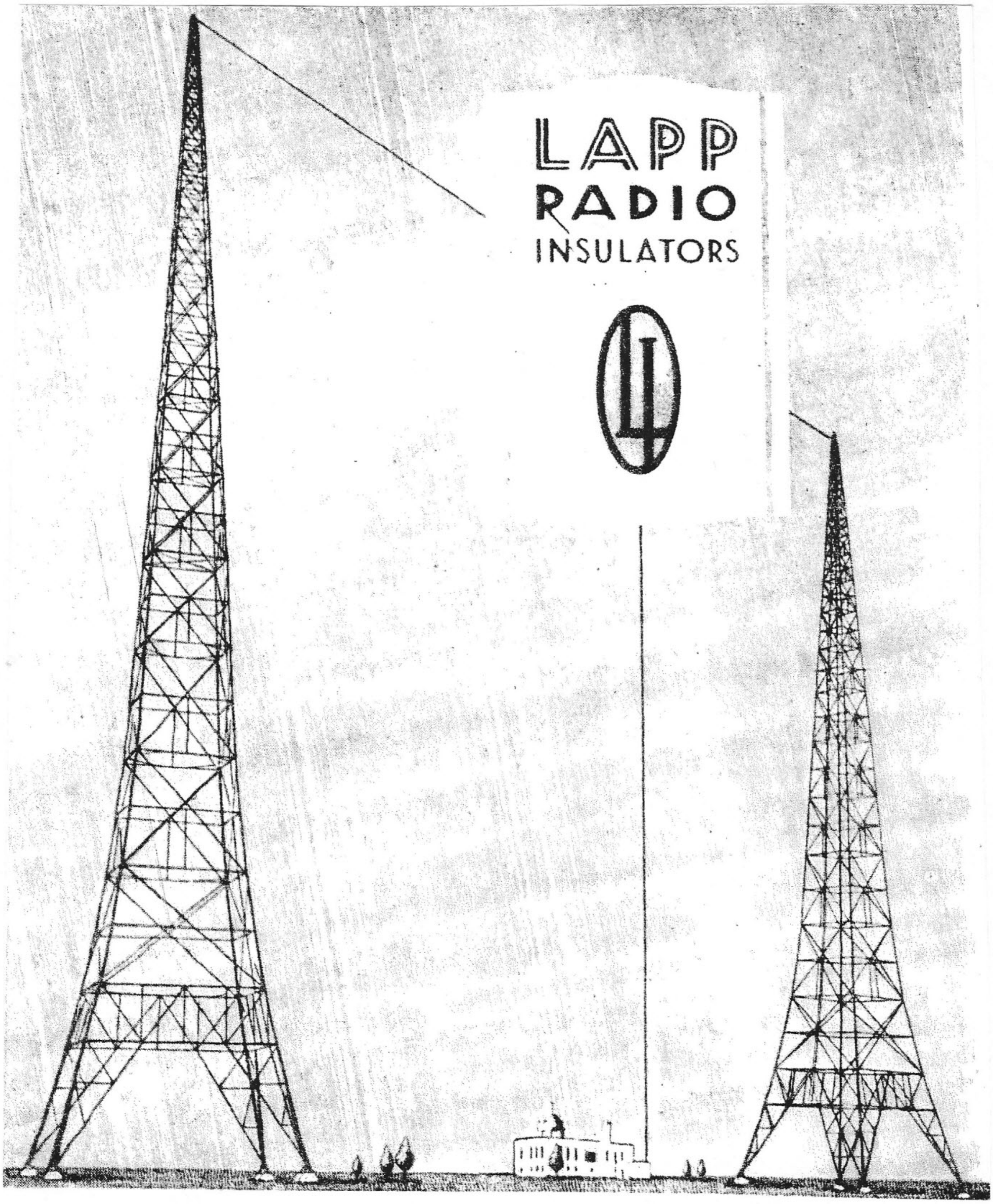
2016 PDF edition

Old Familiar Strains

a newsletter for collectors of radio strain insulators and related items
Volume 7 No. 1 February 2000



Editorial

I decided to say hello to 2000 (and our 7th year in print!) with another extended-length issue. Lapp Insulator Company has a long and interesting history manufacturing military and commercial broadcasting antenna insulators. It more than warrants stretching this into a double issue.

In a related story, Warren Beals (a family friend) relates his real-life experience changing out an insulator on which a 240' broadcasting tower was resting! You'll find Warren's story and picture breathtaking.

Additional updates are presented on, the eBay "insulator" that we profiled last month, Sensory, and Keystone lightning arresters. Check out my "What is it?" insulator this month (pg. 33).

The annual roster is included with this issue. We've been holding at about 60 readers for the last year or so. If you run across other collectors that have an interest in strains, please remind them that we're here.

Thank you for the many renewals. Please check your mailing label to see if you're one of the ones still in arrears.

And thanks *very* much for the letters. Your input is vital. Please write or e-mail soon.

Upcoming shows:

- I'll be at the **Emerald City insulator show in Seattle, WA on February 12th**. Call Robin Harrison at (206) 522-2135 for directions or more information.

- Don't forget about the **NIA Western Regional Show May 5-7 in Enumclaw, WA**. *Old Familiar Strains* will be promoted at my table there. And I'm planning a terrific competitive display of antenna insulators. This is rumored to be the last in a series of annual shows at the fairgrounds that has lasted over 20 years. And it should be a dandy. Hope to see you there! Call or write Vi Brown for more information. (425) 868-4249. Vi's address is: 7049 243rd Ave. NE, Redmond, WA 98052.

Dan Howard

Lapp Insulator Company

by Dan Howard

Last August I was honored to be given a guided tour of Lapp's LeRoy, New York, insulator factory. Still located on the company's original site (which the founder referred to as "Bob Heaman's potato patch," (1:96) the facility is both modern and historical at the same time. The different manufacturing areas in the plant were clear and constant reminders of the company's commitment to modern and efficient manufacturing methods. The testing facilities spoke volumes about Lapp's dedication to innovation, quality, and customer service.

Though I am not in a position to add significantly to what has been previously recorded about the company's corporate history[1], I wanted to bring into print some information about Lapp's radio insulators in particular. This article illustrates many examples of Lapp's radio insulator products and gives me the chance to share some stories from my tour.

Background (from *Porcelain Insulators and How They Grew*)

Lapp Insulator Company is one of the world's leading manufacturers of porcelain insulators[2]. The company currently has plants in two cities, Sandersville, GA, and LeRoy, NY. The Sandersville plant manufactures suspension insulators and low voltage line posts. The facility in LeRoy, NY, houses the corporate headquarters, the testing lab, and production facilities for the company's many other products.

After leaving the Locke Insulator Manufacturing Company in nearby Victor, NY, John S. Lapp formed his own company at LeRoy. At the time, Mr. Lapp was 38 years of age and already had 12 years experience managing Locke's insulator operation. Lapp was incorporated in December, 1916, and ground was broken for the plant shortly there after. The first product was shipped a short 9 months later in September, 1917.

Lapp was a family operation from the beginning. John's brother Grover joined the business and brought with him a degree in engineering and a passion for problem solving. John Lapp, John and Grover's father, also joined the firm for a short time. Like John S. Lapp, he had been employed previously at Locke and had years of experience making porcelain insulators.

"John Lapp built his plant at a time when the industry was just beginning to recover from [a] siege of insulator failures....Two or three manufacturers by that time had demonstrated improved quality fairly convincingly, and buyers [for the electrical utilities] were not inclined to take a chance on an untried manufacturer such as Lapp. As a result, about the only market that was readily available to John was in the special porcelain field" (1:98).

---

[1] *Porcelain Insulators and How They Grew* by Brent Mills and *Fred M. Locke a Biography* by Elton N. Gish were both invaluable resources to me during this project. I am not aware of any more authoritative references on the history of the Lapp Company. I would recommend both books to insulator collectors and other students of history.

[2] In the past the company also manufactured steatite insulators. And I understand that they once had an interest in a company that manufactured phenolic insulators.

And that lead them to develop insulators for the radio industry.

The Tour

LeRoy is a small town located in the northwest corner of New York, not far from Rochester and the shores of Lake Ontario. My first impressions of the town were of beautiful tree-lined streets and classic older homes bedecked in red, white, and blue bunting for the Labor Day weekend. What a beautiful place.

Visitors to Lapp's offices are greeted by a stained-glass front door which features the company logo outlined in leaded glass panels. Wow. This window and other touches remind the visitor that he is entering the offices of a company with over 80 years of history behind it.

My tour began with a visit to the company's manufacturing floor. Our host, Mr. Campo, began by showing us how the clay and other materials are mixed until homogenous and then formed into "pugs." The percentage of water in the mix is critically important to the forming and curing process. At each stage of the manufacturing process, the moisture content is carefully controlled.

The busy shaping area contains lathes, mills, and other special equipment used for transforming solid blocks of material into insulators. Many of the machines that we saw were designed or improved by Lapp employees.

After an insulator has been shaped, it is glazed. During our visit, an employee was glazing strut insulators at a semi-automatic glazing machine. I don't recall how many insulators the machine was simultaneously lifting, moving, twisting, dipping, etc. It was a truly sight to see.

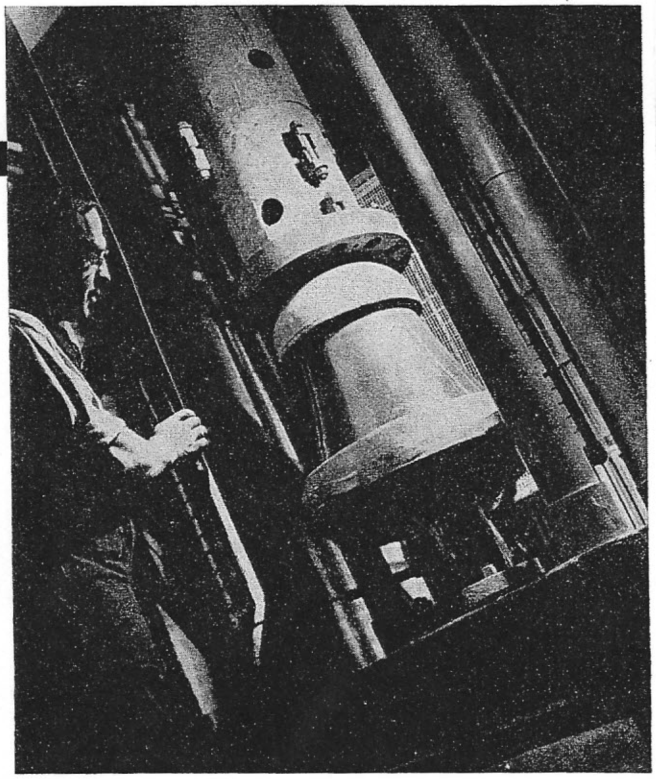
Just picking up and moving the big heavy insulators requires real ingenuity. Uncured insulators must be handled carefully so that they don't get banged or broken. And, how exactly does one pick up a 10 pound piece that is covered in wet glaze? At every turn Dad and I saw examples where someone had figured out an innovative way of getting the job done.

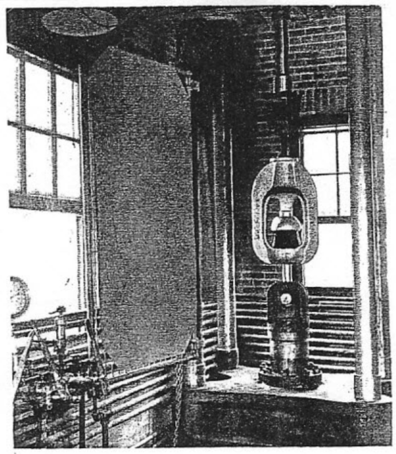
Much of the floor space in the plant is occupied by kilns. Of special interest were the tunnel kilns. At one end, uncured insulators were placed on small "flat cars." The cars moved down a track into, and then through the tunnel kiln, in a slow continuous procession. We were told that the kiln had been running continuously for over seven years at the time of our visit.

As the cooled insulators leave the tunnel kiln, they are unloaded from the flat cars and are thoroughly inspected. Prior to firing, the materials from imperfect insulators can be reclaimed. Finished insulators that fail inspection cannot be converted back into raw materials and have to be recycled in some other way.

Testing facilities for tension, compression, and deflection are maintained right on the shop floor. I cringed as I watched a large, apparently rigid insulator being clamped into the tester and deflected several degrees off center by the powerful hydraulics. These pictures from old Lapp advertisements and catalogs show insulators undergoing a variety of stress tests at the Lapp factory.

Insulators Being Tested at the Lapp Leroy, NY Factory





A 375,000 pound guy insulator being proof tested to 250,000 pounds in Lapp's 1,250,000 pound hydraulic testing machine. Such routine proof and design tests have been of utmost importance in these developments.

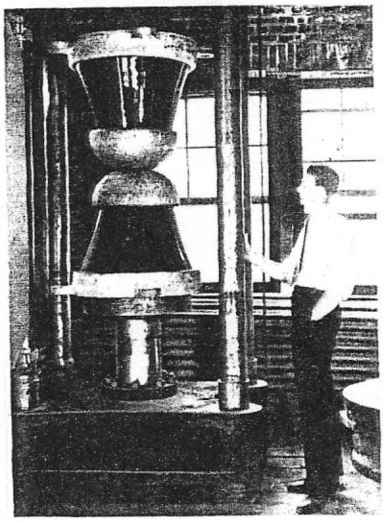
THREE MILLION POUNDS

ON THIS PIECE OF PORCELAIN

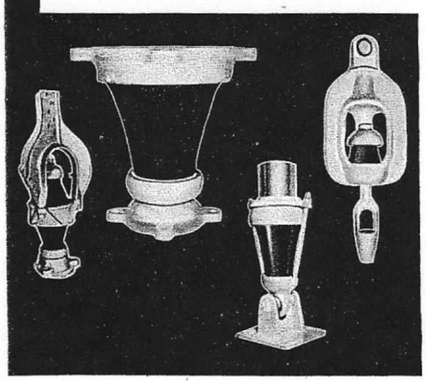
. . . ALL LAPP TOWER INSULATORS INCORPORATE THE SAME ENGINEERING DESIGNS Visitors at the Lapp plant are often most amazed at this demonstration—the proof test of a porcelain base insulator with 1,500,000-lb. loading. On design test, this same unit withstood 3,000,000 lbs.

We *are* proud of a porcelain cone of two-and-a-half-inch wall thickness that will stand up under 3,000,000 lbs. of compression loading. But we don't claim any magic for it. It's merely the application of sound engineering principles in mechanical design and in porcelain production.

Back of every Lapp development is the same kind of thinking. Products for radio transmission include tower footing and guy insulators, porcelain water cooling systems and pressure gas-filled condensers. Every engineer contemplating installation of a new transmitter, or modernization of present equipment, should hear the Lapp story.



Three Million Pound Base Insulator being proof-tested in Lapp Hydraulic Testing Machine



LAPP

INSULATOR CO., INC., LEROY, N. Y., U. S. A.

Nearby, we were treated to quite a show as workers tested samples from a batch in the high voltage room. Insulators were placed on a grounded table with a curtain of high voltage wires overhead. After the room was cleared, the juice was turned on and the sparks *really* began to fly.

Our next stop was the engineering section. It was here that we met Mr. Powell, our host for the remainder of the tour. Lapp has its own design facilities and makes custom insulators for a variety of commercial and governmental concerns. Mr. Mills says that "Grover Lapp could never resist a challenge....Dozens, if not hundreds of times, an order was accepted for porcelain that had never been made, and there was only an optimistic hope of success" (1:98). Even during our short tour, we saw many evidences of the company's commitment to meeting new manufacturing challenges.

After a design is approved, prototypes are manufactured. Prototypes are tested at the John S. Lapp High Voltage Laboratory. The testing lab is located in the building that houses Lapp's museum. On the day of our visit, employees were busy testing a large power line insulator. The insulator being tested was in a "dry" environment. The lab is also equipped to conduct tests in "wet" environments to simulate the effects of rain storms and the like. Each sample may under go several dozen hits at various voltages and under various conditions. These tests document the insulator's basic electrical characteristics and determine how it will react to lightning strikes or other catastrophic situations. I understand that the lab can throw as much as "1 million volts" at an insulator in a single strike.

Most tests take place in a room with a high ceiling that resembles an aircraft hangar. The engineers sit in safety behind glass windows in an adjacent lab. Dad and I quickly learned to turn toward the lab windows and hold our breaths whenever the lab technician said "coming down." That was the signal that the system was charging and the lightning was on the way. Fortunately, I've never been that close to lightning before. It really takes some getting used to. During the tests, lightning slams into the hapless insulator from the tip of the high voltage tower far above. When you're standing near "ground-zero," as we were, the thunder clap is simultaneous with the flash. I don't know how many hits we got to see, but each one was outstanding.

Housed in a special conference room, The John S. Lapp Insulator Museum displays a fine collection of early insulators in glass show cases. Many items came from the personal collection of Brent Mills. In 1971, Mr. Mills, a long-time Lapp employee and former president of the company, wrote a wonderful history of the industry called *Porcelain Insulators and How They Grew*. The book not only shares Mr. Mill's personal insights into Lapp's history, but it presents the histories of many of the company's competitors. Items from the Lapp museum are pictured throughout.

I really want to thank our hosts at Lapp for taking their time to show us around and for explaining the insulator manufacturing process.

Some Lapp Innovations

The article will conclude with a thorough discussion of Lapp's radio strain insulators. But first I wanted to cover some important Lapp innovations in radio-related insulators.

Water Coils:

In his book, Brent Mills refers to the company's achievement in a designing and fabricating porcelain water coils. Essentially, a 30' long, coiled up water hose, the coils were used to supply important cooling water to high-powered transmitting tubes. (Thousands more were used on the Manhattan project) (1:102). Previously, coolant had been piped through rubber hoses. The heat of the water soon broke down the rubber, increasing maintenance costs and decreasing reliability. Imagine the complexity of building such a device from porcelain. At the bottom of the page, an advertisement from the 1940's heralds the company's achievement and shows some of the styles of coils that Lapp produced.

Tower Base Insulators:

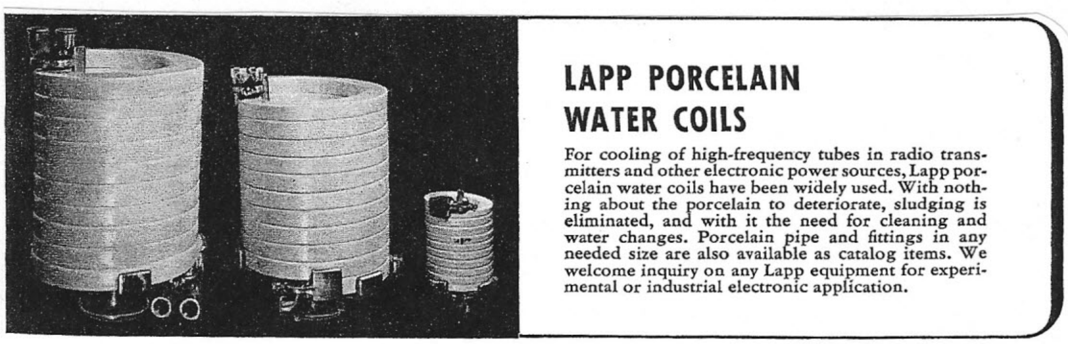
Another achievement was the company's incredibly strong tower base insulators. Prior to the invention of tower base insulators, broadcast towers merely served as masts for supporting wire antennas. Energy was lost to ground through the metal structure of the tower. And the tower itself affected the radiation pattern of the antenna (2:20). After their invention in the late Teens or early 1920's, base insulators allowed broadcasters to use the metal structure of the tower itself as the antenna.

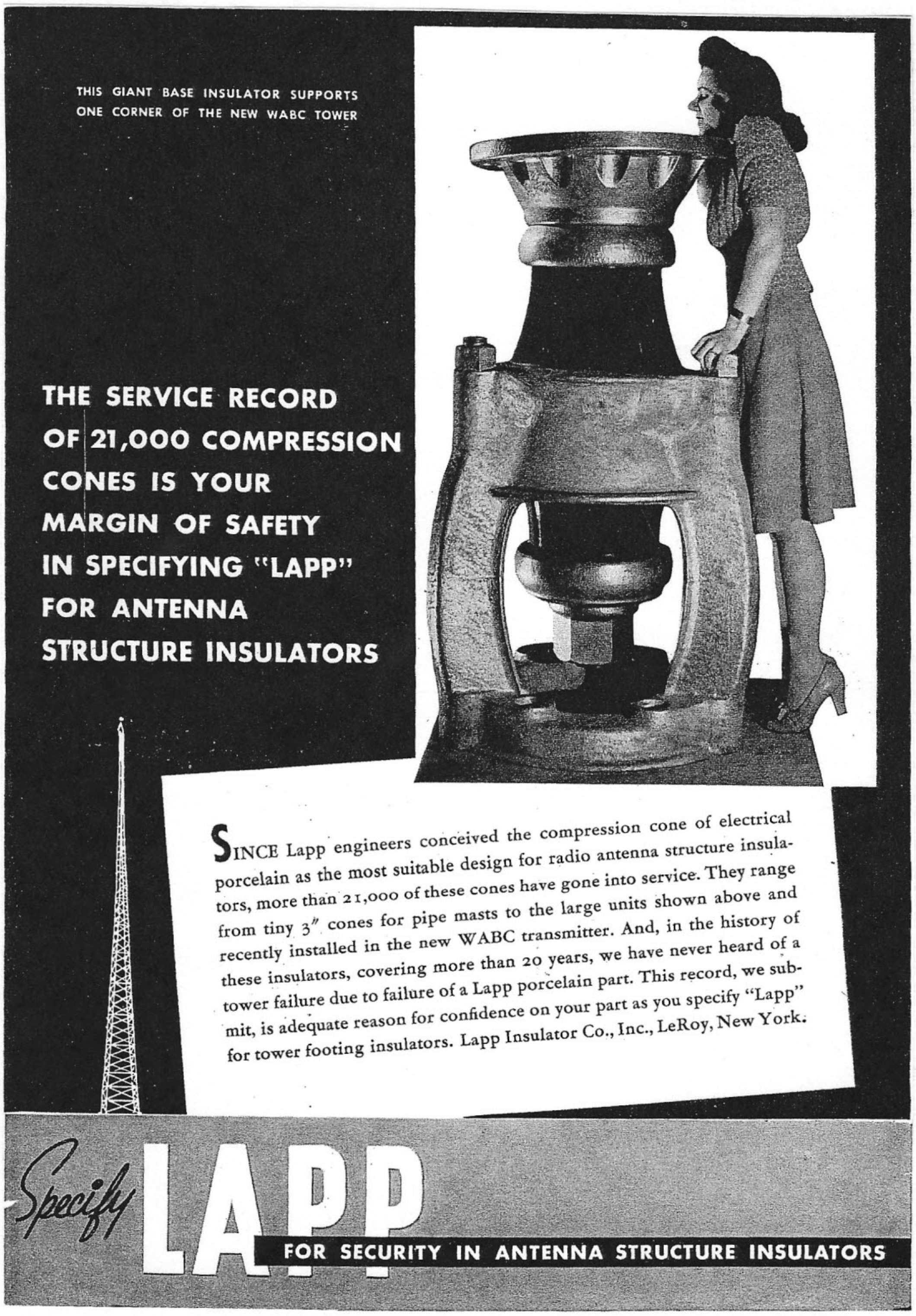
Self-supporting towers with 3 or 4 "legs" require an insulator under each leg. "Guyed" towers, which are kept vertical by wire ropes, typically come to a point at the bottom and rest on a single insulator of immense strength. According to ads, Lapp's insulator with its curved sides can support far more than similar straight-sided designs (3:136).

Lapp Bulletin 110 (1934) cites these "firsts" related to the company's tower base insulators:

- The first modern radio towers to be insulated were mounted on Lapp units
- The first compression cone was a Lapp development
- For many years Lapp was the only insulator organization interested in this work
- The most modern type of radio antenna, Vertical Radiators, grew out of Lapp's complete familiarity with the possibilities of the compression cone as an insulating member (2:2).

Although I couldn't reproduce them all in this issue, over the years company ads




THIS GIANT BASE INSULATOR SUPPORTS ONE CORNER OF THE NEW WABC TOWER
THE SERVICE RECORD OF 21,000 COMPRESSION CONES IS YOUR MARGIN OF SAFETY IN SPECIFYING "LAPP" FOR ANTENNA STRUCTURE INSULATORS
SINCE Lapp engineers conceived the compression cone of electrical porcelain as the most suitable design for radio antenna structure insulators, more than 21,000 of these cones have gone into service. They range from tiny 3" cones for pipe masts to the large units shown above and recently installed in the new WABC transmitter. And, in the history of these insulators, covering more than 20 years, we have never heard of a tower failure due to failure of a Lapp porcelain part. This record, we submit, is adequate reason for confidence on your part as you specify "Lapp" for tower footing insulators. Lapp Insulator Co., Inc., LeRoy, New York.
Specify LAPP
FOR SECURITY IN ANTENNA STRUCTURE INSULATORS

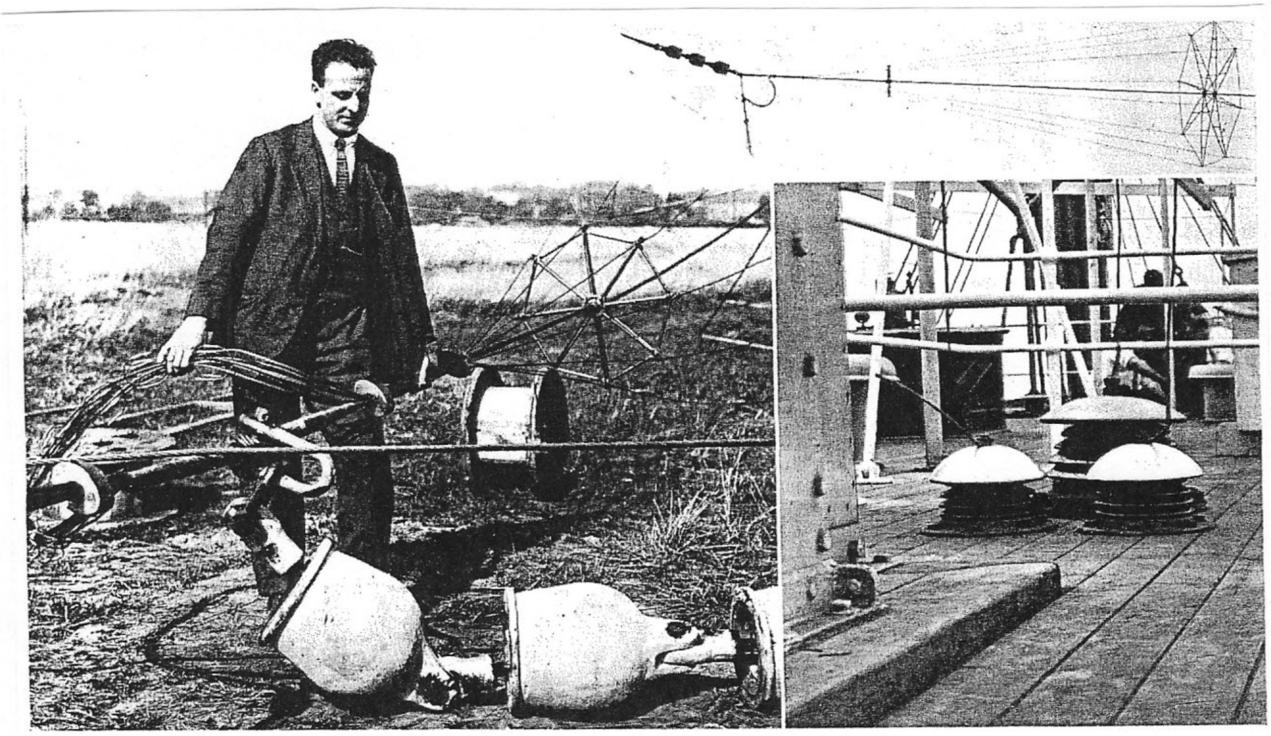
featured a variety of styles of these impressive insulators[3]. According to Mr. Mills, many thousands of Lapp tower base insulators were installed, and he had never heard of a tower failing because of a faulty insulator (1:102).

Bomb Guy Insulators:

As mentioned above, some broadcast towers are kept vertical by strong wire ropes, referred to as "guy wires." Some of the guy wire insulators weighed over 1000 pounds! Among the earliest of the Lapp's super-strong strains may be the "bomb guy" insulators shown below that were used at a high-powered station in Rugby, England.

What especially intrigues me about these views of the Rugby antenna is the fact that the current was so high that they found it necessary to string several of these huge insulators together in series. Amazing.

An illustration from *Radio Broadcast*, shows another view of the Rugby station. Here a feed line passes through a wall with a special feed-through insulator. Note the large corona rings on either side of the opening to keep power from arcing to the wall surfaces.

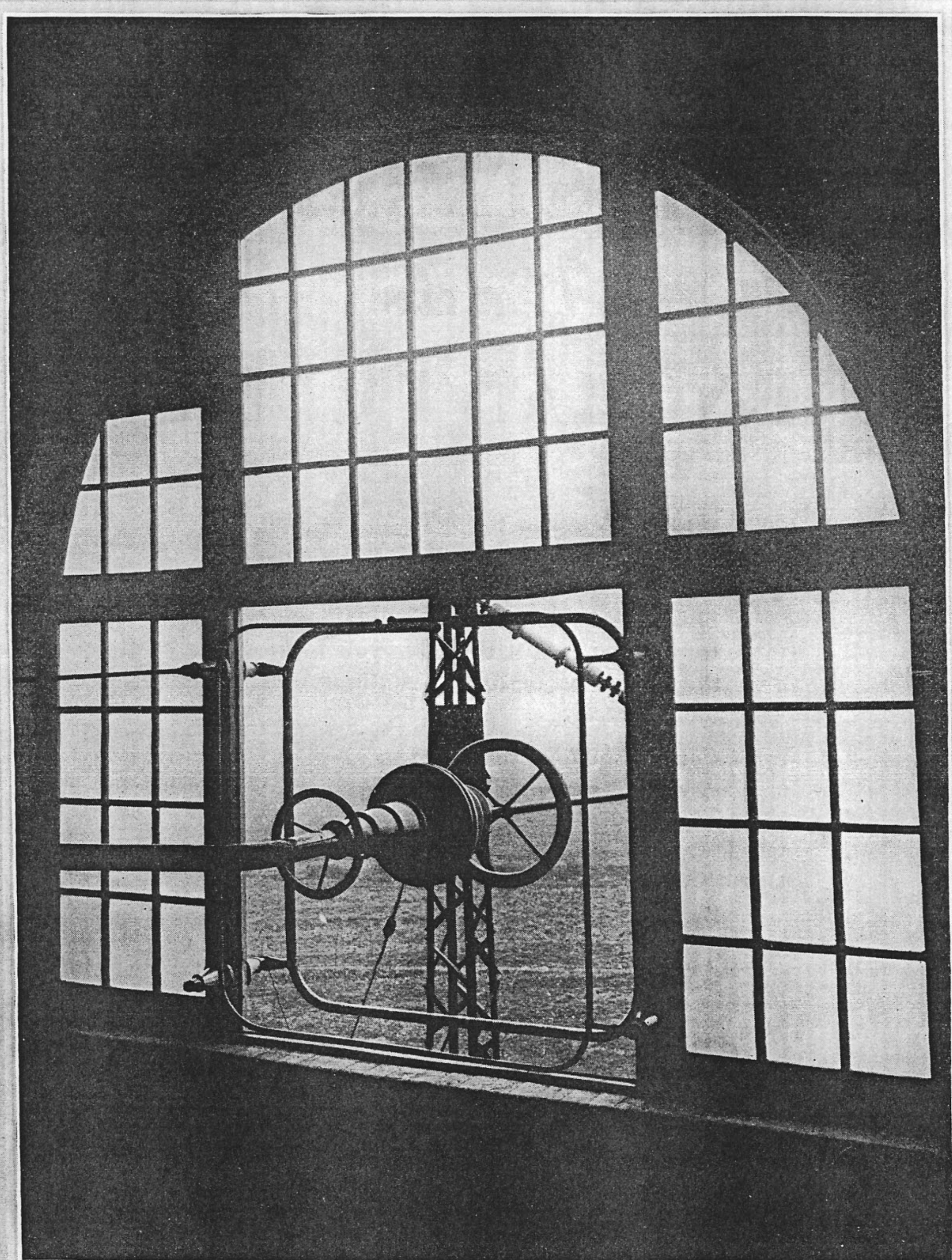


3—No. 5416 Lapp Bomb Guy Type Insulators, with main bridle, ready to be hauled 800 ft. aloft on super-station at Rugby, England.

Insulators and Antenna in place at Rugby.

2—No. 5363 and 1—No. 6000 Lapp Deck Insulators on new SS.MALOLA.

[3] More tower base insulators are pictured on page 32.



At the Rugby High-Power Station of the British Post Office

The antenna lead-in as seen from the interior of the transmitter house. This station is one of the transmitters built in England by the British Marconi Company for the British Post Office, for communication with the Dominions. The British transmitter for the transatlantic radio telephone circuit is located at Rugby and the high-power radio telegraph transmitter is used for direct communication with Australia

Antenna Switch:

An antenna switch is a high-current switch for opening and closing antenna circuits. Similar to the "grounding switch" that is shown below, Lapp's antenna switch is opened and closed by pulling on ropes. As the switch is opened and the blade swings up, it contacts a grounding connection. Pulling the handle further takes the blade past the grounding contact until it closes a small leaf-spring switch. The leaf-spring switch may have been used as part of an indicator circuit to show that the antenna switch was in a "safe" (fully open) position.

Last fall I was helping a local ham get ready for a yard sale. On a trip back into the garage to bring out a load of heavy radio gear, I got a glimpse of white porcelain.... When picked up the salt shaker, insulator, jump rope handle or whatever it was, I found it attached to a long rope. A closer look revealed the familiar LAPP logo. Now I was getting interested. Digging deeper in the pile, I followed the rope to the Lapp antenna switch that was buried there. I am happy to report that, although the switch was not headed for the sale, it ended up following me home anyway (with the blessings of the owner). Both porcelain handles are nicely glazed and marked with the Lapp logo. Unlike the unit pictured here, mine comes with color-coded handles. The rope with the white-glazed handle closes the circuit. The brown handle opens it. This would sure save confusion. A switch like mine is pictured on page 16.

The choice of porcelain pull handles was not based entirely on aesthetics. The Lapp antenna switch was obviously designed to handle a moderate amount of current. And, even if the circuit were deactivated prior to opening the antenna switch, the ropes, by themselves, might not be much protection from static on the lines.

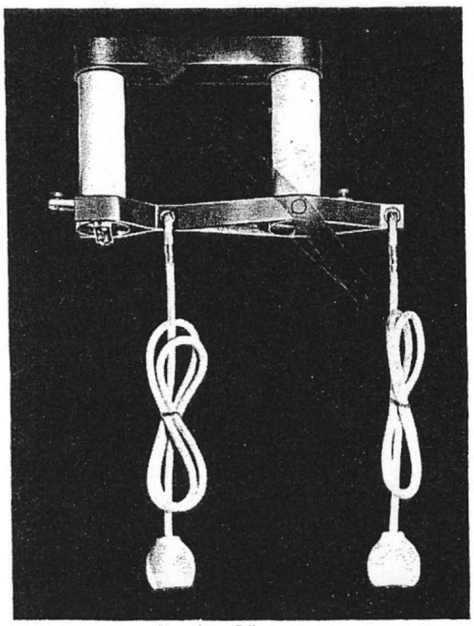
Lapp Grounding Switch

THIS device offers many advantages over previous designs. It has been developed to give maximum efficiency combined with low cost.

The switch blade, made of spring bronze is self-trussed for rigidity and ruggedness. It is pivoted on the cap of one of the porcelains, swinging either to the grounded position on the base of the switch or to the service position in contact with the cap of the other insulator. No external projections are necessary, the entire switch being very compact. A distinct advantage of this arrangement is that the tubing, bar or other conductor can be connected directly to the terminals on the caps approaching the switch from any direction.

It is to be observed that all contacts are made with a pressure wiping action which preserves a good, bright line contact at all times. The resilience of the blade makes the spring pressure permanently effective.

The insulation consists of 1¾″ rods of Lapp Vacuum Process Porcelain, white glazed, mounted in sockets provided in the rigid brass base. To the other ends caps are attached by the new process now used on all Lapp stand-off insulators. This type of attachment provides maximum electrical efficiency and highest mechanical strength. The usual inserts in such pieces weaken the porcelain in both regards. The entire assembly is strong and rigid and will provide many years of efficient service.



Catalog No. 9331

Radio Strain Insulators

As shown in the following pages, Lapp Insulator Company made a variety of radio strain insulators over the course of many years. Today, Lapp strains are still popular with ham radio operators. Most were originally designed for heavy-duty commercial or military applications and are of a very high quality.

Lapp no longer makes strain insulators. And, sadly, few Lapp strains were displayed in the company's museum. During my tour, the only strain that I saw outside of the museum's glass cases, was a Lapp steatite bar that a lab employee was using.

Years of Production:

As best as I am able to determine, Lapp produced radio strains at its LeRoy, NY, plant from the late teens until the early 1960's.

Bulletin 110 says that radio insulator production began in 1919 (2:2). By 1920, bomb guy insulators had been produced for testing at a high-powered broadcast station in China (2:19). By the late 1920's, Lapp was cataloging quite a variety of strain designs.[4]

Radio strain insulator production supposedly ended during the 1960's. Lapp had an advertising spread for its line of radio products in the *1962 Institute of Radio Engineers directory* (my latest). In that publication, three employees of Lapp's Radio Division were listed as IRE members:

- Sumner P. Lapp, the manager of the division and an IRE member since 1955
- Rudolph S. Lapp, an electrical engineer and an IRE member since 1935
- Richard D. Stefani (4).

Sumner Lapp was John S. Lapp's youngest son. Rudolph, the eldest, was noted as a "radio buff" in Mill's book. According to Mr. Mills, Rudolph used his interest in radio to guide "Lapp into some very advanced work in this field." (1:97). Wendell V. Lapp, the second eldest of John S. Lapp's four sons, also worked in the Radio Division before transferring to the Process Equipment Division (1:97).

Lapp's Sandersville, GA, plant was not opened until the late 1960's so I consider it likely that all radio strains were produced at that factory in LeRoy, NY.

Glaze Colors:

In his book, *Porcelain Insulators - Guide Book for Collectors*, Jack Tod mentions several colors of glaze used at Lapp: brown, white, chocolate brown, orangy, and blue (5:131). Specimens of Lapp strains in each of these colors (except for blue) are found in collections today.

John Lewis has a good-sized orangy strain that was originally made for the Navy (SE-2133). This nice early strain doesn't bear a manufacturer's mark, but it appears to be a Lapp 5993[5].

The regularity with which we find "plain" brown units likely stems from massive World War II era and other military and commercial production. White-glazed "Lapp Steatite" bars were also used both by the military and commercial concerns[6]. And

[4] See pages 21-22.

[5] See page 20.

[6] See page 16.

they also turn up with some regularity.

Markings:

The chart of date markings on page 19 was given to me by an employee during the tour. It provides date code markings for Lapp products made in 1941 through 1990. Earlier date markings (1919 – 1940) are explained in Jack Tod's book.

Tod says that only a fraction of the company's pin insulators were actually marked (5:132). I don't know if this holds true for the strain insulators. I suppose that it could. However, I would expect most or all military-specification insulators to be marked, in keeping with regulations.

The trademark Lapp oval marking does not appear on the strain insulators that I've seen. However, I've received very few reports from readers for early Lapp, and strains with the early marks may yet show up. I've not seen date codes of the types described by Tod, or on this chart, used for the radio strain insulators, but I would appreciate any additional information.

Lapp seems to have used two methods for marking its radio insulators: under-glaze ink markings and stamped-in "incuse" markings on the metal ends.

➢ **Under-glaze ink markings**

A simple "LAPP" underglaze ink marking is typical for the company's strain insulators. Steatite insulators were marked "LAPP STEATITE."

On both white-glazed and brown-glazed insulators, the markings are often made in black ink. (You may have already figured out that it's far easier to see the black ink under the white glaze). A chocolate brown style 70 military strain insulator[7] in **John Lewis's** collection is marked with a silver or white ink. Another, from my collection is marked with an off-white or tan LAPP.

Lapp's military manufacturer's symbol was CBO (6). Its Federal Source Code for Manufacturers (FSCM) is 75539 (7).

World War II vintage insulators such as the Navy's 7-1/2" 61014A[8] are regularly found with the "CBO" marking. A 10" 61013[9] in my collection, is marked CBO and with the word LAPP as well. Perhaps the insulator was sold both to the military and commercial purchasers.

In addition to the manufacturer's marking, larger Lapp strains are occasionally marked with their rated capacity. It's fun to heft one of the "big guys" for guests and point out the "SAFE WORKING LOAD 3000 LBS" message stamped on the side.

➢ **Stamped-In (Incuse) Markings**

Jack Tod says that Lapp used stamped-in markings during the first 10 years of manufacture. Then, in 1927, Lapp started using under-glaze markings (5:132). Although no Lapp strains have been reported with the pre-1927 markings, it is quite possible that they exist.

My collection includes a Navy 61175A

---

[7] Similar units are pictured on page 27 and in *OFS* 10/98 pg. 24. The style 70 insulator is similar to the white units with metal ends shown in the middle of the picture.

[8] See picture on page 27. The 61014A is the 7-1/2" brown ribbed strain, second in from the lower left-hand corner.

[9] This appears to be the same as Lapp part number 5993. See page 20.

standoff insulator with stamped-in markings on one of the metal ends. This style of incuse marking should *not* be used as an indication of early manufacturer. The particular insulator is ribbed from end to end. The only practical way to mark the item was on one of the metal end fittings. It is most likely a World War II item.

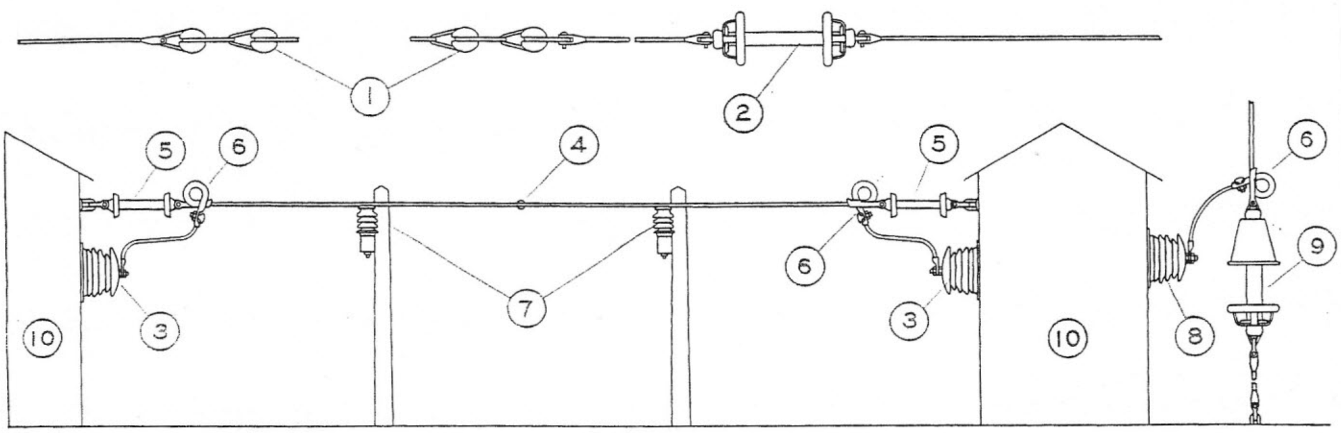
Steatite:

Lapp manufactured insulators from steatite for a period of time that spanned World War II. The ad below shows some of the many styles that were produced. Unlike porcelain, steatite is a talc-based insulating material with exceptional insulating properties at high temperatures and at radio frequencies[10].

Lapp's high-quality steatite insulators found application at many large commercial radio broadcasting installations. Several of the insulators that **Lee Stewart** recovered from the Voice of America installation at Bethany, OH, were marked LAPP STEATITE. Lee found both brown and

Suggested Materials

for Antenna and Transmission Line Construction



1 Break-up insulators, page 7. All guys, supporting wires, etc. in high intensity field of antenna should be broken.

2 Antenna insulator. No. 9172 if voltage high or No. 9171 if moderate. No. 9182, page 5, suitable if electrical and mechanical duty not great.

3 Lead-in insulator. For higher voltages select from page 8. Otherwise No. 9167, page 9.

4 Spreader insulators where desired. Page 7.

5 Dead-end insulator. Prefer No. 9182, page 5.

6 Dead-end clamp No. 7511 below. Preferred to many other types because of its economy, convenience and satisfactory performance.

7 Transmission Line insulator. Line Post, below, excellent for this duty or use Stand-Off Insulator No. 9063, page 13. Either type greatly to be preferred to ordinary pin type insulators which have very high loss and capacitance compared to these. Some engineers prefer a suspended transmission line. Use No. 9182 or No. 9150, pages 5 and 6. Certain types pages 6 and 7 suitable if loading not high.

8 Antenna lead-in insulator. Usually voltage high and subject to lightning. Select from the larger insulators, page 8.

9 Prefer corona ring rain shield insulator, design No. 9173, page 4.

10 Numerous requirements for stand-off insulators, pages 12 to 15, for bus supports, switches, tube supports and for holding and insulating heavy equipment as condensers and inductances. Also there are many requirements for various sizes of lead-in insulators, pages 8 to 10.

---

[10] See *OFS* 12/97.

Steatite, the raw material, is available in greater quantity than can be used. The only limiting factor in availability of finished Steatite insulating pieces is the facilities for producton. Lapp has mastered the technique of Steatite production and offers almost unlimited capacity for Steatite — in pieces for which Lapp processes are suitable. These include nearly all types of large pieces in which close tolerances are not primary factors—pieces that can be made by extrusion, throwing, plunging, turning, casting —such pieces as standoff insulators, rod antenna insulators, bowl entrance insulators, bulkhead insulators, streamline entrance insulators. Facilities are adequate also for a large volume of sanding and cementing of Steatite into hardware.

There is no reason to substitute for Steatite in pieces which can be made by Lapp.

Lapp INSULATOR CO., INC.

LEROY, N. Y.

white glazed insulators of various lengths at the site. Several are pictured in the 6/97 *OFS* article about the station. A Lapp steatite cruciform insulator that was used on the station's open wire feed line is shown on page five of the issue.

I understand that one of the reasons for dropping the production of steatite insulators was that Lapp was dependant upon another company to provide raw materials.

Photo Gallery

The photo below shows John S. Lapp (the company founder) and Grover Lapp (his brother) accepting an "E" award from the U.S. Army Signal Corps for the company's contribution to the war effort during World War II[11].

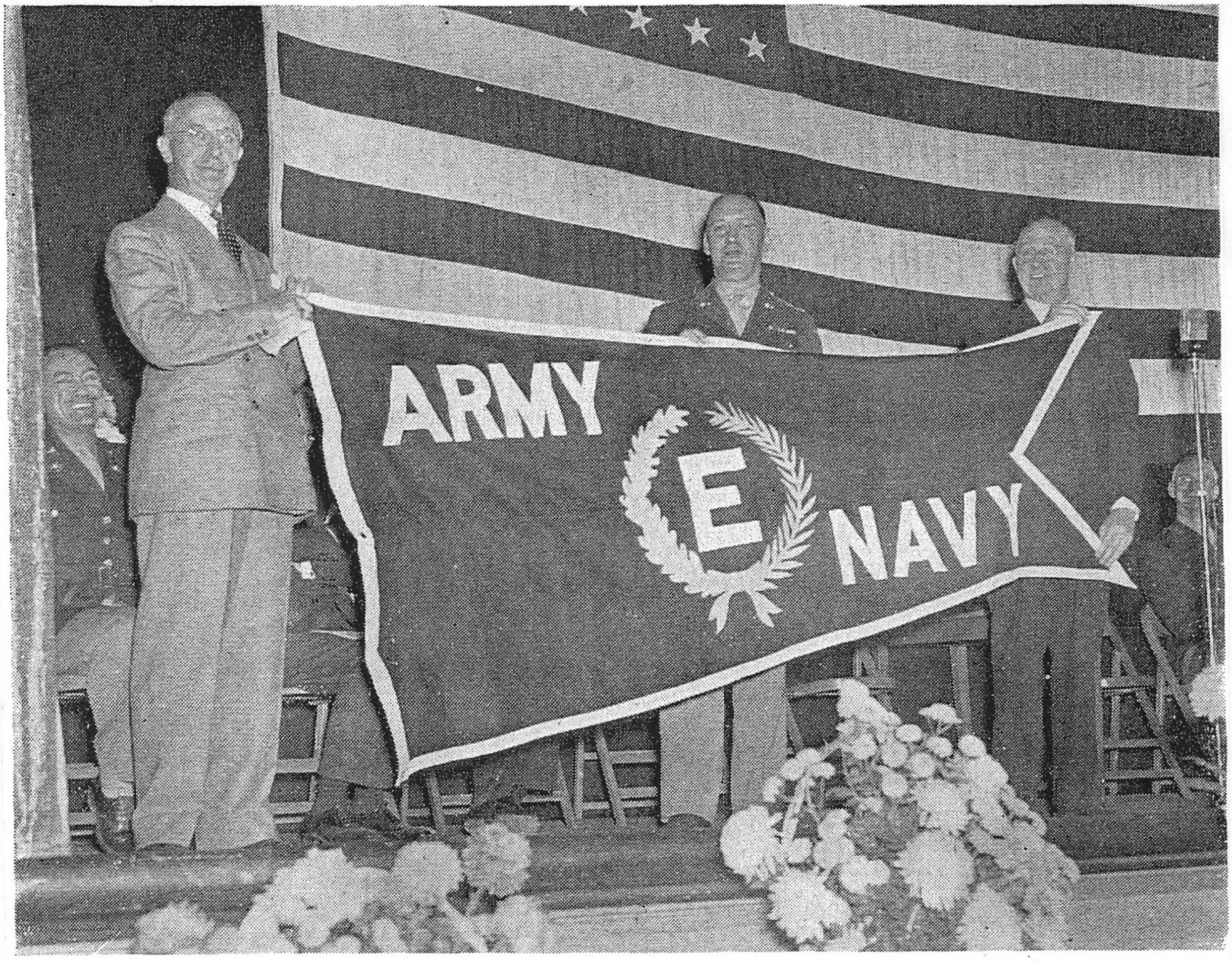
The next few pages shows Lapp radio insulators from every era of production.

- Pages 20-21 show insulators from Lapp's Catalog No. 4 (1928).
- Pages 22-26 are from Lapp's Bulletin 110 which was issued in 1934. They picture examples of the company's improved insulator designs that were in use prior to World War II.
- Examples of the company's 1940's era production are shown on page 16.
- The ads on page 27 are from the company's display ad in the *Institute of Radio Engineers 1962 directory*. They show typical products from the company's radio line in the final years of production[12].

[11] I am confused by Mr. Mill's's statement that "practically no insulators of any kind" were made during World War II (1:168). This statement is in stark contrast to the company's advertising and its achievements as noted above. Further, insulators with World War II era markings are quite common today. I cannot think of a way to reconcile the two apparently conflicting facts.

[12] Illustrations in *Catalog 8* (1959) are identical to those used in the 1962 *IRE* ad three years later. While it is clear that the pictures just show a representative sample of the available products, it can be inferred that the line was mature by this time and mainly consisted of time-tested designs.

Lapp Execs Get Pennant for "Excellence"



At LeRoy(N. Y., on November 16, the Army-Navy "E" was awarded to the Lapp Insulator Co., Inc., and its employees. Above, left to right, are seen John S. Lapp, president of the company; Major H. D. Newton, U. S. Army Signal Corps; and Grover W. Lapp, company treasurer. The Lapp company is a large producer of condensers, porcelain water coils, insulators, and numerous special parts of porcelain and steatite, used in the electronic industries

LAPP INSUL/ ›R CO., INC	LEROY, N ʻ.	DWG. S-1817 C	DA⁻ 2-15-49	DATE ETTER F RUBBER TAMPS
REVISIC.	DA..	REF.	REV. 10-28-65	DWN. CHK. APP.

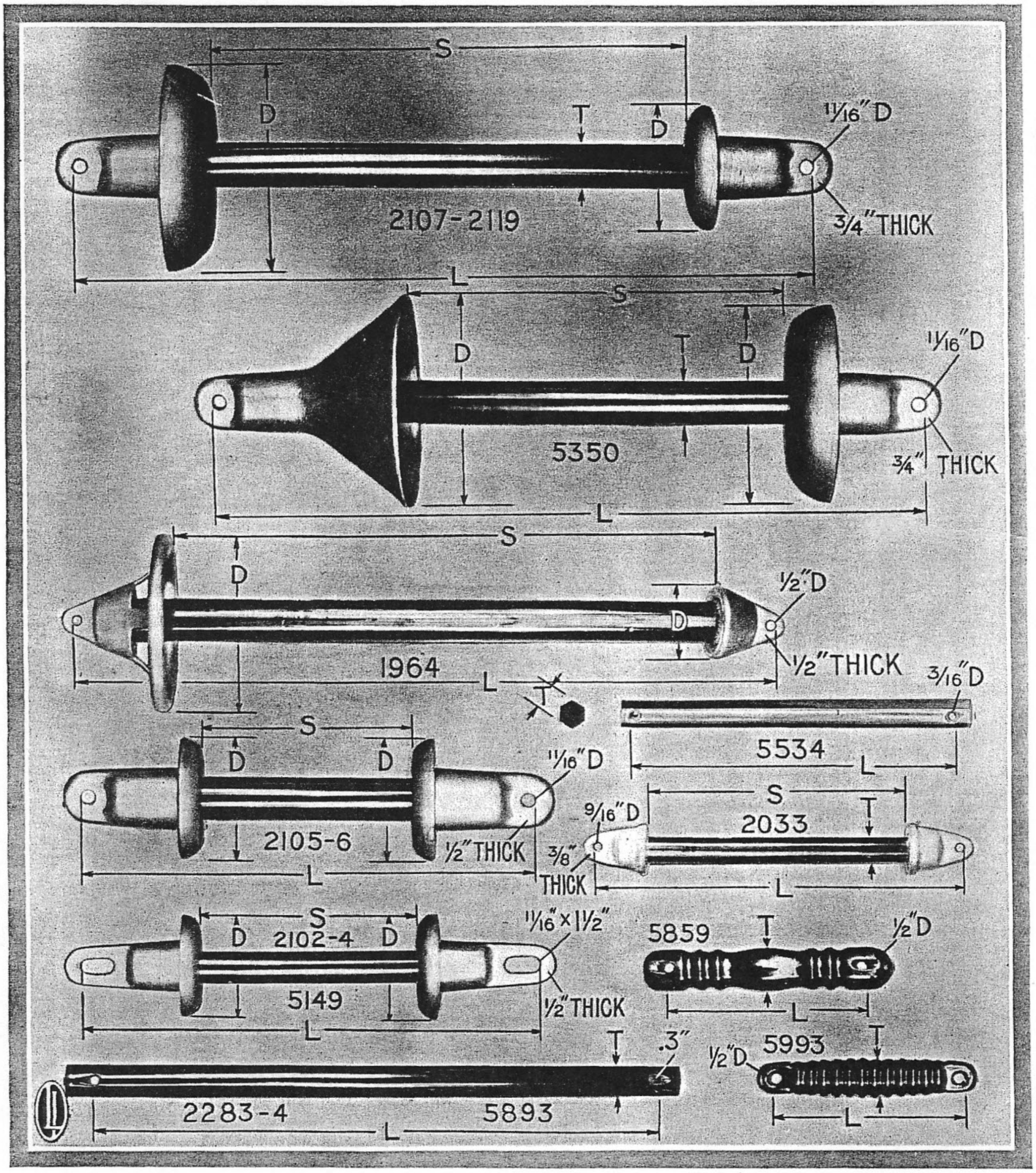
FROM 1941 THRU 1990

LETTER	YEAR	LETTER	YEAR	LETTER	YEAR
A	1941	W	1962	S1	1983
B	1942	X	1963	T1	1984
C	1943	Y	1964	U1	1985
D	1944	Z	1965	V1	1986
E	1945	A1	1966	W1	1987
F	1946	B1	1967	X1	1988
G	1947	C1	1968	Y1	1989
H	1948	D1	1969	Z1	1990
I	1949	E1	1970		
J	1950	F1	1971		
K	1951	G1	1972		
L	1952	H1	1973		
M	1953	I1	1974		
N	1954	J1	1975		
O	1955	K1	1976		
P	1956	L1	1977		
R	1957	M1	1978		
S	1958	N1	1979		
T	1959	O1	1980		
U	1960	P1	1981		
V	1961	R1	1982		

THESE DATE LETTERS ARE TO BE USED ON THE VARIOUS STYLES OF STAMPS AS REQUIRED.

LAPP RADIO INSULATORS

OUTDOOR ANTENNA TYPES



See also Bomb Guy types, page 57. All castings are silicon-aluminum alloy, free from salt water destruction.

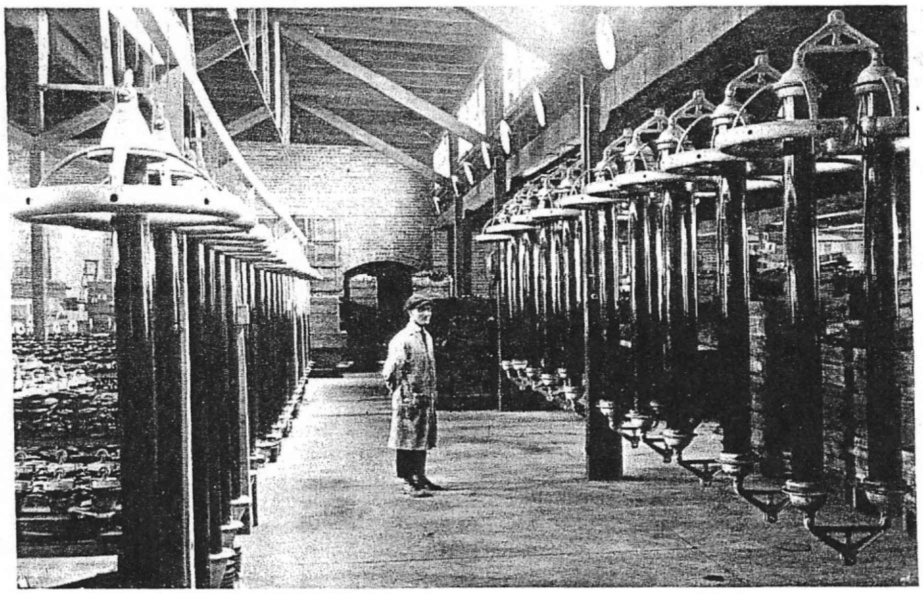
LAPP RADIO INSULATORS

OUTDOOR ANTENNA TYPES

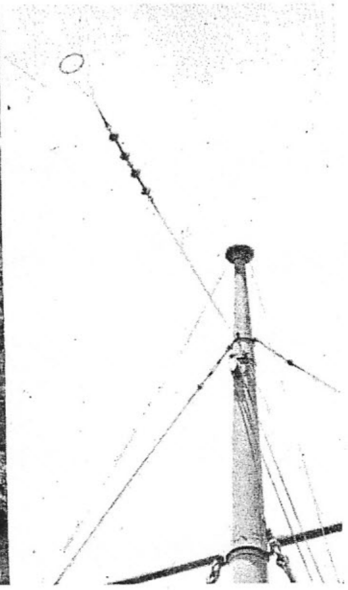
No.	60 cyc. Arcover KV.	C. W. Safe KV.	Strength Lbs.	Net Lbs.	INCHES D	INCHES D	INCHES L	INCHES S	INCHES T	Code
1964	330	110	4000	20.0	10.	4.2	39	30	2.5	ABBYG
2033	150	30	4000	4.8			20.5	14	1.5	ABBYL
2102	100	35	4000	3.5	4.75	4.75	17	6	1.5	ABBYM
2103	140	45	4000	4.0	4.75	4.75	21	10	1.5	ABBYS
2104	170	55	4000	4.5	4.75	4.75	25	14	1.5	ABCAC
2105	100	35	6000	7.0	5.63	5.63	17.3	6	2.0	ABCAF
2106	140	45	6000	7.8	5.63	5.63	21.3	10	2.0	ABCAG
2107	225	75	6000	10.0	9.25	5.63	26	14	2.0	ABCAL
2108	275	95	6000	11.0	9.25	5.63	30	18	2.0	ABCAM
2109	320	110	6000	12.0	9.25	5.63	34	22	2.0	ABCAP
2112	350	120	8500	23.0	12.5	9.5	37	22	2.5	ABCAS
2113	400	135	8500	24.0	12.5	9.5	41	26	2.5	ABCED
2114	450	150	8500	25.5	12.5	9.5	45	30	2.5	ABCEH
2117	350	120	11000	29.5	12.5	9.5	37	22	2.5	ABCEJ
2118	400	135	11000	31.0	12.5	9.5	41	26	2.5	ABCEK
2119	450	150	11000	32.5	12.5	9.5	45	30	2.5	ABCEN
2283	110	20	3000	2.3			12.8		1.5	ABCER
2284	230	45	3000	4.3			26.2		1.5	ABCET
5149	220	75	4000	5.2	4.75	4.75	33	22	1.5	ABCEV
5350	360	120	6000	13.5	9.25	10.0	34	28	2.0	ABCIC
5534	90	15	700	.4			9.2		.75	ABCIF
5859	100	20	3000	4.5			11		2.5	ABCIL
5893	160	30	1000	1.3			18		1.0	ABCIM
5993	110	20	1400	2.6			10.5		2.3	ABCIP

Special shapes or sizes can be supplied. In addition to these standard styles we have supplied large quantities of special designs, such for example, as illustrated below.

Add approximately 25% to net weight to ascertain approximate packed weight.

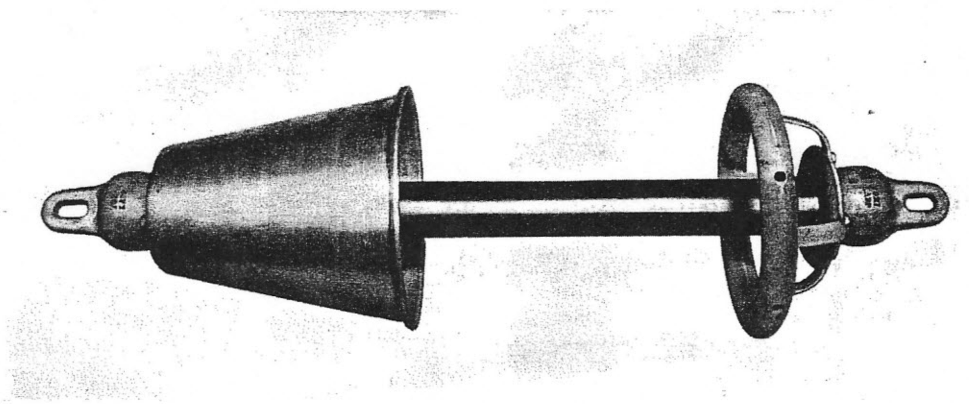


Special antenna insulators. Porcelain tubes 4″ I.D., 6″ O.D., length between caps, 72″. Tensile strength per tube 32,000 lbs., proof-tested at 20,000 lbs. Corona shields 30″ D.



2 No. 2107 in series on main bridle of new SS. MALOLA.

Lapp Antenna Insulators



Insulator No. 9173P30

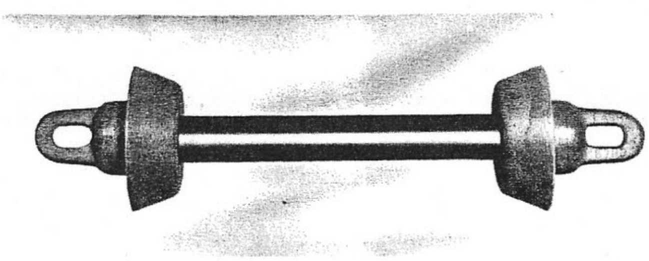
LAPP Vacuum Process porcelain has been used in antenna insulators for a great many years with complete satisfaction and continues unsurpassed for this service. The large number of installations and the widely varying types of service provide a complete and satisfactory operating test of these designs. The excellent mechanical strength and electrical characteristics of the material are combined by most careful workmanship into assembled insulators which give long, trouble-free life.

The porcelain, in addition to being absolutely nonabsorbent so far as exacting laboratory tests can determine, is not affected by smoke, salt spray or fog, chemical fumes or other contamination. The hard, smooth, glass-like glaze offers the best chance for any contamination to be removed by wind and rain, thus preserving the original high resistance surface of the porcelain.

A most interesting development which improves the uniformity of load application to the porcelain has resulted in a considerable increase in strength for a given porcelain diameter. This improvement also increases the uniformity of the insulators, developing practically the full strength of the material.

Lapp was one of the first, if not the first, to use silicon aluminum caps to combat the corrosive effect of salt spray. All Lapp caps are of this material. In addition, there are many special design features which assure maximum satisfaction from each individual insulator. These features are based on complete experimental facilities which include ceramic, mechanical and chemical laboratories as well as one devoted to electrical determinations. Heat run data are available for any insulator at any frequency and voltage.

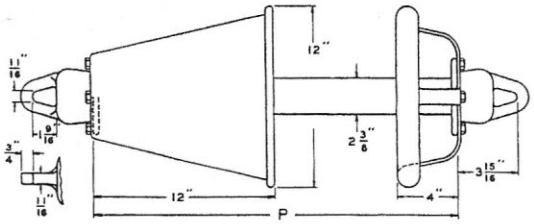
It is well to note that single insulators can be provided to meet almost any strength requirement without the necessity of yokes for multiple insulators in parallel. The addition of extra, unnecessary hardware serves to increase the capacitance of the assembly and in some cases reduces the effectiveness of the insulation.



Insulator No. 9182P14

Lapp Antenna Insulators

Heavy Duty Types



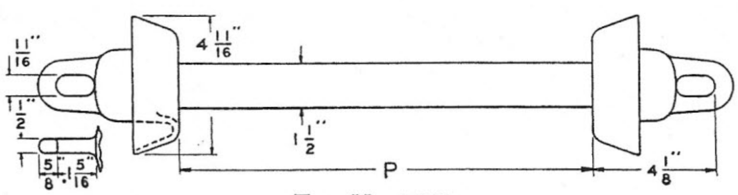
Type No. 9173

Cat. No.	Type	Order Lengths P-Ins.	Net Wt. Hardware Lbs.	Add Lbs. Per In. P	Strength Lbs.
9171	No Ring or Shield	12-16-20 24-30	6½	.39	12,000
9172	2 Rings	16-20 24-30	12¾	.39	12,000
9173	Ring and Shield	20-24-30	12¼	.39	12,000

THESE insulators, with the attachments, form a complete line of high strength units and are suitable electrically and mechanically for the most severe duty. Select insulator No. 9171 if the electrical duty is not particularly great. If it is severe prefer the corona ring type No. 9172. These rings eliminate the need for large caps, reduce loss, temperature rise and corona. The rain shield type No. 9173 is used when it is important to hold leakage current to the minimum value or to protect the porcelain from excessive water such as is encountered at the foot of the down lead of a flat top antenna due to the water that falls on and flows down the lead.

Specify insulator length desired by adding suffix P16, etc., to catalog number. Example, No. 9172P16 calls for an insulator with a net porcelain length between caps of 16 inches.

MATERIAL: Lapp Vacuum Process Porcelain, chocolate brown glazed. Silicon aluminum caps and corona rings. Duralumin attachment cap screws. Rain shield of .091″ spun aluminum.



Type No. 9182

This insulator, strength 7500 pounds and available as standard in 10, 14, 18 and 22 inch net porcelain lengths, is suitable for a large percentage of all antenna applications and is the most popular insulator in the entire Lapp line. Quantity production makes the price moderate.

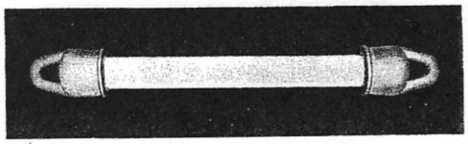
A simple but important design feature has been incorporated in this unit. The thin, extended cap lip serves not only as a corona shield and grading device but also as a cushion to protect the porcelain from damage in case the insulator is accidentally dropped, thus avoiding much mysterious breakage.

Specify insulator length desired by adding suffix P14, etc. to catalog number. Example, No. 9182P18 calls for an insulator with a net porcelain length of 18 inches. Weight of hardware 2¾ pounds. Add .15 pounds per inch of P dimension.

MATERIAL: Lapp Vacuum Process Porcelain, chocolate brown glazed. Silicon aluminum caps.

Lapp Antenna Insulators

Moderate Duty Types



Insulator No. 9150P10

Insulator No. 9150, strength 5000 lbs., is suitable for a considerable range of moderate duty applications. The caps are without any type of shielding and were made small as possible to reduce capacitance, thus making the insulator more effective for short wave applications. The assembly combines maximum strength with minimum weight.

Order for net porcelain lengths of either 8, 10 or 12 inches. Weight, 8″—1¾ lbs.; 10″—2 lbs.; 12″—2¼ lbs. Cap eye opening $1\frac{1}{16}$″ x ½″, thickness ⅜″. When ordering, use suffix to catalog number to indicate the desired length. For example, write No. 9150P10 for 10″ of net porcelain length.

MATERIAL: Lapp Vacuum Process Porcelain, white glazed, silicon aluminum caps.

Round Strain Insulators

Insulator No. 9175P18

Cat. No.	Diameter Inches Rod	Diameter Inches Holes	Select Inches Between Holes	Pounds Strength	Wt. per Inch, lbs.
9174	1	⅜	10, 14, 18	1000	.069
9175	1½	$\frac{5}{16}$	12, 18, 25	2000	.15

Strong, well designed and carefully made, these insulators are recommended for many types of service where the loading is not severe. For short wave work including directional antenna arrays where their permanent low loss characteristics and reliability are particularly valuable.

In ordering, specify length between holes desired by adding that figure as a suffix to the catalog number. Example, 9174P14 for 14″ length.

MATERIAL: Lapp Vacuum Process Porcelain, white glazed. All supplied with grooved cable ways.

Rectangular Strain Insulators

Insulator No. 9178P8

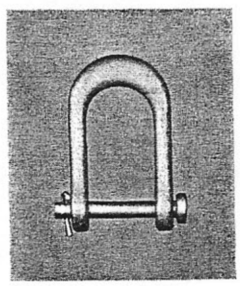
Catalog Number Without Grommets	Catalog Number With Grommets	Select Inches Between Holes	Dimensions Inches Bar	Dimensions Inches Hole Dia.	Lbs. Str.	Wt. Pr. Inch
9176	9177	6, 8, 10	$\frac{9}{16}$x1¼	⅜	1000	.062
9178	9179	6, 8, 10	1 x1½	⅜	1500	.132

The chief application for these insulators is in the short wave field where large quantities are used in directional arrays and in other equipment. They may be used with or without the soft copper grommets which serve to distribute the loading on the porcelain, increasing the strength of the assembly.

In ordering, specify desired length between holes by adding that figure as a suffix to the catalog number. Example, 9178P10 for 10″ length.

MATERIAL: Lapp Vacuum Process Porcelain, white glazed.

Clevis No. 9035 may be used with insulators No. 9178 and No. 9179. It facilitates attachment of the cable and replacement in case the insulator is broken.



Cat. No. 9035

Lapp Antenna Insulators

Spreader Insulators

Insulator No. 9181P12

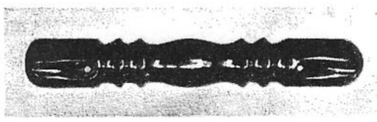
Cat. No.	Order Length Inches	Diameter, Inches			Pounds Wt. Per Inch
		Rod	Hole	Groove	
9180	6, 8, 10	¾	$\frac{3}{16}$	$\frac{3}{16}$	.039
9181	8, 10, 12	1	⅜	⅜	.069

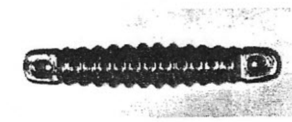
Used chiefly in radio frequency transmission lines but are suitable for general applications where it is desired to maintain proper separation of electrical conductors. Can be supplied in other spacings, but the ones shown are standard. Indicate length desired as a suffix to the insulator number.

Material: Lapp Vacuum Process Porcelain, white glazed.

Shaped Antenna Insulators

Cat. No. 5859





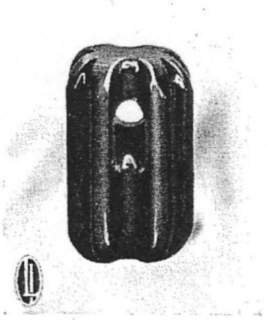
Cat. No. 5993

These insulators have been designed to include more leakage distance than the conventional plain types. They are suitable for applications where the mechanical and electrical duty is not severe.

No. 5859, weight 5 pounds; strength 4000 pounds; hole ¾ inch dia. Length, between holes, 9½ inches. No. 5993, weight 2.5 pounds; strength 1750 pounds; hole ½ inch dia. Length, between holes, 9½ inches.

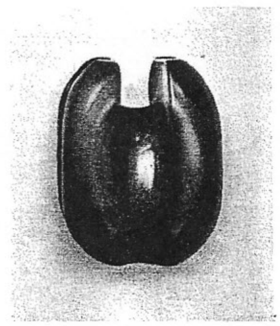
Material: Lapp Vacuum Process Porcelain, chocolate brown glazed.

Break-Up Insulators



Nos. 5450, 5451, 5452

Cat. No.	Strength	Diam. Ins. Max. Cable	Ins. Length	Net Wt. Lbs.
5450	10000	$\frac{7}{16}$	3½	1.5
5451	16000	$\frac{9}{16}$	5	2.9
5452	22000	⅝	6¼	4.9
7080	15000	½	3½	1
7341	25000	⅝	4	2
6696	50000	⅞	6	6



Nos. 7080, 7341, 6696

There are many places where break-up insulators are required to prevent losses and re-radiation. Supporting wires for antennas, guy wires and the like should be broken electrically. Due to the small leakage distance and flashover values these insulators are not generally recommended for primary insulation. In certain cases where the electrical duty is low, adequate insulation may be obtained by using several units in series. With these designs the cables are interlocked, working the porcelain in compression in contrast to the usual antenna insulator where the porcelain is in tension. Failure of a unit can not endanger the structure. Temperature rise data available for all designs.

The open end type has the advantage of most simple replacement since a new insulator can be inserted without interfering with the cables. The closed end type is produced in large quantities for the power field and as a result costs considerably less.

Material: Lapp Vacuum Process Porcelain, chocolate brown glazed.

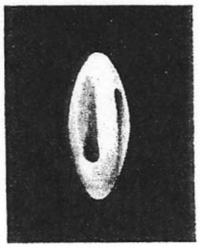
Lapp Airplane Radio Insulators

RAPID advances in the art of radio transmission combined with equally spectacular improvements in the ships themselves have created a situation in which there is little material that can be considered standard and catalogued as such. Many of the engineers responsible for the design and maintenance of airplane radio equipment are engaged in the development of new antenna systems believing that present methods are subject to considerable improvement.

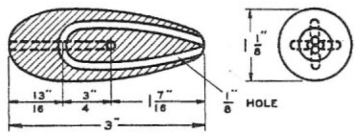
The Lapp Insulator Company is ready at any time to aid in such development work having available a wealth of experience in the design and production of all types of radio insulators, a proved material with which to work and testing facilities to check the correctness of the designs.

It seems worth while, therefore, to present here only a few designs, at the same time extending our offer of full cooperation in new developments.

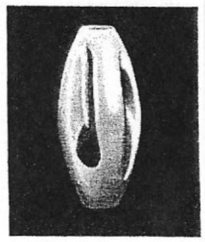
Antenna Insulators



No. 8979



No. 9025

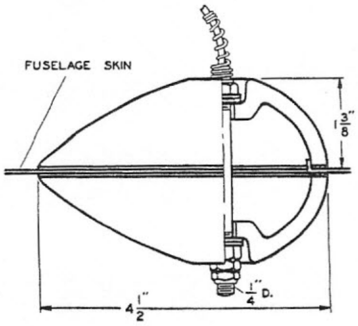


No. 7189

STREAMLINED antenna insulator No. 9025 shown above represents a revolutionary departure from the conventional unit for this duty. It combines many desirable qualities heretofore not available. The strands are interlocked within the insulator. In the past such interlocking has been desired for safety but has been accomplished at great sacrifice of electrical characteristics, particularly leakage distance. Moreover, the conventional insulator to increase leakage distance utilizes corrugated surfaces which are the opposite of effective streamlining.

Leakage distance, 3 inches as compared with a fraction of an inch for conventional insulators. Weight 2.5 ounces. Due to the close spaced interlocked holes the corona forming voltage is comparatively low, slightly over 2 Kv at 850 Kc. It is necessary to operate the insulator below the corona voltage because of heating. Hole treatments are possible which will increase this corona forming value. Temperature rise and other test data available on request. White glazed.

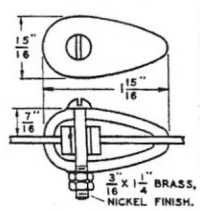
The conventional guy type antenna insulators, such as insulators No. 8979 and No. 7189 have been used to support airplane antennas for many years. A great many are in service giving entire satisfaction. These insulators are supplied white glazed. Leakage distance, No. 7189, ¾" and of No. 8979, $\frac{5}{16}$". Weight, No. 7189, .95 ounces; No. 8979, .18 ounces.



No. 9321

Streamlined Entrance Insulators

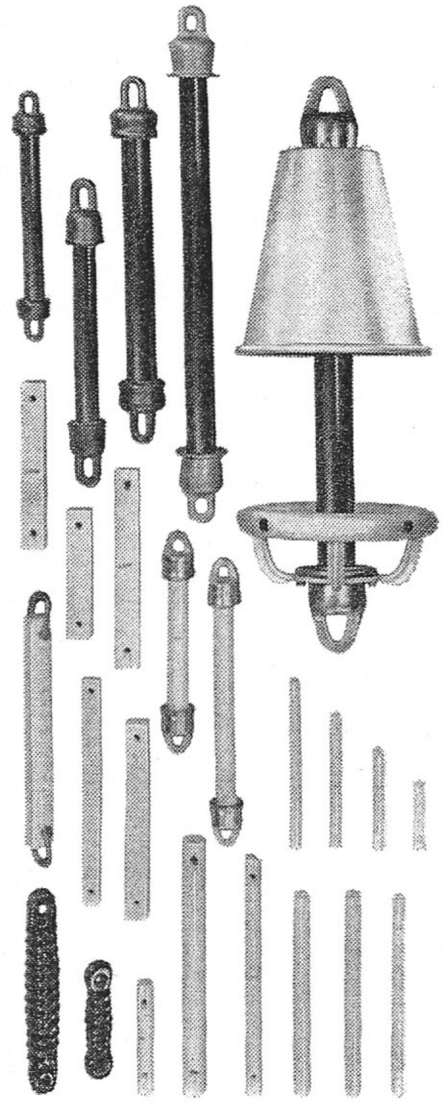
THESE FULLY streamlined entrance insulators are presented to indicate the possibilities along this line. Modern, high speed ships are worthy of the best equipment which the state of the art affords. These insulators open an entirely new field of improvement. White glazed. Weight No. 8980—.8 ounces.



No. 8980

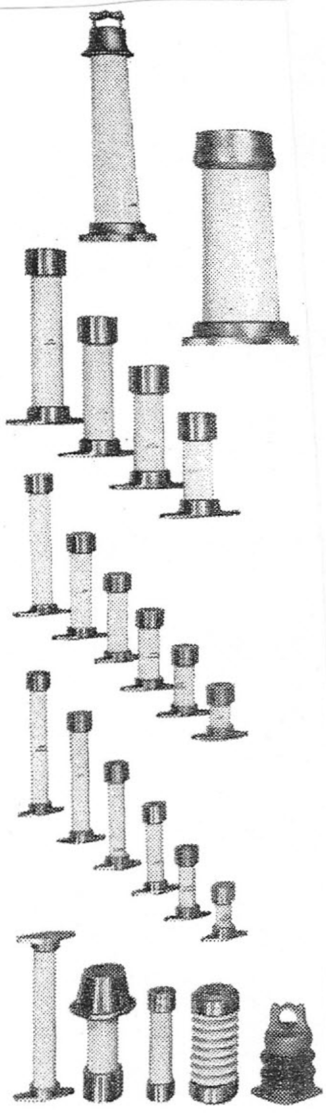
ANTENNA STRAIN INSULATORS

The largest of the porcelain rod insulators shown develops 12,000 lb. strength. Available, as specified, with rain shield and/or corona rings. Smaller units, in porcelain or steatite, for all strain or spreader use. Engineering and production facilities also available for special performance units See catalog 301.



Lapp

LAPP INSULATOR CO., INC.
RADIO SPECIALTIES DIVISION
150 SUMNER ST., LE ROY, N. Y.



STAND-OFF INSULATORS

Dependable mechanical and electrical performance—and trim good looks. Hundreds of standard and special types available.

Write for Bulletin 301, listing entrance and stand-off insulators.

Acknowledgments

I want to again thank the owners and employees of Lapp Insulator Company for their assistance and for the tour. Dad and I had a great time.

The pictures reprinted in this article were reproduced by permission of the company.

Bob Stahr and **Elton Gish** donated copies of Lapp radio insulator catalogs that were key in preparing this article.

End Notes

1. Mills, Brent "Porcelain Insulators and How They Grew" (LeRoy, NY: published privately) 1970.
2. Lapp Radio Insulators - Bulletin No. 110 (courtesy of Bob Stahr)
3. Lapp Insulators - Catalog No. 8 1959 (courtesy of Bob Stahr)
4. "IRE Directory 1962" The Institute of Radio Engineers Inc. New York.
5. Tod, Jack "Porcelain Insulators - Guide Book for Collectors" 3rd edition, (Buna, TX: Infinity Press) 1995.
6. Chesson, F.W. "Electronic Military Equipment: Naval Equipment Manufactures" The AWA Review Vol. 7 (1991) pp. 69-89.
7. Wrigley, Don letter, 1997.

Photo Credits

Front Cover: Source Unknown
Pg. 6 Electronics 3/41 pg. 9, Bulletin 110 pg. 2, Bulletin 110 pg. 20
Pg. 8 Electronics 12/42 pg. 35
Pg. 9 Electronics 2/42 pg. 15
Pg. 10 Lapp Catalog No. 4 pg. 70
Pg. 11 Radio Broadcast 2/28 pg. 270
Pg. 12 Bulletin 110 pg. 24
Pg. 15 Bulletin 110 pg. 16
Pg. 16 Electronics 9/42 pg. 29
Pg. 18 Electronic Industries 12/42 pg. 97
Pg. 20 Lapp Catalog #4 pg. 72
Pg. 21 Lapp Catalog #4 pg. 73
Pg. 22-25 Bulletin 110 pg. 4-7
Pg. 26 Bulletin 110 pg. 11
Pg. 27 IRE 1962 Directory pg. 53
Back cover: Bulletin 110

Sources

Chesson, F.W. "Electronic Military Equipment: Naval Equipment Manufactures" The AWA Review Vol. 7 (1991) pp. 69-89.
Gish, Elton "Fred M. Locke - A Biography" (Buna, TX: Infinity Press) 1994.
"IRE Directory 1962" The Institute of Radio Engineers Inc. New York.
Lapp Catalog No. 4 - 1928 (courtesy of Elton Gish)
Lapp Insulators - Catalog No. 8 - 1959 (courtesy of Bob Stahr)
Lapp Radio Insulators - Bulletin No. 110 - 1934 (courtesy of Bob Stahr)
Lehner, Lois "Lehner's Encyclopedia of U.S. Marks on Pottery, Porcelain & Clay," (Paducah, KY: Collector's Books) 1988.
Mills, Brent "Porcelain Insulators and How They Grew" (LeRoy, NY: published privately) 1970.
Tod, Jack "Porcelain Insulators - Guide Book for Collectors" 3rd edition, (Buna, TX: Infinity Press) 1995.
Wrigley, Don letter, 1997.

How to Replace a Base Insulator

by Warren Beals
formerly Chief Engineer - Okinawa
Far East Broadcasting Company

KSBU was a 100KW AM radio station on 1360 KHZ, owned and operated by the Far East Broadcasting Co. near the town of Okuma, at the north end of Okinawa. The station, operated for missionary purposes, was programmed in the Chinese language. The transmitter fed a four tower in-line array aimed at Shanghai, China. The towers had a height of 240 feet.

The transmitter site was a beautiful place, on a small peninsula extending into the China Sea. The salt water on three sides contributed to the effectiveness of the signal. The station signed off for good in 1972 when Okinawa was returned to the Japanese and they refused to extend its license.

Okinawa is in the middle of "Typhoon Alley" with several major typhoons hitting the island every year. These are major storms. Because of the threat of high velocity winds we made every effort to keep the towers in excellent condition, but the salt air created lots of problems.

We were funded by missionary funds from Christians around the world and we guarded against the spending of money unnecessarily because it was frequently scarce. However, we did maintain a good plant.

My home was about 55 miles south of KSBU, near Ojana, Okinawa. We had two local service radio stations close by.

In the typhoon season of 1970 we were hit by a good solid blow with about the usual force of winds and with peaks at 140 mph. During these blows we bring everything possible inside because the winds will remove anything that is loose.

At the height of the storm our engineer on duty at KSBU called to tell me that they were off the air. He stated that the indications were that the antenna system was shorted. Because it is unsafe to go outside during such winds all he could do was listen to the wind in the towers for their characteristic singing of the wind through them. It was too dark to see anything but he reported that the antenna array "sounded OK."

After daybreak, when the winds had died down enough for the crew to go outside they discovered that the tower base insulator on #1 tower was broken. It appeared that during the height of the storm the wind-driven salt spray had hit the base insulator during a modulation peak which created an arc across the insulator. The insulator shattered, about 75% of it fell to the ground, and we rode out the storm on only about 25% of the insulator! The remaining piece of insulator had a carbonized path across it which grounded the tower and indicated the short circuit. There was significant horizontal movement at the lower end of the tower because of the dying winds. Obviously, quick action was called for. If this tower went down all of them would. Their guy wires were interlaced!

Industry practice calls for taking the tower down piece-by-piece before changing out a tower base insulator. However, climbing the tower to dismantle it to replace the insulator was out of the question. The tower was too unstable.

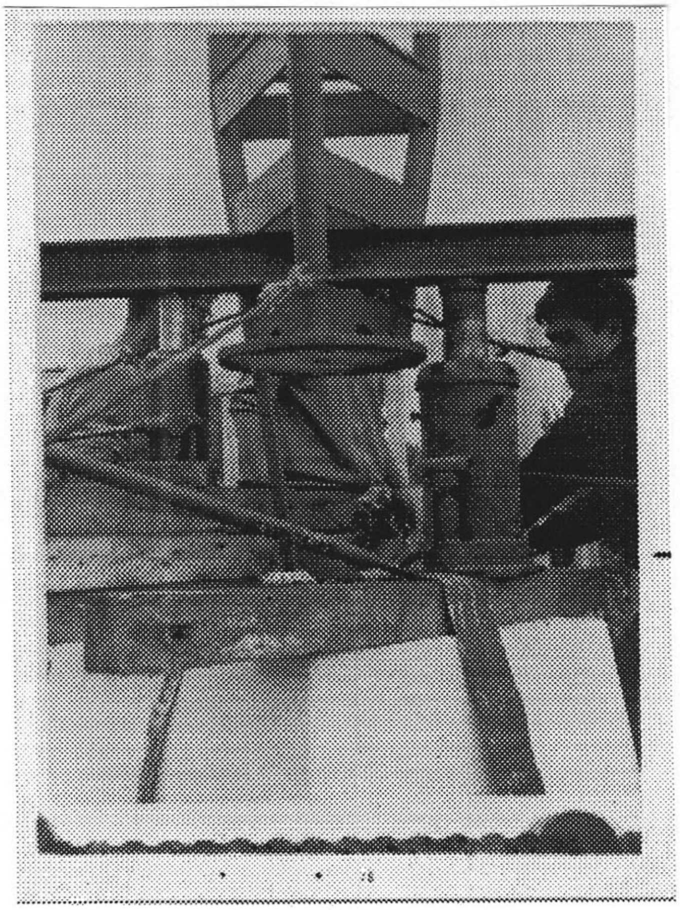
The solution that we arrived at worked. We borrowed two 50 ton hydraulic jacks from two different shops in Naha, the capital city. From a third place we borrowed a section of railroad track about 7 feet long. What railroad track was doing on Okinawa is not known. This stuff went into a small Mazda station wagon which was driven up island with its nose in the air because of the load.

The tower had some horizontal plates welded into the tapered section above the base insulator plate. We had no drawings on the tower and therefore had no idea of the strength of the plates.

We decided to try to raise the tower, in place, using the jacks and the railroad track. We set up the jacks on the concrete pier, threaded the track through the plates, took up a bit of tension to hold things in place, and had a crew meeting. On my command a crew at each of the three guy anchor points would slowly release some of the guy tension, while I slowly tried to raise the tower, hoping those plates in the tower could support the load. An added problem was wind. Should we get a gust of wind while we raised the tower on the jacks it would probably fall and drop everything.

We paused to pray! Couldn't think of anything more important.

We slowly raised the jacks, two strokes on one, then two strokes on the other. During this process we kept everyone away except me to operate the jacks. In a very short time the tower proceeded to lift off of the broken insulator.



KSBU Tower #1 sitting on jacks

When the tower had been raised enough to remove the broken insulator (just a few inches) the broken insulator was lifted out and a helper and a I lifted a new Lapp insulator into position.

It dawned on me I had a new problem. I hadn't checked the jacks to see how easily they would come down. I certainly did not want to rush this process and break another insulator.

With all of the gentleness I could summon, I carefully lowered one jack a fraction of an inch and found that I could control it well.

The trial was repeated with the other jack. It worked fine, too!

I proceeded to lower one jack a small amount and match that on the other side. In a very short time the tower was securely sitting on the new insulator and the guys were tightened and we were ready to go back on the air.

I looked at my watch. It seemed like the project took hours. It actually took only 45 minutes.

A question might be asked, "Where did the replacement insulator come from so quickly?" Our good friends at the Voice of America had a one megawatt transmitter installation next to us and they had just what we needed and they loaned it to us. Coincidence or divine intervention?

The 1962 Lapp ad on the following page shows tower base insulators similar to those used at KSBU.

Epilogue:

Warren Beals and his family have been personal friends of the Howard family for lots of years. On a plane flight years after this event, Warren found himself sitting along side a traveling salesman from the radio division of the Lapp company. Warren casually asked if the salesman if he had ever heard of anyone replacing a tower base insulator without taking the tower down first. Yes, he had, the salesman replied, but he figured that it was just a wild rumor.

My mother reminded me of Warren's story and put me in touch with him. Thanks, Mom!

More Pictures!!

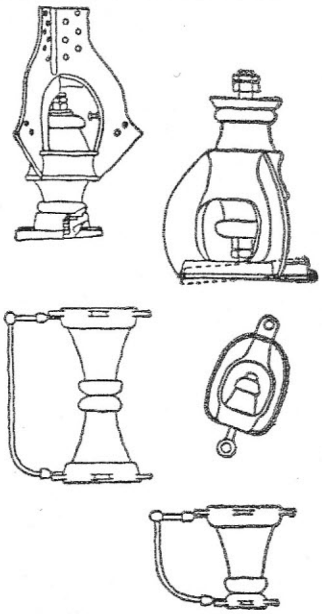
For more pictures of KSBU and other historical information about Far East Broadcasting Company, visit their web site at http://www.febc.org. On the home page, click the history button. The pages found there provide a detailed chronology of the FEBC's activities.

On the 1960 page, I found several pictures of KSBU including:

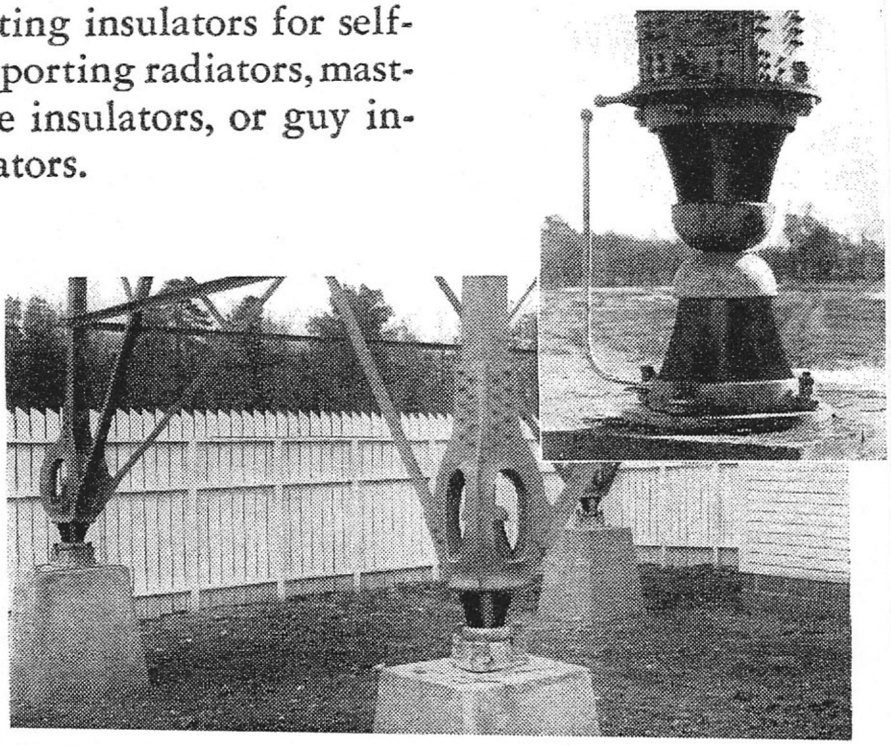
- an aerial shot showing the towers and the beach
- a low angle shot showing the transmitting shack and the towers
- a photo of a U.S. landing craft delivering transformers to the station.

The 1986 page has an interesting picture showing the remains of a typhoon-devastated tower and antenna array on Saipan. The site is a wealth of information. Enjoy!

ANTENNA TOWER INSULATORS



Most of the world's radio towers are supported by Lapp insulators, including the tallest guyed mast ever built. Through the Lapp "compression cone," immense loads can be carried by electrical porcelain. Write for data on Lapp footing insulators for self-supporting radiators, mast-base insulators, or guy insulators.

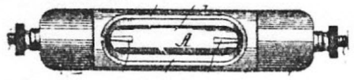


Classifieds

Wanted: Restoring Lapp Type 9173P12 (please see the drawings on pg. 20/21) ... need a 12" corona ring ... Lapp insul... ...nd, OR ... -7/99 s...@msn.com.

Wanted: Still seeking information on the E.F. Johnson company for an upcoming article. Please let me know what you have. Thanks, Dan Howard

802,702. POLARITY-INDICATOR. FREDERICK W. MANGER and CHARLES E. AVERY, Jersey City, N. J., assignors to Manhattan Electrical Supply Company, a Corporation of New Jersey. Filed Mar. 24, 1904. Serial No. 199,886.



Claim.—1. In a polarity-indicator, the combination of a transparent tube hermetically closed and containing a suitable liquid, an electrode sealed in each end of the tube, an inclosing case for the tube provided with a sight-opening, removal ends for the case, contacts carried by the ends of the case and metallic connections between the contacts and electrodes.

2. In a polarity-indicator, the combination of a transparent tube hermetically closed and containing a suitable liquid, an electrode sealed in each end of the tube, an inclosing case for the tube provided with a sight-opening, screw-caps forming ends for the case, contacts carried by the caps and metallic connections between the contacts and electrodes.

3. In a polarity-indicator, the combination of a transparent tube hermetically closed and containing a suitable liquid, an electrode sealed in each end of the tube, an inclosing case for the tube provided with a sight-opening, screw-caps forming ends for the case, contacts carried by the caps and yielding metallic connections between the contacts and electrodes.

4. In a polarity-indicator, the combination of a transparent tube hermetically sealed and containing a suitable liquid, an electrode sealed in each end of the tube, a case for the tube, provided with a sight-opening, contacts carried by the case in metallic contact with the electrodes, and a revoluble shield for the sight-opening in the case.

5. In a polarity-indicator the combination of a transparent tube hermetically sealed, an electrode sealed in each end of the tube, an inclosing case provided with a sight-opening, caps of greater diameter than the case secured thereto, a revoluble shield for the sight-opening fitted between the projecting caps, and contacts carried by the caps in metallic connection with the electrodes.

6. In a polarity-indicator, the combination with a transparent tube containing a suitable liquid and carrying an electrode at each end, a case for the tube, ends for the case, and a conducting-spring arranged between one end of the tube and the end of the case to exert a yielding pressure on the tube.

F... ...s from ... available. ... listed. ... W2ER, 16 ... East Orange, NY 11942.

Keystone Update

Since the last issue, I've had a chance to examine a Type B(3) Keystone lightning arrester. For the record, the embossing is the same as the Type B(2) arresters ("Radio Lightning Arrester"). The only apparent difference is the placement of the screws in the sides of the posts rather than the ends.

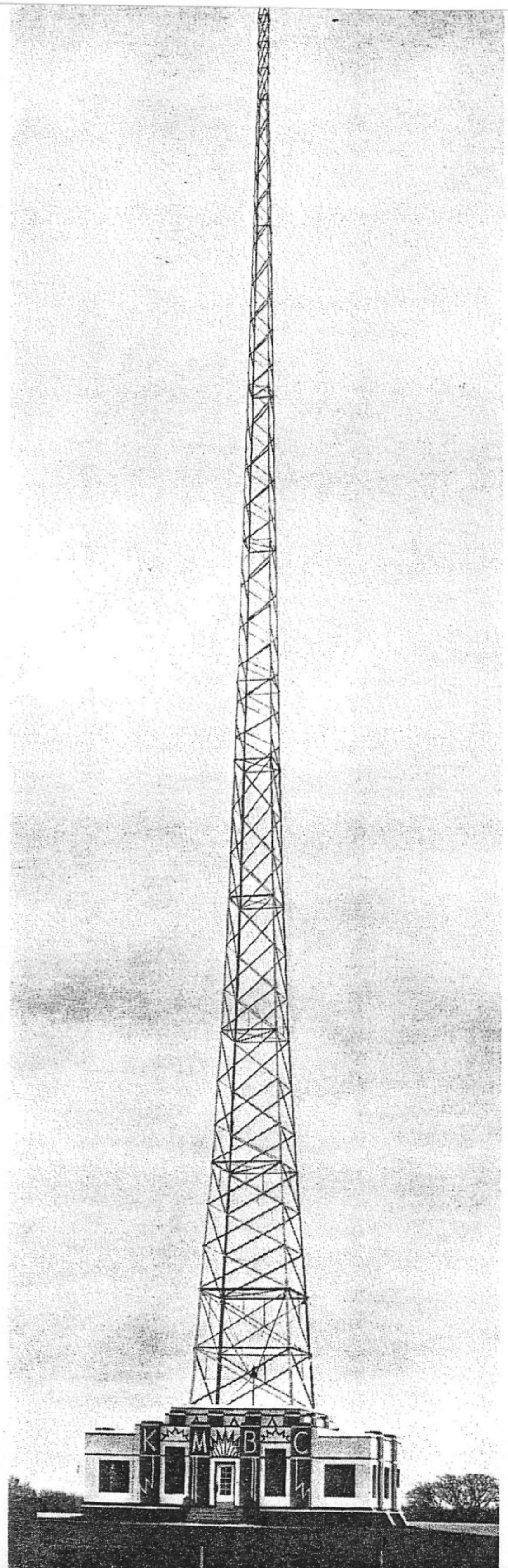
I'm still gathering information on a new Keystone arrester that Phillip Drexler found. More information in the next issue.

Sensory Update

When visiting with Bill Shaw in September, I had the chance to examine one of the tall Sensory lightning arresters like was pictured on the cover of the *OFS* 4/99. As we surmised, the arrester is a visible gap unit with essentially the same construction as the shorter unit shown on the page. I am not sure what advantage was gained by placing the gap at the top of the column. But it is sure an impressive looking thing.

eBay "insulator"

In the last issue, we discussed an "insulator" that was advertised on eBay that in fact was a line testing device called a polarity tester (see *OFS* 12/99 page 13). I referred to a patent that helped me identify the unit but I forgot to put it in. Here's the patent.



Supporting Vertical Radiator
« « 254 feet high » » » »

Station KMBC, Kansas City, Mo.
Photo, courtesy Blaw Knox Co.

LAPP RADIO INSULATORS