HOBBY CORNER

Getting youngsters started in electronics

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HOW MANY TIMES HAVE YOU HAD youngsters come up and ask such questions as *"What 'cha doin'?"*, *"What's that?"*, *"How does that work?"*, *"Why are you putting that wire there?"*, *"Can I do that?....Can I help?"*, etc., etc.? If you are like most of us, you've had these questions thrown at you plenty of times. Perhaps it was your son or daughter, a neighbor's child, or your grandchild.

Sometimes you are so busy that you just mumble some answer or suggest that the questioner go play outside. There are times, however, when you need a change of pace or you feel guilty about brushing aside a perfectly legitimate question. On those occasions, what do you do? From the mail we receive, at least some of you try to teach them the rudiments of electronics. You start by teaching electricity. And there's the rub.

Have you ever tried to start at ground zero with one of those kits that are available for teaching/learning electricity? You know, the type with components mounted on individual rectangular blocks. The kits are convenient; there are a lot of parts and they are easy to interconnect.

Those learning kits are fine for those youngsters who have *already* learned something. But kids with absolutely no background tend to be confused by them. Often, the parts may be too small or it may not be clear exactly what is happening on those blocks. For example, a child can't see what is really going on inside a doorbell-type switch. He needs a few old-fashioned, simple parts that clarify rather than confuse.

Figures 1 through 4 show just such parts that you can build easily. They can be used to teach a lot about electricity as a prelude to electronics. Since those parts are easy to use, children find that playing with them is fun and they learn without even trying. Before we get into them, however, it should be mentioned that a child can learn a great deal if you let him help you do the building.

Figure 1 shows the "power supply." It is a simple battery holder and the child understands it much better than he does the metal one from the parts store. The holder is nothing more than a rectangular piece of wood with two wood side railings to keep the battery from rolling off.

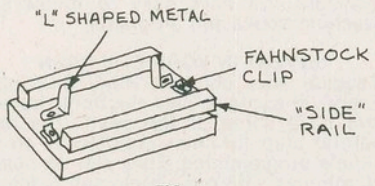


FIG. 1

The rails are attached with small nails or brads, glue, or both. The battery connections are made using two metal strips shaped like an "L". They are fastened to the base with small wood screws that also hold Fahnestock clips for inter-block wiring. Be sure to file the metal strips to remove any sharp edges.

I suggest that you make at least two battery holders; one for each cell. In that way, series and parallel supplies can be "discovered." Of course, you can also blow out more lamps that way.

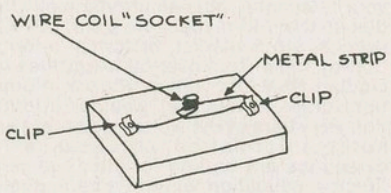


FIG. 2

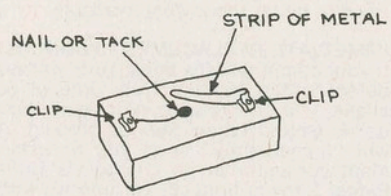


FIG. 3

Next, make a couple of lamp holders as shown in Fig. 2. The center connection is made using a flat metal strip. The "socket" is a piece of stiff copper wire wound around the lamp thread (actually, lamps can be screwed into and out of the coil). The connection to the tip of the lamp is made by springing it against a flat metal strip. Of course, you can use a real socket if it is a plain, non-encased one so that the inner workings can be observed. If you make at least two lamp holders, then you will have the opportunity to get into series and parallel circuits.

No setup would be complete without a switch to turn things on and off. Resist the temptation to stick a regular single-pole, single-throw (SPST) switch on the board. No one can see what is happening in that thing when the handle is pushed. Instead, use a strip of metal as shown in Fig. 3. If you are lucky enough to find an old "knife" switch, that will do the job quite well too.

Well, there you are with a few components that you have made in a short

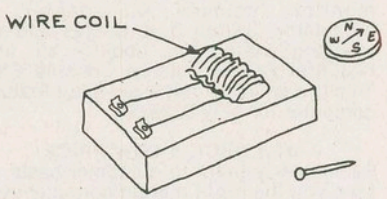


FIG. 4

time. All you need to add are a couple of batteries, a couple of 1.5- and 3-volt flashlight bulbs, and a few strips of wire. With little or no further help from you, the child can learn a lot about how electricity works. About all you really need to do is to supply a few terms at the appropriate times: voltage, current, resistance, series, parallel, and the like.

When the time is ripe, you can add other parts to that electricity "lab." Figure 4 shows a coil of wire, a compass, and a nail. It doesn't take much imagination to see how much information about electromagnetism can be picked up with those items.

Just to keep your creative juices flowing, you can also build a module with a doorbell buzzer. Be sure to remove the cover so that the coils and contacts can be observed. Later on, you can add such things as an open-frame motor and a meter. (Use a panel meter housed in a clear plastic case. Remember, we don't want to have *any* mysterious items.)

As the student's knowledge grows, you can add more sophisticated things. Of course, he will soon get to the stage where he can profitably use one of the many learning lab kits already on the market. Eventually, he (or she) may even be able to help you troubleshoot

that old TV set you have lying around. So, the next time an inquisitive youngster shows up in your workshop, don't just brush him off.

Time—by the stars

You will recall that we have talked now and again about various ways of keeping sidereal (star) time. The ways discussed varied from relatively simple modifications of standard clocks to fairly complex ones. Now, I have one more method for you.

If you have a computer (and who doesn't have one, or, at least, have a friend with one?) there is a *TRS-80* Level II BASIC program that will give you the exact sidereal time at your house, and in Greenwich, and throw in the Julian date as a bonus.

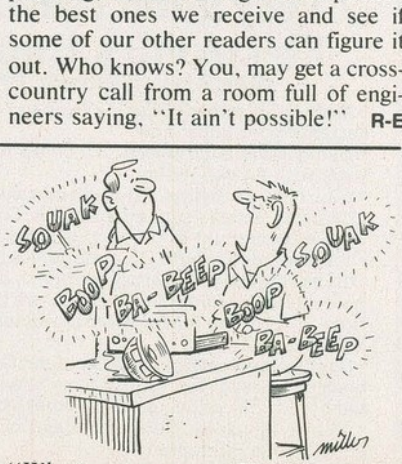
To find the time, all you have to do is load the program and follow the instructions. Those instructions are complete and there is a tutorial section that "walks" you through a computation session. Of course, you can bypass the tutorial when you no longer need it. You must enter five pieces of readily available information—location, time, and the like. The computer does the rest.

That program, Sidereal Time, is available from Becker Electronics (108 West Franklin St., Chapel Hill, NC 27514). When you contact those folks, you may want to ask about some of their weather-related programs.

Puzzles, anyone

A number of readers have asked for more puzzles of the type you saw here a few years ago. Remember the mystery light box and the light that was bright when it "should" have been dim? I don't know why both puzzles involved lights, but it must have been coincidental.

In any case, some of you want more mysteries and I am fresh out of them. If you know of something relatively simple (at least in appearance) yet puzzling, send it along. We'll publish the best ones we receive and see if some of our other readers can figure it out. Who knows? You, may get a cross-country call from a room full of engineers saying, "It ain't possible!" **R-E**



"Whatta ya mean, 'That's a catchy tune?'"