

MAGNETIC RECORDING

1888 to 1954

By
LEON A. WORTMAN

EVER since the beginning of time, man has been intrigued with the sound of his own voice—and frustrated by his inability to reproduce it. History reports that as early as the 3rd Century B.C., Heron of Alexandria attempted to devise a machine that could talk or make animal sounds. However, it wasn't until the year 1791 A.D. that a "talking machine" was invented which could actually speak short sentences. These were man's early efforts to create or generate sound.

An amateur scientist in the year 1857 described an invention which he named the "Phonautograph." It was an ingenious device which traced a visible pattern of the sound of the human voice. It is almost frightening to think of the dazzling possibility that apparently had completely escaped the amateur scientist, the possibility of simply reversing the process and getting back the original sound which he had recorded. But, man was not to be easily deprived of this scientific advancement and within a few years of 1857 a number of people suggested the principle of the phonograph. One of them, l'Abbé Lenoir, even used the name "Phonograph" in a technical paper in 1877, the year Edison built his machine. Thus man, after so many thousands of years of anxiety, had discovered one mechanical means of recording and reproducing sounds and intelligence. This, as we know, was only the beginning.

In 1888 the magazine *Electric World* published an article by Oberlin Smith in which he suggested the use of a permanent-magnet recording technique. He proposed that a cord or silk thread be impregnated with steel dust or short clippings of fine steel wire. He also suggested, but thought impractical, a length of steel wire for magnetic recordings. Unfortunately, Mr. Smith never actually built a magnetic recording machine.

In the latter half of the 19th Century any boy who was interested in electricity considered telephone work to be the highest goal of attainment in an ambitious life. All young scientists dreamed of achieving their bit of success in that field. One such young man was Valdemar Poulsen, an unsuccessful

medical student in Denmark. The ambitious young Poulsen decided to leave medicine and turn to other pastures. In 1893, when he was 24, he obtained an appointment as a trouble-shooter for the *Copenhagen Telephone Company*.

We will probably never know how Poulsen got his ideas for practical magnetic recording, but his ideas were quite unique and completely original. Many great inventions are challenged every year and the court records are filled with histories of litigations, claims and counter-claims. But no one other than Valdemar Poulsen has ever claimed to have invented the "Telegraphone," as his magnetic recording machine, the forerunner of present day tape recorders, was named in his original patent application in Denmark in 1898.

The "Telegraphone" won the Grand Prix in the 1900 Paris Exposition. It created a sensation. People came from everywhere to see it. Technical journals and contemporary newspapers were filled with stories, mentions, and references to it.

In the United States Poulsen was awarded patent number 661,619, dated November 13, 1900. Poulsen used a steel wire, 1/100th of an inch in diameter, drawn rapidly past magnetic cores surrounded by coils through which sound currents were passed. When the wire was again passed through similar magnetic cores, voltages were generated in their windings corresponding to the original currents. It worked extremely well, when judged by the standards then prevailing. However, frequency response was quite restricted and noise was high and dynamic recording range limited to ap-

proximately 20 decibels. According to reports of that day, everyone who heard it was enchanted by the naturalness of the sound reproduction! The "Telegraphone" operated with earphones, but everyone assumed that this difficulty would be overcome shortly. Actually it was not overcome until the development of electronic amplifiers, about 25 years later.

On the commercial side, Mr. Poulsen came to America seeking investment capital. In 1903 the *American Telegraphone Company* was formed with a capital stock of \$5,000,000 at a par value of \$10.00 a share. The company's objective was to manufacture "Telegraphones" for use as dictating machines and telephone recorders. The machine was capable of ½ hour recording time, with the steel wire moving at the extraordinarily high velocity of 7 ft. per second. Compared with early mechanical dictating machines, the longer playing time, the relatively low distortion, and the fact that the wire could be used over and over again made strong "selling" points.

It was terribly unfortunate for the company and its investors that certain of the operating features became strong "unselling" points. The speed at which the wire traveled in recording was just about as fast as was practical at that time, making it impossible to speed up the rewind time. This meant that before playing back a reel of magnetic wire which contained dictation, one had to wait. What was worse, threading a "Telegraphone" was much more involved than the simple procedure of placing a cylinder on a mechanical dictating machine. Eventually the

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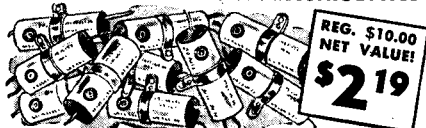
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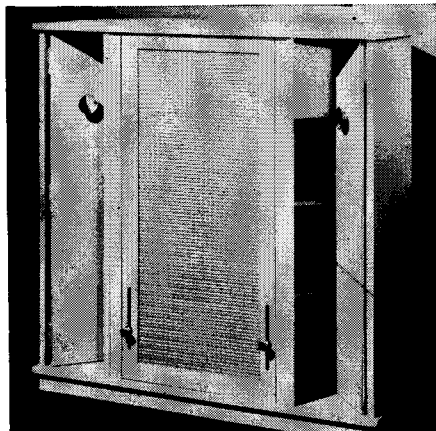
output level is 52 db below 1 volt/dyne/ sq. cm, pickup pattern is essentially non-directional. The unit is supplied with a 20-foot attached single-conductor, shielded cable. The case is light-grey plastic.

A similar unit, but without the clip and with a 7 foot cable, is being offered as the Model 100.

NEW "FOLD-A-FLEX"

Angle Genesee Corporation, 107 Norris Drive, Rochester 10, N.Y. is now in production on the Model 33 "Fold-a-flex" speaker enclosure.

The new unit permits compensation for every speaker system, every room, and every acoustical condition. By means of a simple adjustment, it be-



comes a folded horn, infinite baffle, or bass reflex enclosure.

Provision is made for either a 12" or 15" speaker. A sealed compartment at the top is provided for tweeters and mid-range speakers with space available for a crossover network. It can be used with a single speaker originally and later expanded to a 2- or 3-way system.

Standard finishes for the Model 33 are hand-rubbed blonde oak and mahogany. Custom finishes are also available. Dept. RN will supply full details on request.

SOUND PACKAGE

Asco Sound Corporation, 115 West 45th Street, New York, N.Y. is now offering a new sound package which has been designated as "High-Fi in Miniature."

The system comprises the new Brociner "printed circuit" Mark 12 amplifier and an imported Lenco record player.

The new unit can be attached to any quality speaker system. Compact in design, the unit is an integration of the Brociner amplifier which includes all of the controls ordinarily found only on expensive units and the Lenco record player, of Swiss precision make, which is designed to play 33, 45, and 78 rpm records.

Set within a typical phonograph enclosure, the over-all unit measures 9" high, 16" wide, and 13 1/4" deep. It is currently available in ebony, black lacquer, cherry mahogany, and natural birch finishes.

Magnetic Recording

(Continued from page 59)

company failed and the stock became worthless. A Danish company was formed in 1909, and dissolved in 1916 without having manufactured a single machine. For some years after the "Telegraphone's" commercial failures, magnetic recording disappeared from the public eye and ear.

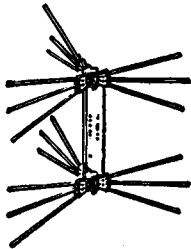
In the middle twenties a man with a wire recorder and a remarkable ability at persuasion obtained backing from German financiers and formed a company known as the *Telegraphic-Patent-Syndikat*. He was Kurt Stille and the company's purpose was that of selling licenses to manufacture magnetic-recording equipment. Some say it was a modified American "Telegraphone." By dramatic salesmanship he succeeded in selling them to companies who actually went ahead and did manufacture the machine.

About 1930 a motion picture promoter named Blattner bought the right to manufacture Stille's machine for entertainment purposes. Blattner, however, used a steel tape. He named his machine the "Blattnerphone." It was used quite extensively by the *British Broadcasting Company*. It is believed that the "Blattnerphone" was the first magnetic tape machine to be used in the Western Hemisphere when the *Canadian Broadcasting Corporation* installed it in their Montreal offices for delayed broadcasts.

The "Blattnerphone" used a steel tape about 3/1000th of an inch thick, approximately a quarter inch wide, and required operating speeds of 3 to 6 feet-per-second. It was discarded eventually for technical and economic reasons. It had only slightly better frequency range than the original Poulsen machine, noise was high, the reels were unwieldy and quite expensive.

Kurt Stille sold a license for the manufacture of dictating and telephone recording equipment to a Karl Bauer who formed the *Echophone Company*. Its product was called the "Dailygraph." It was the first magnetic wire recorder to use a magazine instead of separate reels, considerably simplifying operation. A number of different models were manufactured, the least expensive of which cost approximately \$600.00. The "Dailygraph" had good acceptance. In 1932, Bauer sold the *Echophone Company* to the *International Telephone and Telegraph Company*. It was then resold to the *C. Lorenz Company* in Germany who completely redesigned and marketed the machine under the name of "Textophone." This new recorder was placed on the market in 1933, about the time Hitler came to power. The Gestapo bought the "Textophone" in large quantities and gave magnetic recording a big commercial boost. The *Lorenz Company* also marketed a magnetic steel tape recorder which they called the "Stahltonmaschine," and in

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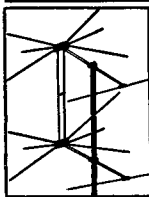


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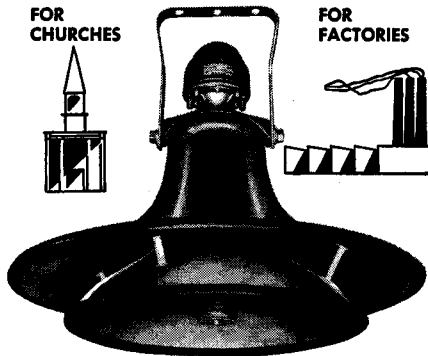
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1935 the German Broadcasting Company adopted it.

While all of these business exchanges and maneuvers were going on, another German, by the name of Pfeumer, developed the forerunner of the modern magnetic tape recorder. He conducted experiments with magnetic recording mediums consisting of paper or plastic tapes coated with powdered magnetic materials. His first efforts were somewhat crude and the results were a sandpaper-like roll of tape.

However, in 1931, several large research organizations, one of which was I. G. Farben, undertook the development of his idea. They designed and constructed a magnetic tape of paper with a very fine powdered coating and a recorder which could produce the best results yet obtained. They called it the "Magnetophone."

At its first demonstration in 1935 at the German Annual Radio Exposition in Berlin, the "Magnetophone" made a hit. The "hit" was due primarily to the astonishingly low cost of the "Magnetophone" magnetic recording tape which cost only 15 cents-per-minute as compared to \$1.00 per-minute for steel tapes. The new magnetic recording material was also less unwieldy. Very little information concerning the "Magnetophone" was available from that time until the end of World War II.

When the Allies entered Germany they discovered that the Nazis had continued to work on magnetic recording despite severe shortages of manpower and material. The equipment showed a remarkably high degree of development for both broadcast and military applications. Magnetic powder-coated tapes had been greatly improved and the "Magnetophone" had been redesigned to take fuller advantage of their capabilities.

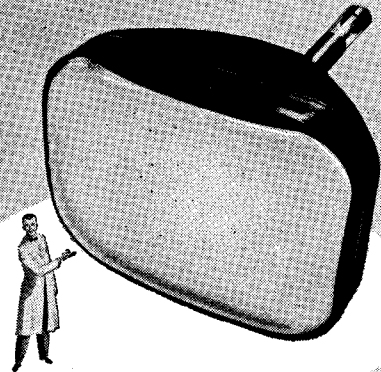
American industry and research and development companies continued where the "Magnetophone" had left off, bringing magnetic recording tapes and equipment to their present low cost, long life, astonishing fidelity, and have so simplified their operation that the youngest child can, with brief instructions, make and play back his own instantaneous magnetic tape recordings.

-30-

J. R. Bauserman (right) director of the bureau of vehicles in the Virginia Division of Motor Vehicles, presents a special license plate for mobile W4RSB to Joseph A. Johnson, owner of the station while Vernon McCoy, another ham, checks gear.



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