' as his eyes flash.

If you expect a lot of walk-up traffic, you may wish to reward this more intimate audience with another special effect. You could have a recording of a short verse, story or sound effect that plays, and a second lighting or mechanical effect might be presented.

On Halloween night, the third audience scenario is almost inevitable - that is, if your neighborhood still accepts (or trusts) the custom. In addition to the other triggered effects, you might wish to be in costume, or backstage triggering more devices. The list of possibilities is endless, and suggests an imaginative approach, wherein lies the *fun.*

It is not our intention in this essay to deal directly with large-scale venues; however, we recommend that you take the following advice to heart: If you find yourself bitten by the bug, and would like to become involved in a full-scale haunted attraction, there are

many of these which actively look for volunteers. As with other apprenticed professions, the best way to become a haunt pro is to 'pay dues' as a volunteer in a charity haunt. You will quickly learn what works and what doesn't, and what sorts of problems typically occur, in terms of facility and personnel politics. You will also discover what is required by the local building, fire, and safety inspectors. It is not the intent of this series of articles to explain the workings of haunt management, as there are a number of good books on that subject already available. Remember, though, that no book can substitute for hands-on experience. Trying to put on a haunted attraction based solely upon what has been gleaned from text is an exercise in exasperation, if not in futility. Using a modest home setting, cut your teeth on basic imagineering. Make your ideas work by experimenting with them over the course of several seasons, and revel in them. When you become involved as a volunteer and demonstrate what you can do, you may find yourself singled out for an important position in the hierarchy.

Construct and carry out tests of your systems.
Make sure they are capable of safely and reliably doing
what you want them to before you assemble the final
versions to go into your setting. This is the time for the
inevitable revisions, and perhaps even a few compromises.

The above step is self-explanatory. It should be stressed that the best way to become familiar with the quirks of mechanical and electrical systems is to be involved with them as often as possible. If you are not comfortable with mechanisms, but find yourself fascinated nonetheless, reading books in the 'How Things Work' genre is a good start. One of the best exercises a beginning imagineer can undertake is the disassembling old mechanical toys and malfunctioning appliances. This will help you learn not to be afraid to dig into things. Observe how mechanical linkages work, how geared motors are employed, and how they interface with the user. What you want to achieve, ultimately, is an intuitive vocabulary of conceptual mechanisms that come quickly to mind when you wish to create a device that achieves a certain movement or effect. This is one of the most important assets any phantasmechanic can possess.

If you build moving props, run them continuously, and make sure that they will not fail quickly under repeated cycling. If you detect a weakness, re-design the parts that fail.

Below, we will describe the 'Phantasmechanics approach' to improvised mechanisms. We will also demonstrate how to apply them specifically to haunted props in the other how-to articles that follow this one. The simple principles presented will hopefully lead you into the creation of props based upon your own ideas.

Build the attraction, and execute a dry-run or 'dress rehearsal', and correct any problems that develop.

As obvious as this step may seem, it is the one that is ignored most often, along with the previous step (debugging.) The author has seen a frightening number of attractions try to open on their first scheduled night, only to shut down for repairs after only a handful of guests were admitted. This is not only embarrassing, but also unprofessional.

Open the attraction to the public.

This is positively the most intimidating part of the process, but it can also be the most rewarding. A toast of some sort would be most appropriate at this point, as well as at the closing of the attraction for the season. Spare no expense on the beverage - it was your hard work that helped to make the whole thing possible!

The Phantasmechanic's Tool Kit

Beginning with this section, we'll look at some basic skills you'll want to acquire as a phantasmechanic. We won't try to teach you everything, nor should we have to. There are many excellent books on electricity, 'do-it-yourself' carpentry, and the like. Bookstores abound with 'how things work' encyclopedias. One trait typical of imagineers is an eager desire to tear into things and discover for themselves what makes a thing tick. If that describes you, you have probably already begun to acquire the skills by tinkering. That's how I learned, and I believe it to be the best way. To help you along, this chapter will present exercises designed to encourage 'creative re-engineering' - that is, the process of taking machinery designed for one purpose (or no specific purpose) and putting it to work for you in the creation of the effects you wish to achieve.

It is desirable that you learn not to be intimidated by projects which might seem at first to be beyond your abilities. Overcoming the fear of tackling a large project on your own for the very first time is not easy, but it's necessary. To help you practice this boldness and daring, I'm about to ask you to pick up a tool that surprisingly few people have bothered to learn to use - the humble soldering iron - and to develop a proficiency with

it. If you are already expert at soldering, read through the material, and see what you think of my approach. There just may be something here that will help you, anyway. You will also need to overcome the fear of opening a mechanical or electrical device to examine and learn from it, or even to alter it to suit your needs. It may sound odd to some of my readers, but I have met a large number of laypeople who are literally afraid to investigate machinery, let alone put a wrench or screwdriver to a fastener. Years ago, I held a very simple seminar in the basics of soldering and simple electrical repair, and I was surprised that so many of those in attendance had no idea how a simple lamp switch worked, much less how to fix or replace one. When I finished the teaching, the comment I heard most was: 'Gee, that wasn't hard! I was always afraid to open the socket up, because I never thought I could put it back together!' This is absolutely true for many of the techniques I will be explaining, and you will be surprised (hopefully) how easy the basic tasks of home imagineering can be.

Before you start, you should also begin building a basic electrical tool kit. Purchase these items at the same supplier, and avoid cheap electrical tools like the plague! Wire cutters that break under heavy use, and flimsy needle-nose pliers that bend, gap and refuse to hold small wires are a true nuisance. Nothing can make you hate soldering (or any mechanical task) more than inadequate tools! I have had very good luck with the Xcelite brand, which is targeted at professional purchasers.

Your tools should include:

- Wire cutters, small and medium sized.

- Long-nose pliers, small enough to hold tiny strands of wire tightly
- Rosin-core electrical solder (Ersin Multicore is my favorite, and comes in a handy dispenser pack.)

- A tip cleaner for the soldering iron. You can purchase a fancy one, or use something as simple as a small sponge or even a wet paper towel. Its use will be explained in the text below.

- A rest for the iron, which will hold it securely when it is hot and not being used. Avoid the small curved-metal stands that require the handle of the iron to rest on the table-top. The one I use holds the iron much like a pen-holder holds a pen, at an angle, away from the tabletop, and shields the point of the iron from touch, while allowing ventilation for the heat.

- A set of small screwdrivers of multiple sizes, and of good quality, Philips and flat-blade.

- A heat sink, a clip-on pliers-style device designed to conduct heat away from the delicate parts which may be attached to a wire being soldered. Medical hemostats are excellent for this purpose, as they lock closed and can be left hanging as you solder. You may want two of these.

- Small vacuum-base vise to hold parts (like connectors) as they are being soldered.

- A small utility knife.

A kit like this may cost you as much as $100 or more, but remember that you will be using these tools regularly, and will want to add more purpose-specific tools as you get more involved. Beyond their uses in Halloween imagineering, you will find a lot of general uses for them around the home.

Soldering: Fun With Molten Metal

This is one of the most important skills you can learn if you intend to work with electrical circuits. Not limited to making electrical connections, soldering also allows the fabrication of small metal assemblies which may become part of a special-effects device. Soldering irons come in many varieties, and you will need one that is rated at between 25 and 40 watts for general purpose wire connection and part fabrication. Select an iron that offers you multiple tip sizes, and acquire a selection of tips (usually separate purchase items) with the iron. Do yourself a favor, and go to a professional electronic supply house to make your purchase. Irons by Weller and Ungar are fine.

For work on circuit boards, you will want a lower wattage iron. The one I use is rated at 25 watts, and has a fine point. Temperature-controlled irons for multi-purpose work are available, but are rather expensive, with good ones costing as much as $100.

Don't purchase a soldering gun for small work with electrical components. Although they offer the convenience of instant heat, their tips get very hot, and can damage small parts. They're fine for the part fabrication role, however, as long as you don't need the iron to stay on for a long time. They have a 'duty cycle' - in other words, they may be left running for several minutes, and then require a cool-down period roughly twice the duration of the 'on' cycle to keep them from damaging their own large heating elements.

Let's Practice

To begin, find a work surface that allows plenty of room for your tools and the work. Make sure the surface does not contain flammable objects, and that it is not flammable itself, or likely to be damaged by hot objects, such as drops of molten solder. Keep any solvents away from your workspace. Much like a wood-burning tool, a soldering iron is capable of inflicting severe burns to skin. Wear clothing that covers your arms and legs, and don't neglect eye protection. Work in a well-ventilated area. Be careful, but don't be timid!

Get a small spool of single-strand copper 'bell-wire' and another spool of stranded 'zip wire' for practice purposes. You can find these at Radio Shack. We'll begin by joining two pieces of single-strand copper wire in a splice.

Put your iron in its holder, plug it in, and let it heat. You will want to 'tin' the tip of the iron when you first use it. Test the tip by bringing solder to touch it, and when it is hot enough, solder will flow onto the tip, coating it. The coat will most likely be uneven, and this is where the tip cleaner comes in. Let the iron 'season' for a minute or so after coating it, then use the cleaner.

Wet the sponge-like material of the cleaner, but not until it is soaked - only moist. To use it, drag the tip of the iron across the cleaner (or wet paper towel, if that's what you are using.) You will find that a thin layer of solder adheres to the iron, and that the surplus has been removed onto the cleaner material in little solid globs. You will be using the cleaner from time to time as you work, to remove debris and excess solder from the tip. When you are done with your practice session, clean the spongy material and discard the waste solder (or simply throw the wet paper towel away.)

Before we can join the wires, we must strip off the insulation. There are basically three ways to do this. The first is to use a utility knife, holding it at an angle, with the wire to be stripped in your other hand. Place the thumb of the knife-hand on the top of the blade, and bring the edge to touch the insulation, between 1/4 and 1/2 inch from the end of the wire. As you would when whittling a piece of wood, carefully push the blade into the insulation, and toward the end of the wire. With thin insulation, this single cut may cause the piece, or half of it, to slide off the end. If the insulation is thicker, rotate the wire and make another whittle-cut on the opposite side. This should be sufficient to allow you to pull the piece of insulation off the wire. You will need to practice, and although you must support the wire with a finger near the cut, don't allow the finger to contact the edge of the blade.

You can also use the tip of the small wire cutters to nibble a cut into the insulation around the wire core, then use the cutter as a pliers to slide the insulation off the end. You must practice this technique, and learn to avoid damaging the wire itself in the process.

Alternately, you can actually grab the insulation with the cutters as if you were using regular pliers, grip firmly (but not firmly enough to cut through the metal) and push toward the end of the wire, snap-peeling the insulation directly off the wire. This is the most difficult technique to learn (for some,) but the quickest and easiest method, once learned. Do not use it on very thin and fragile wire, however.

For those who already have a love of stripping wire, there's a wonderful device from a German company, Weidmuller, called a Stripax (distributed by Paladin Tools) and it's one of my most-used tools. It looks like a mutant pliers, with a jaw inside a jaw, like the Alien in the movie of the same name. You set a little switch on the outer jaw for the thickness of the insulation, then set a stop-block in the inner jaw for the length of stripped end you desire, insert the end of the wire into the jaw-set, and squeeze the handle. Instantly, in the blink of an eye, the insulation is stripped off perfectly, leaving the wire completely undamaged. It uses a perfected version of the third method described above, and will cost you over $80. However, it is incredibly durable, though

made of plastics, and will pay for itself quickly in time saved if you do a lot of work with wire. Mine has been through several hundred thousand cycles, is nowhere near the end of its life, and still works as well as it did the day I bought it, nearly ten years ago. This device should be available at the pro electrical tool supplier where you bought your other tools, and it now comes in a smaller, mini-sized model. *Warning: you will fall in love with special tools!*

After you have successfully stripped two lengths of single-strand wire, twist them together, end to end, one pointing toward the other. Next, take the iron and apply heat to the wire directly. Be sure your hands are at least 6-8 inches away from the join if you must hold the wire, because it will obviously get hot there, and eventually, the heat will travel to your fingers through the insulation. Preferably, hold the wire with the needle-nose pliers, and set the solder container on the table with a strand of solder sticking up, and bring the join to the solder.

When the iron has been in contact with the wire for a few seconds, apply the tip of the strand of solder to the join, not to the iron itself. The solder should flow onto the copper and cover the twist. At this point, remove the heat, and keep the wire as still as possible while the solder cools. You may blow on the solder to speed up this process. If all went well, you have your first successful solder connection!

When working with stranded wire, the procedure is much the same, except that you will want to 'tin' the wire itself, much as you trimmed the tip of the iron when you broke it in. Tinning keeps the strands of the conductor together while you are soldering the connection. Strip stranded wire carefully, so you don't cut away the tiny strands themselves, and lose thickness. Before you tin the ends, twist the strands around one another by gripping the exposed end and turning the fingers.

Stranded wire is superior to single-strand wire in that it is far more flexible, and will endure a lot of flexing before it snaps. If you are joining two bits of stranded wire, tin both stripped sections, then use the needle-nosed pliers to twist them together, and proceed as with the single strand wire method above. You won't need as much solder, since the tinned ends will automatically flow onto each other, providing a bond.

Practice these splices until you become comfortable with the soldering process.