2016 PDF edition

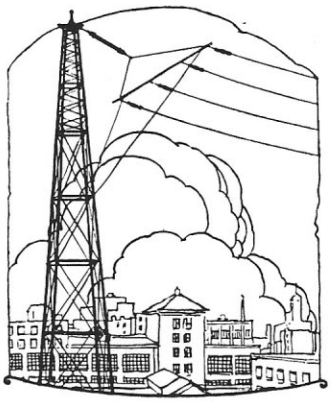
Old Familiar Strains

a newsletter for collectors of radio strain insulators and related items
Volume 5 No. 1 February 1998

PYREX

T.M.Reg.U.S.Pat.Off.

Radio Insulators



CORNING GLASS WORKS
CORNING, NEW YORK.
U.S.A.

Editorial

As we begin a 5th year of Old Familiar Strains, it's a pleasure to bring you a feature on Corning's Pyrex strain insulators.

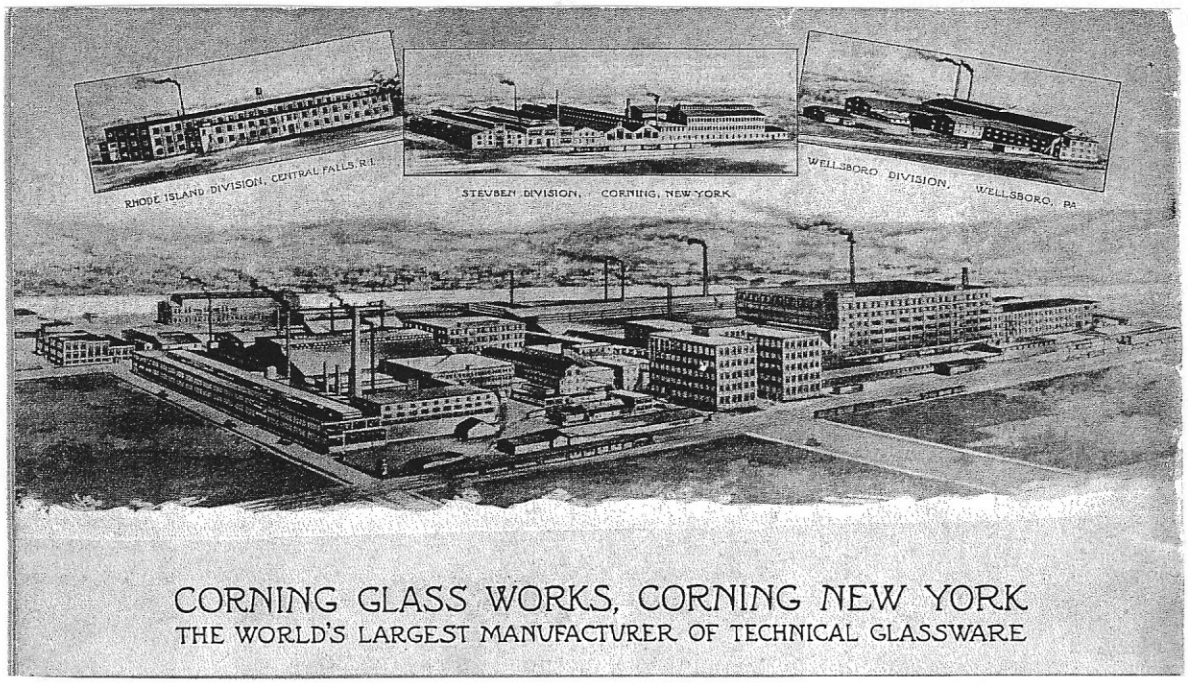
But, while we look ahead to a year full of new friends, new finds, shows, etc., I feel obliged to look back a little.

Just before Christmas I received the sad news that **Dick Mackiewicz** passed away. Dick and Alice hosted our back yard strain swap in October, 1996 (see OFS 12/96). That little get together will always have a special place in my heart. In addition to his fine collection of strains and lightning arresters, Dick was an avid collector of radio headphones and wrote a regular column on the subject for a leading magazine. Dick regularly sent me letters, drawings, and photographs of his insulators. You will find him listed as a source for nearly every major feature that has been run in OFS. He will be sorely missed.

Several readers sold their strain collections in 1997. If you are contemplating such a move yourself, please take a look through the OFS roster and call a collector in your area. I am sure that none of us would mind getting a call when the time comes (and it sure beats hearing about the sale after-the-fact).

The hobby lost several publications during 1997. Thank you everyone for helping OFS to be one of the survivors. A dozen readers contributed to the Corning article!

I have great plans for the coming year. If you have not sent in a donation for 1998, now would be a good time.



Corning Pyrex Radio Strain Insulators
Part I

by Dan Howard

In the April, 1995 issue, we took a brief look at Corning's glass strain insulators. In the first part of a two-part follow-up, we'll present information on Pyrex strains in a question-and-answer format. Many of these questions were provided by the readers. Thank you!

On pages 9-11, you'll find checklists showing the reported versions of Pyrex strains and embossing variations. There's a lot of interesting information here. Be sure to review it and let me know about additional varieties in your collection.

In the April issue I plan to feature the larger "Navy-type" Pyrex strains. We'll review selected Corning patents and trademarks. A color page showing Pyrex insulators is planned and I'll present additional information from the readers. Send in those cards and letters!

Additional information on the history of the Corning Glass Works is presented in McDougald's "Insulators A History and Guide to North American Glass Pintype Insulators Vol. 1." A bibliography of articles on related topics follows the list of sources on page 12.

Questions of General Interest

When did Corning make Pyrex radio strain insulators?

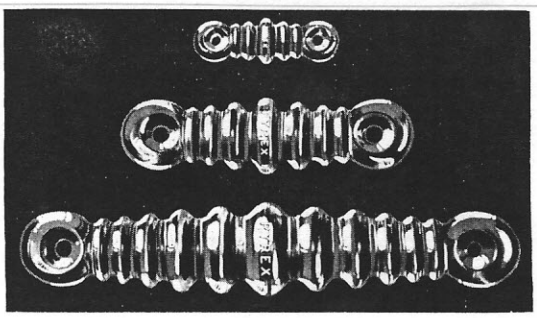
Corning Glass Works made radio strain insulators from 1924 to 1951 (1:131)

How many styles were made?

Corning catalogued three sizes of all-glass strain insulators:

- 3-1/2" "Broadcast Reception"
- 7-1/4" "Amateur Transmitting"
- 12-1/4" "Strain Insulator"

Each size was assigned a catalog part number that did not change. However, each



PYREX ANTENNA INSULATORS

	Broadcast Reception Insulators	*Amateur Transmitting*	*Strain Insulator*
Number	67007	67017	67021
Length (Overall)	3⅝"	7¼"	12¼"
Developed Leakage Path	3⁹⁄₁₆"	6"	11¾₁₆"
Av. Flashover Value (K.V.) Wet	22.5	32	84
Av. Flashover Value (K.V.) Dry	38	75	124
Weight	3 oz.	13½oz.	1 lb., 14 ozs.
Strength	450 lbs.	1,000 lbs.	1,000 lbs.
Suitable for Powers (up to)		250 watts	1½ K. W.
Price (Each)	$0.30	$1.50	$3.50
Packing	One in carton 12 in display box 12 display boxes in case	One in carton 36 cartons in case	12 in case
Galvanized Shackles, complete, 1 each end (Extra)		$1.00	$1.00

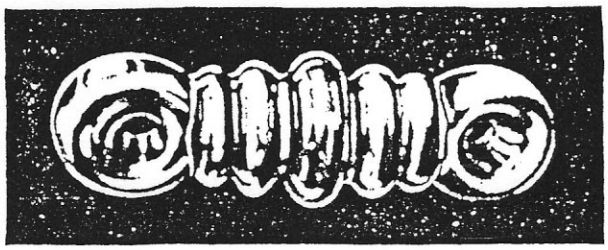
insulator was periodically restyled over the years. The two larger sizes went through very significant restyling which included the addition of saddleways to the ends and later, reinforcing the ends with glass "flukes."

Jim Singleton estimates that the 7-1/4" and 12-1/4" strains with the simple, round ends were made from 1924 until 1934. The strains with saddleways were made between 1935 and 1948, and the strains with reinforced ends were made from 1949 to 1952 (2:1). (These are "educated estimates." To date, we have not been able to document them.)

Corning made other types of insulators for radio work as well. Stand-off, lead-in, and feed-thru insulators were made. Large tubular-glass strain insulators with metal ends called "Navy type" insulators were made in several lengths. And one collector has a Pyrex johnny ball insulator (part no. 66000).

PYREX

Broadcast Reception Insulator



Phase Angle Difference 0.3°
Strain Resistance over 450 Pounds

Pyrex is not an ordinary glass, but a special patented product characterized by a high silica and low alkali content.

It is an ideal material for the construction of antenna insulators and other parts of radio equipment where permanent high insulating values are desired.

Pyrex does not depend for its insulating properties on a surface glaze, but is homogeneous and of a continuous uniform structure. It does not absorb moisture, and the high surface finish does not tend to accumulate soot and atmospheric dust.

The proper insulation of a broadcast reception antenna is as important as the insulation of a transmitting set, particularly when clear reception of distant stations is desired. Pyrex Antenna Insulators are made in three types:

Commercial Tran ission.
eur Transmi. n.
least Reception.

The three types possess the same unique characteristics, the distinction being one of size only.

Pyrex is a produc of:—

THE CORNING GLASS W. S
Corning, New York

Were they made in colors?

So far only clear and "straw" insulators have been reported by collectors.

Tin oxide was applied to many Pyrex pintype and suspension insulators to minimize radio static (1:131). This created a "carnival glass" finish. I am not aware of any "carnival" Pyrex strains.

One of Pyrex's advertised features, low solar heating, is predicated on passing light through. Coloring the glass would seem to take away this advantage. I would be extremely interested to hear from any reader who can document colored Pyrex strains.

In the 1934 catalog and the 1945 Radio's Master listing, Corning offered several sizes of lead-in bowls in "opaque" glass. I do not know how the glass was made opaque, nor what the resulting color was. I have a photo of a blue bowl that may one of the "opaque" insulators described in the catalogs.

What do the 2-letter codes on the strains mean?

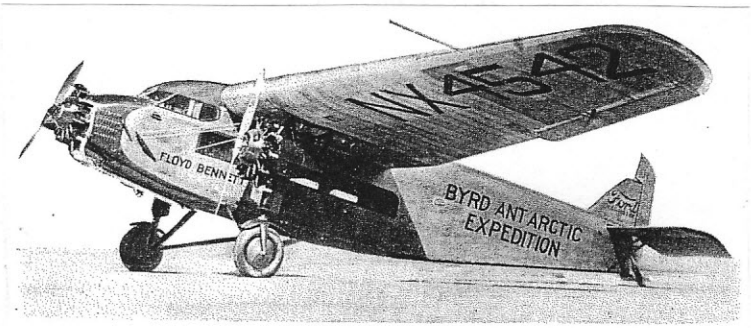
Like some other glass insulators, many Pyrex strains are embossed with mold numbers. Look for a 2 digit number or letter code on the back of the insulator. We believe that this is the number of the mold in which the unit was formed (1:131). The mold numbers reported to date are included in the check lists. What do *you* have?

Who used Pyrex insulators?

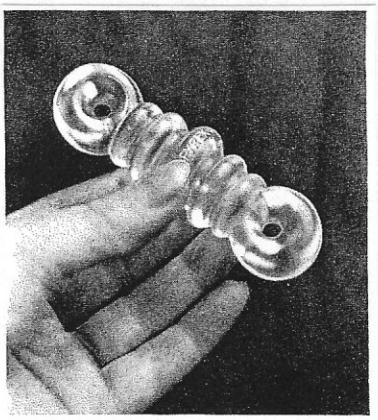
Nearly everybody!

Pyrex glass is known for its superior qualities including a low coefficient of expansion. This makes it very rugged. After their introduction in the mid-1920's, Pyrex strain insulators earned a reputation for durability even under adverse conditions.

Pyrex radio insulators were used *exclusively* on several early explorations of the polar regions (3:14). The U.S. Army, the Navy, the Coast Guard, the air mail service, and other Government departments used Pyrex



Chief flight plane of the Byrd Antarctic Expedition. Radio set equipped with PYREX Insulators.



One of the four PYREX Insulators used by Commander Byrd on the antenna of the plane in which the flight across the North Pole was made.

insulators. Corning's Navy supplier code was CBI (4:71).

In 1943, the American Standards Association published a set of standard specifications for Glass Radio Insulators for military use. The standards for glass strain insulators appear to have been created directly from specifications for the three sizes of Pyrex strains (5:22)!

Many of the insulators were sold to commercial broadcasters and to amateur radio operators. And, examples with French and Japanese markings have been reported.

Judging from the numbers surviving today, it would not be an exaggeration to say that many thousands of each style were sold.

Why were they phased out?

Changes in the 1950's prompted manufacturers to stop making many types of strain insulators, including Pyrex. I believe there were three important factors:

- More homes began sporting TV antennas than outdoor radio antennas during this period.
- Many commercial broadcasters had converted from large wire antenna arrays to loaded towers.
- Less expensive and more durable insulating materials such as plastics and fiberglass were becoming available.

T.M. REG. PYREX U.S. PAT. OFF.

RADIO INSULATORS

for

BETTER RECEPTION · BETTER PROTECTION · BETTER TRANSMISSION

The isolation of radio frequency currents and their confinement within definite circuits demand the use of non-conducting materials possessing an unusual combination of electrical and physical characteristics. Radio frequency currents tend to leak over to adjacent conductors, and materials which may offer a fairly effective barrier to the passage of currents of low frequency sometimes prove to be conductors, or at least inefficient insulators, at radio frequencies.

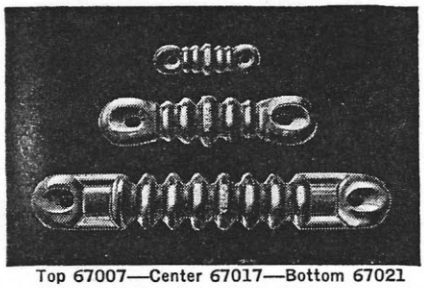
Essential properties for satisfactory radio insulation are low power loss, low surface conductivity, high electrical resistance, a hard smooth surface, stability against corrosive influences, and a high strength-to-weight ratio. These properties must remain permanent and unchanged by age, exposure to the elements, and the continued impact of radio energy.

Performance, which alone has won for PYREX Radio Insulators their present day supremacy, is the direct result of the inherent properties of the glass composition from which they are made. PYREX Radio Insulators are made of a material whose dielectric constant is 4.7 at 740,000 cycles, and whose power factor is 0.42% at 740,000 cycles. The surface conductivity is so low as to be practically negligible. The specific gravity is 2.23, so that in PYREX Radio Insulators the dual advantages of light weight and high electrical strength are combined.

The stability of PYREX Radio Insulators against corrosive influences renders them immune to the attack of acid fumes, smoke, fog and salt sprays. For this last reason, PYREX Insulators are widely used for marine communication systems.

PYREX Radio Insulators, because of their coefficient of expansion of 0.0000032 between 19 deg. C. and 350 deg. C., are indifferent to heat shock and abrupt temperature changes. Tropical sunshine does not create strains within them. The sudden chill of a summer hailstorm does not affect them.

PYREX Insulators have played their part in many spectacular examples of extreme service. They have been with Commander Byrd at the North and South Poles. They were an important part of the radio equipment of the Louise A. Boyd and the MacGregor Arctic expeditions. The Atlantic Ice Patrol sends warnings of icebergs over antennae equipped with PYREX Radio Insulators. They are used by the United States Army Signal Corps, the Coast Guard, the Navy, and the Lighthouse Service. On your own equipment they will perform the same duties and provide the same unfailing service.



Top 67007—Center 67017—Bottom 67021

PYREX ANTENNA INSULATORS

For Superior Sending and Reception. For Longer Life and Trouble-Free Service.

No.	Description	Length Over-all	Developed Leakage Path	Average Flashover Value (KV) Wet	Dry	Minimum Ultimate Strength	Price Each, List
67007	Broadcast Reception Insulator	3 5/8"	2 9/16"	28	42	300 lbs.	$ .25
67017	Amateur Transmitting Insulator	7 1/2"	6 1/16"	54	70	800 lbs.	1.00
67021	Strain Insulator	12 1/4"	11 3/16"	87	121	1000 lbs.	3.00
67003	Galvanized Shackles for installing 67017 or 67021; one pair per insulator; price per pair						1.00

The technical questions that you asked and I felt obliged to answer.

(Unless it's bedtime, you may want to skip over this part - trust me).

What is "dielectric constant?"

In several ads, Corning differentiates the quality of its Pyrex glass from ordinary glass. "At a frequency of 500 Kilocycles, Pyrex has a dielectric constant of 4.9 and ordinary glass has a dielectric constant of 6.8 to 8.0" (6:66).

Miner defines dielectric constant as "the ratio of the capacitance of a condenser containing a given dielectric to the capacitance of the same condenser with a vacuum for dielectric" (7:8).

Now, *in English*. Insulators and other materials are commonly evaluated in terms of their "resistivity" (ohms per cubic cm) and their electrical capacitance.

Insulators should have a high resistivity. Miner rates "Conductors" as those materials with a low resistivity (0 to 10^6), "Semiconductors" as those materials with a resistivity of 10^6 to 10^{12}, and "Good Insulators" as materials with a resistivity greater than 10^{12} (7:8). Pyrex glass has a resistivity of 10^{15} ohms at 22° C (8:76).

In most applications, low electrical capacitance is desired in insulators. **The dielectric constant compares the capacity of an insulating material to that of vacuum (a perfect insulator).** The lower the dielectric constant of an insulator, the better.

According to Miner, "Conductors" have dielectric constants ranging from 30 to 100, "Semiconductors" range from 6 to 30, and "Good Insulators" have a dielectric constant less than 6 times that of a vacuum (7: 8). As noted above, the dielectric constant of Pyrex is 4.9.

What is phase angle difference? (yes, someone really wants to know)

The American Society for Testing and Materials defines phase angle as "the angular difference in the phase between the sinusoidal alternating potential applied to a dielectric and the component of the resulting alternating current having the same period as the potential difference" (9:24).

The power factor (PF) of a dielectric can be expressed as the cosine of the phase angle (9:24).

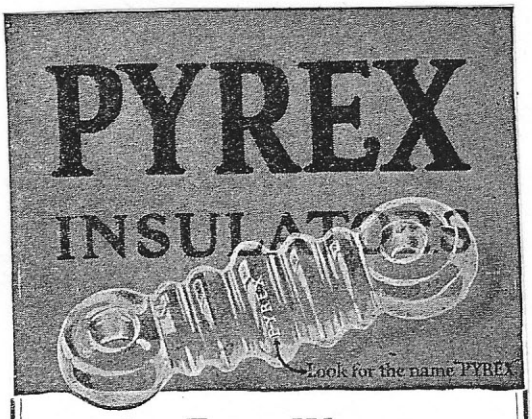
So, **the phase angle is an indication of the efficiency of the dielectric (insulating material).**

The phase angle difference of Pyrex glass has been variously described as .16° (10:58), .25° (11:60), and .3° (12:71). In contrast, Corning says that ordinary glass has a phase angle difference of .4° to .6° (10:58).

End Notes:

1) McDougald, John & Carol *Insulators A History & Guide to North American Glass Pintype Insulators* Vol. 1 (St. Charles, IL: McDougald) 1990.
2) Singleton, Jim "letter" 12/15/97.
3) Corning catalog (1929) (courtesy of Jim Singleton).
4) Chesson, F.W., *Electronic Military Equipment: Naval Equipment Manufacturers* The AWA Review Vol. 7 1991 pp. 69-89.

(continued on page 12)



An Easy Way to Improve Reception

Insulate with PYREX. Because of certain unique electrical and physical properties, PYREX is vastly superior to any other glass or insulating material. It must not be confused with ordinary glass insulators. PYREX insulators eliminate energy leaks. Note these comparative values of PYREX and ordinary glass at 500 kilocycles.

	Dielectric Constant	Phase Difference	Product
PYREX	4.5	.16	.72
Ordinary Glass	6.8 to 8.0	.4 to .6	2.72 to 4.80

PYREX is also used in the construction of precision condensers, inductances, and special tube sockets.

PYREX equipment for amateur use is supplied in the following sizes:

PYREX—Broadcast Reception Insulator, 3½" long $0.45

PYREX—Low Power Transmitting Antenna Insulator, 7¼" long $1.50

PYREX—Medium Power Transmitting Antenna Insulator, 12¼" long $3.50

PYREX—Stand-Off Insulator, height 3" over all $2.75

PYREX—Stand-Off Insulator, height 7" over all $3.00

PYREX—Lead-in Insulator, Navy Standard Bowl Type, for voltages up to 10,000....$1.50

PYREX is used by the U. S. Navy, Coast Guard, and Light House Service because it gives better insulation.

Industrial & Equipment Division
CORNING GLASS WORKS
Corning, N. Y.

3-1/2" Broadcast Reception Insulator

Pyrex part #: 67007
length: 3-5/8" long
# of styles found: 1

Style 1: **without saddleways**
# of ribs: 5

embossing variants:

version	embossing	loc.[1]
A	PYREX	3f
B	PYREX	3f
	MADE IN U.S.A.	4f
	PAT. 1700066	4b
C	MADE IN U.S.A.	2f
	PYREX	3f
	PAT. 1700066	3b

mold markings:

version	embossing	loc.
C	C A	2b

other information:

- the broadcast reception insulator was cataloged throughout the radio insulator production
- only one style of this insulator has been found. Catalog illustrations showing a version with saddleways are artist renderings. None has been reported by the readers.

[1] Holding the insulator upright, locations are indicated by counting the ribs down from the top. Front is indicated by "f", back by "b."

7-1/4" Amateur Transmitting Insulator

Pyrex part #: 67017
length: 7-1/4" long
# of styles found: 4

Style 1: without saddleways

# of ribs: 5

embossing variants:

version	embossing	loc.
A	PYREX	3f
B	PYREX	3f
	MADE IN U.S.A.	4f
	PAT. 1700066	3b
C	Japanese markings	ends

mold markings:
none reported

Style 2: w/ saddleways ("skinny")[1]

# of ribs: 5
max. dia. of end: 1-3/4"

embossing variants:

version	embossing	loc.
A	PYREX	3f
	MADE IN U.S.A.	4f
	PAT. 1700066	3b

mold markings:

version	embossing	loc.
A	E 3	2b

[1] found in gray box.

Style 3: w/ saddleways ("thick")[2]

# of ribs: 5
max. dia. of end: 1-15/16"

embossing variants:

version	embossing	loc.
A	PYREX	3f
	MADE IN U.S.A.	4f
	PAT. 1700066	3b

mold markings:

version	embossing	loc.
A	AB	2b[3]
A	B	2b
A	B A	2b
A	CA	2b[4]

Style 4: reinforced ends "flukes"

# of ribs: 4

embossing variants:

version	embossing	loc.
A	PYREX	2f
	MADE IN U.S.A.	3f
	PAT. 1700066	2b

mold markings:

version	embossing	loc.
A	F1	4b
A	F2	4b
A	F4	4b
A	F7	4b
A	F8	4b

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other information:

- this is the most commonly found size
- minor length variations were ignored

[2] found in red box.
[3] not sure if this is thick or skinny version
[4] not sure if this is thick or skinny version

12-1/4" Strain Insulator

Pyrex part #: 67021
length: 12-1/4" long
# of styles found: 3

Style 1: without saddleways
# of ribs: 11

embossing variants:

version	embossing	loc.
A	PYREX	6f
	MADE IN U.S.A.	6-7f [1]
	PAT. 1700066	6b
B	PYREX	6f
	MADE IN U.S.A.	6-7f
	PAT. 1700066	6b
	SE 2188	ends[2]

mold markings:
none reported

Style 2: with saddleways
# of ribs: 9

embossing variants:

version	embossing	loc.
A	PYREX	5f
	MADE IN U.S.A.	5-6f
	PAT. 1700066	5b

mold markings:
none reported

Style 3: reinforced ends "flukes"[3]
# of ribs: 8

embossing variants:

version	embossing	loc.
A	PYREX	4f
B	PYREX	4f
	MADE IN U.S.A.	5f
	PAT. 1700066	4b

mold markings:

version	embossing	loc.
B	C 2	3b
B	C 5	3b
B	7	5b

---

other information:

- each style has a different number of ribs
- minor length variations were ignored
- as shown below, drawings in ads are sometimes inaccurate.

PYREX Nos. 67007-67017-67021 Antenna Insulators for Improved Transmission

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[1] embossing is located in groove between ribs 6 & 7
[2] navy part # SE 2188 is etched on both ends, front side

[3] this style has prominent grinding marks where the casting sprus were ground off. "Left hand" and "right hand" versions have been reported.

(continued from page 8)

5) American Standards Association *American War Standard: Glass Radio Insulators* (New York: ASA) 1943. (Courtesy of Rick Soller).
6) "Corning ad" *QST* 5/25.
7) Miner, Douglas F. *Insulation of Electric Apparatus* (New York: McGraw-Hill Book Company) 1941.
8) "Corning ad" *Radio News* 1/42.
9) American Society for Testing and Materials *1979 annual Book of ASTM Standards Part 39: Electrical Insulation - Test Methods: Solids and Solidifying Fluids* (Philadelphia, PA: ASTM) 1979.
10) "Corning ad" *QST* 4/25.
11) "Corning ad" *Popular Radio* 10/24.
12) "Corning ad" *QST* 11/24.

Photo Credits:

Illustrations from Corning Glass Works catalogs reprinted by permission of The Corning Glass Company.

front cover: Corning catalog (1928) cover (courtesy of Elton Gish)
pg. 3 Corning catalog (1929) pg. 14 (courtesy of Jim Singleton)
pg. 4. Corning catalog (1928) pg. 6 (courtesy of Elton Gish)
pg. 5 Broadcast Reception Insulator hand bill (courtesy of Gene Condon)
pg. 6 Corning catalog (1929) pg. 4 (courtesy of Jim Singleton)
pg. 7 *Radio's Master* 11th Ed (1945) pg. Q-37.
pg. 9 *QST* 11/25 pg. 76
pg. 11 The Radio Amateur's Handbook 1938 pg. 482.
pg. 13 Pyrex Amateur Transmitting "red box"

Thanks to:
Steve & Lois Blair
Gene Condon
Corning Museum of Glass
Charles Crews
Elton Gish
Greg Hafer
Gil Hedges-Blanquez
Dick Mackiewicz
Jim Singleton
Rick Soller
Bob Stahr
Dennis Stewart

Other Information on Corning Insulators:

Dingman, Brent "Corning Pyrex Radio Insulator Technical, Historical, Air, Land, and Sea Expedition Information," *Crown Jewels of the Wire* 7/73 pp. 3-5.
Dingman, Brent "Large and Small Corning Pyrex-Radio-Glass-Antenna-Feed-Thru-Insulator Bowls" *Crown Jewels of the Wire* 11/72 pp. 9-11.
Dingman, Brent "Letter" (in Insulator By-Lines column) *Old Bottle Magazine* 12/72 pp. 22-23.
Howard, Dan "A Brief Look at Pyrex Insulators," *Old Familiar Strains* 4/95 pp. 8-9.
Kruse, S. "Some Good Lead-In Insulators" *QST* 3/24 pp. 28-29.
McCurty, Jeff "A Closer Look at Corning-Pyrex Insulators," *Crown Jewels of the Wire* 12/77 pp. 4-7.
McDougald, John & Carol *Insulators A History & Guide to North American Glass Pintype Insulators* Vol. 1," 1990.

Classifieds

For Sale: Nearly a ton of porcelain and glass. Jeff Hogan (352) 669-0655

Wanted: Buying radio insulators. Larry Bratcher

Wanted: Buying radio strains and lightning arresters. Individual items or collections. Larry Novak (301) 680-8910

Wanted: Colored glass radio strains. John Lewis (904) 968-5212

Wanted: Information on Pyrex strain insulators for next the next issue. What did I miss on the Pyrex lists? Do you have any "Navy Strains?" Unlisted embossings? Advertisements? Also need color photos of your Pyrex or other strains for upcoming color pages. Send info ASAP to your editor.

Wanted: Readers have been asking for more show reports and stories of new "finds." Please help me out with a letter. Dan

New Reader

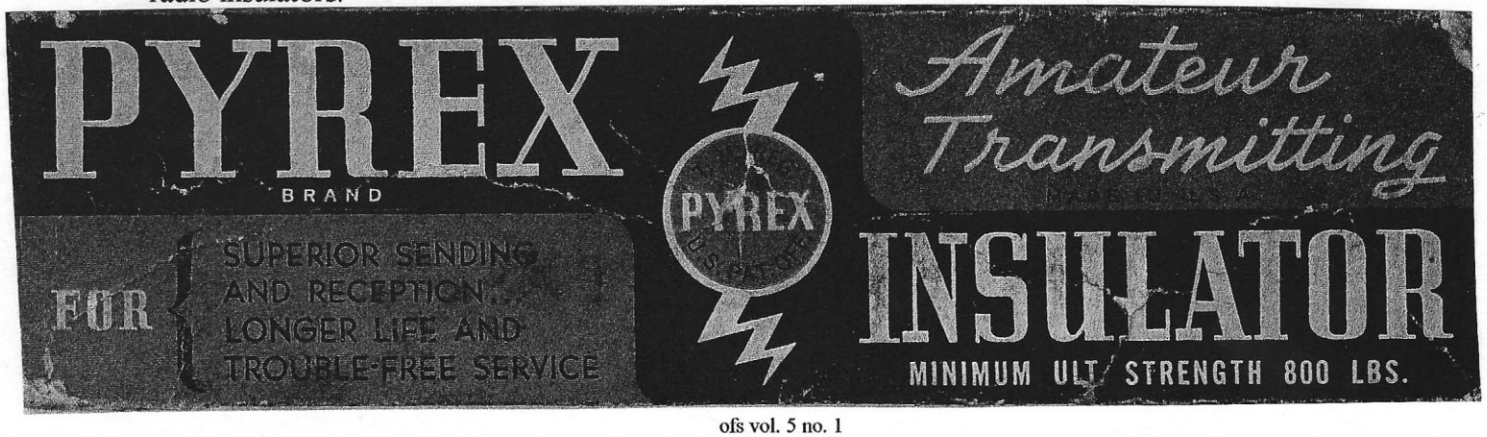
Old Familiar Strains welcomes **Larry Bratcher**. Larry writes that he found us on the internet. Like most of us, for a while Larry thought that he was the only one who collected radio insulators.

Insulators on the Web

Jim Singleton recently pointed me to **Rod Rogers's** internet site. I am very impressed. Rod presents over two dozen color pictures of antenna insulators and lightning arresters on his pages. The site also includes color photos of collectable radios from several eras. Rod's site at http://www.tri.net/ant/ant.html is worth a visit.

Happy St. Valentine's Day

I had to slip in this ad from pg. 953 of the April, 1929 issue of *Radio News*. What could be a more appropriate Valentine's gift for that special strain collector than this LOVELESS antenna?



Thanks For Asking...

In the last week, **Steve Coffman** and **Tim Wood** both sent me sketches of the same German insulator! I flipped a coin and elected to print Tim's drawing of the unusual item.

These insulators are real standouts with very attractive coppery-brown glaze, about the color of a new penny. The material appears to be a dry process porcelain. The insulator measures 4-7/8" long by 1-1/2" max. dia., causing it to dwarf many other strains. Both readers noted the insulator's four unglazed mold rest points.

Although I can't tell you who made them, the "Germany" embossing leads me to presume that they were made in Germany for export and were made prior to the division of the Country at the conclusion of World War II.

The March, 1925 *QST* carried an ad for imported German insulators (see below). The importer was Tobe C. Deutschmann of Boston, MA. The dimensions and rib count are the same as our insulator. However, the ends are not quite the same. And the advertised insulator is supposed to have "pure white glaze." So I'm not convinced that we have a match.

Both readers asked if the insulator is especially rare. I have had a couple of them and others report them as well. I suppose that would exclude them from the rare category. However, they are head-and-shoulders above the standard 2-1/2" chocolate brown porcelain strains. If you have anything to add to the story, please write. And again, *Thanks for Asking!*

Source: "Deutschmann ad"*QST* 3/25 pg. 99. Reprinted by permission of the American Radio Relay League.