ANTIQUE RADIOS

RICHARD D. FITCH
CONTRIBUTING EDITOR

Early radio history

AFTER DISCUSSING OUR ANTIQUE RADIO of the month, we'll explore some of the history of electricity, magnetism, radio, and related disciplines. It's a long history lesson, so you'll have to wait until next month for its conclusion.

Antique of the month

You'll never guess the make of the antique radio shown in Fig. 1. Actually, it's a composite—it's made up of components that weren't assembled together originally. Composite antiques like that are not unusual. During the lean 1930's, the radio enthusiast often assembled his set from other people's cast-offs. It's possible that your antique is one of those composites—which doesn't make it any less valuable as an antique.

In the 1920's and earlier, all radios were, in a sense, composites. Early radio enthusiasts had complete knowledge of both chassis and cabinet construction. If you've got one of those homemade composites, you've got a real "one-of-a-kind" that may be a valuable link in the evolution of radio.

If you have a chassis and a cabinet left over, feel free to make your own composite, as I did. Take the usual precautions pertaining to exposed high voltages, and provide some means of heat ventilation. Do a good job, and you'll have a fine conversation piece.

My composite has a cabinet made by E. T. Earl. It pre-dates the 1930's, and I got it without the original chassis; so I had to alter the cabinet to accommodate a Zenith chassis I happened to have on hand. The beautifully-worked escutcheon from that cabinet will go in my collection. The chassis that I used to fill the cabinet is about seven years newer than the cabinet itself. I wanted to mount a *Wave-magnet* antenna (from another Zenith) inside the cabinet as well. Unfortunately, it doesn't fit, so I may have to mount it on the back (or on the top) of the cabinet. In general, you can be a little more creative than usual when "restoring" a composite.

FIG. 1

Early radio

In the past, we limited our discussions mostly to radios originally manufactured in the era from the early 1930's to the mid 1940's. But radios from that era were considered modern by some readers who have been involved with radio since the 1920's, or even earlier. They built their chassis from mail-order parts and instructions in radio magazines like *Modern Electrics* (an early Gernsback publication). Then they built or purchased a cabinet to house that chassis. We haven't talked much about radio before the 1920's, but that's when it really took off in a commercial sense. However, before we talk about the '20's, we'll go back even farther to gain some historical perspective on the development of the radio arts through the ages.

Ancient history

In ancient Greece, around 600 BC, the philosopher Thales noticed that rubbing a piece of amber caused it to attract small bits of material. That's the earliest record of static electricity. In Greek, the word for amber is *elektron,* and that's the root of many words we use every day.

Magnetism, too, was known in ancient times; for example, the Greek playwright Euripides mentioned, in 425 BC, that lodestone attracts iron. The word magnetism comes from the town in Asia Minor, Magnesia, where lodestones are found.

Saint Augustine discussed magnetism and electricity in the late fourth and early fifth centuries, AD, but little else happened throughout the dark and middle ages. In fact, it wasn't until the Renaissance when electrical and magnetic phenomena were again investigated in a scientific manner. William Gilbert, physician to Queen Elizabeth, built a device for detecting electricity that he called an *electroscope.* Gilbert was the first person to use the word *electric* in English. Later in the 17th

century, Sir Isaac Newton did some work with electricity, but things really took off in the 18th century.

Many phenomena were discovered then, including the difference between insulators and conductors, and the difference between "positive" and "negative" electricity. Ben Franklin performed his famous kite experiment, which proved that electricity and lightning are different manifestations of the same phenomenon; the leyden jar was discovered in 1745/6.

The leyden jar

Several investigators simultaneously discovered a device that we now consider to be the first capacitor (or as readers of this column used to say, condenser). The leyden jar is named after the Dutch town of Leyden (also spelled Leiden); leyden jars were used by all early investigators to experiment with static electricity.

The leyden jar is lined, inside and out, with thin, conductive foil; those linings are the "plates" of the capacitor, and they condense, or store, a large quantity of electricity. The leyden jar must be used on a non-conductive table top, and the glass jar must be kept dry. The jar is charged by touching a charged plate to the brass ball on top. The jar is discharged by using a wand to short the ball and the foil-lined outer surface of the jar. The wand has two brass balls connected by stiff wires; the wires extend from an insulated handle held by the experimenter.

Adams, in the late 1700's, and Matteucci, in the 1820's, worked with leyden jars. Their work centered around inducing reactions at a distance of several feet. Riess and Henry also experimented with the Leyden jar, as did Paazlow and Lodge, who worked with huge, oversized Leyden jars. Sir Oliver Lodge, with his *syntonic* (literally, in harmony with, or "tuned with") leyden jars, probably made the most important contributions to the field of radio. Variations on the leyden jar were used in many early electrical appliances.

Other discoveries of the late 1700's included Coulomb's formalas that quantify the attractive forces of electricity, and magnetism. Galvani discovered a biological phenomenon that was the forerunner of the electrical storage cell, or battery; later that device was refined by Volta.

The 1800's

The nineteenth century was the real Golden Age of electrical discovery and invention. Among the more important discoveries were those of Oersted, who showed that an electrical current could deflect a magnet, and Faraday, who did experiments that eventually led to the electric motor.

The German Georg Simon Ohm discovered the mathematical relationship we now call Ohm's law in 1825. Later, Henry and Faraday independently discovered mutual induction, and shortly thereafter Henry discovered self-induction. Gauss built a rudimentary telegraph, and, in the U. S., Morse made a practical instrument of it. Possibly the most important theoretical breakthrough was that of James Clerk Maxwell, who found a way of mathematically relating light, electricity and magnetism.

Many useful devices were invented in the 19th century, including Alexander Graham Bell's telephone (1876), and Edison's incandescent bulb (1879). Edison also came up with the idea of placing a second element in the light bulb, and that, without a doubt, opened the door for many experimenters. However, the Edison Effect, as it was called, lay dormant for over ten years.

In 1888 Rudolf Hertz provided an experimental verification of Maxwell's theories, and that is what led to practical radio transmission as we know it. A year earlier, Hertz had demonstrated that both sender and receiver had to be tuned to the same frequency for long-distance communication to occur. And Marconi made one of the first long-distance (nine miles!) radio transmissions in 1897.

In the late 1800's the need for standardizing electrical units was recognized. The International Electrical Congress, meeting in Paris, convened a commission to study the matter in 1881.

We'll continue our look back at radio in our next column. **R-E**