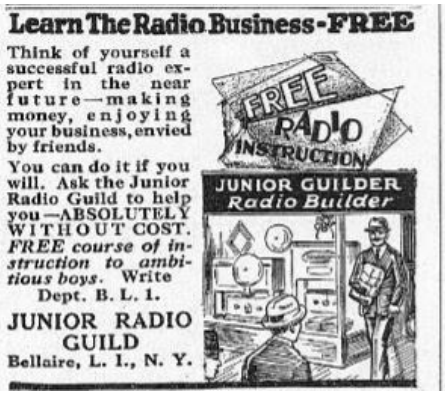
The Junior Radio Guild

by
Jerry Berg
Lexington, MA

I had no idea what the Junior Radio Guild was when I came upon an interesting half-inch diameter lapel pin with the group's name and the depiction of a lightning bolt. With a little research I discovered that for most of its short life, which began at the end of 1928 and ended in mid-1931, home was *Radio News* magazine, published by Experimenter Publishing Co. But the origins of the Junior Radio Guild appear to have been in *Boys' Life*.

The first signs of the group were in some small advertisements in the December 1928 and January and February 1929 issues of the magazine, published by the Boy Scouts of America. The ads encouraged boys to take up radio construction, earn money and learn the radio business. It was a "free course of instruction to ambitious boys," who were invited to write to the guild in Bellaire, Long Island.

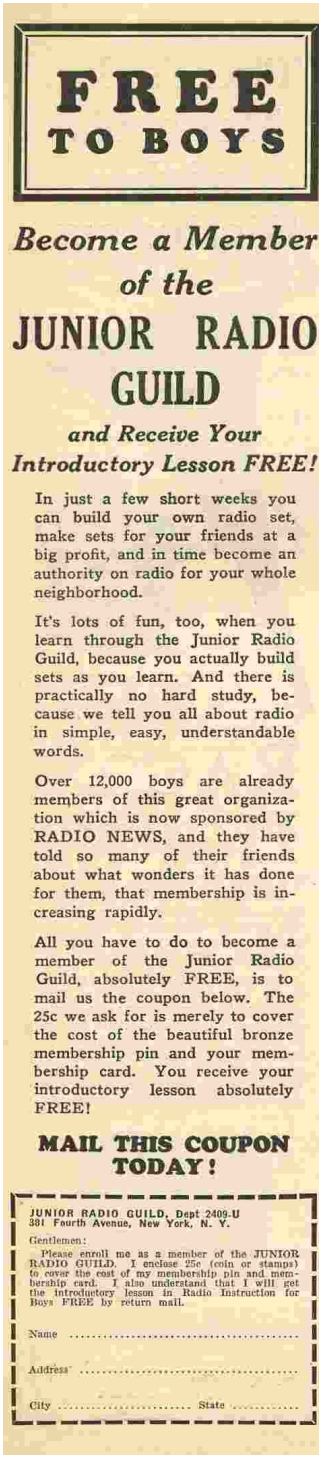


Readers had to wait until April 1929 for a short *Boys' Life* article with more information. It was presented by "Sparks Chard," a youth character who was created by *Boys' Life* and who, since 1926, appeared often in the magazine's "Radio Listening Post" column. "Sparks" reported that the guild had been organized by a group of unnamed radio manufacturers to provide a course in radio design and construction, first of a one-tube set, then adding on various features to eventually make it a five tuber and finally a shortwave receiver. The lessons, five in all, were described, and there was to be an unlimited advisory service as well, all provided at no charge. When the first two lessons had been mastered and the one-tube radio completed, the third lesson could be requested; when it had been mastered the fourth was sent, and so forth. The guild was open to all, whether Boy Scouts or not. The objective was to interest youth in "the radio game."

Parts could be bought wherever the builder chose. Consideration was being given to making the parts available through the guild for those who did not have a ready source of supply, but it does not appear that this ever happened.

Applicants were asked to submit name, address, age, school, and number of radio sets already built. A pin–the one I had in my possession–would be awarded to all who actually constructed one or more of the stages of the receiver (which had to work satisfactorily).

Alas, the April 1929 article about the Junior Radio Guild was the group's final appearance in *Boys' Life.* It resurfaced in September, with its lightning bolt logo, in *Radio News,* one of the leading radio magazines of the day. The objective was the same, to teach boys the essential principles of radio and to "earn while learning," although the exact way that might happen was not explained. It was a general invitation to join the world of radio technicians, one of the main audiences of *Radio News.* Some 12,000 boys were already members, it said. The new address for the guild was *Radio News* headquarters.

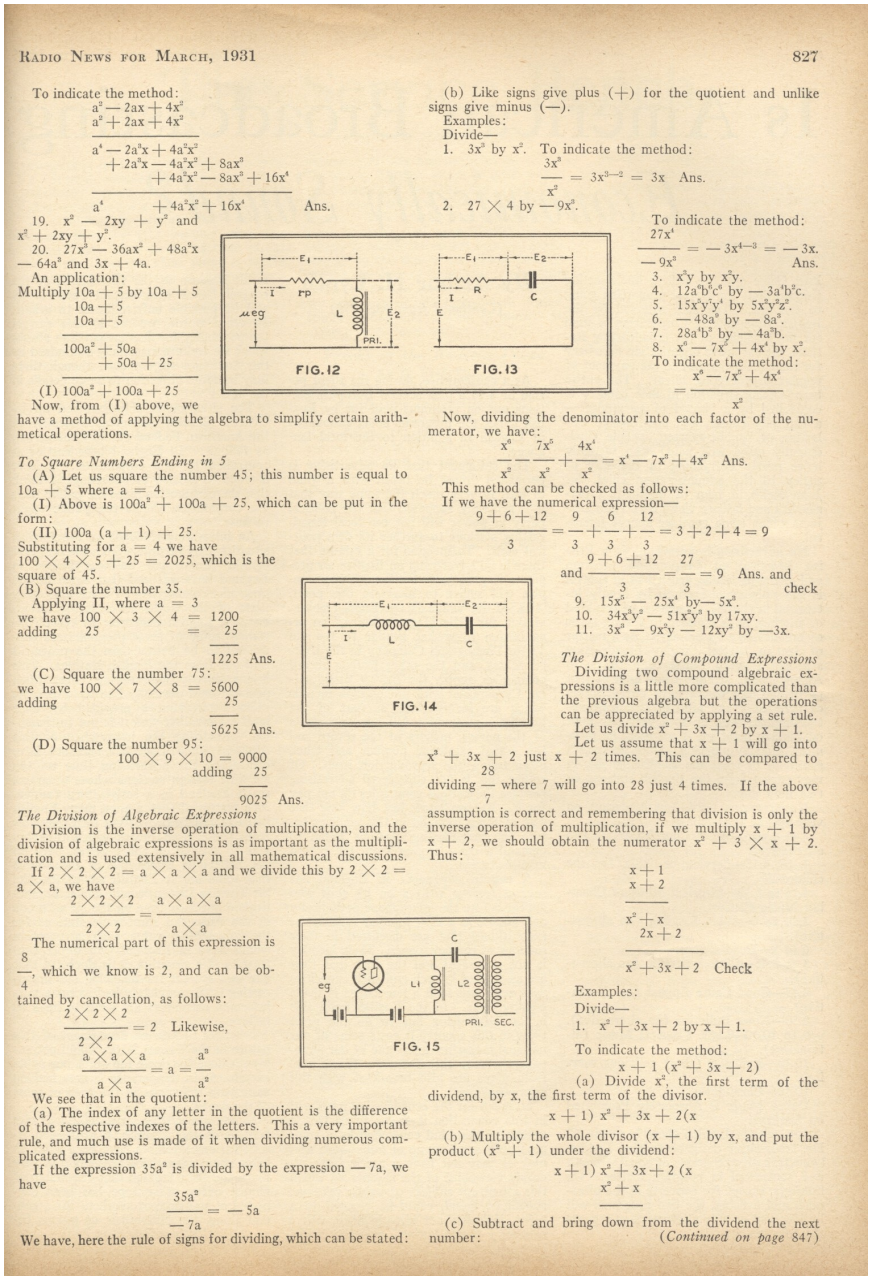


From the guild's advertisement it appeared that the pin would now be a membership pin, not connected with any particular level of accomplishment. And there was a 25¢ membership charge. A few guild ads also appeared in another Experimenter publication, *Science & Invention.*

Instead of waiting for the lessons to arrive by return mail, however, one now had only to read on, for the lessons were reproduced in the magazine. First there were the five lessons covering the one-tube receiver, the growth to five tubes and the addition of shortwave. Additional lessons on other radio-related topics appeared most months. With the 15th lesson, in December 1930, there began what was called "a simple course in radio mathematics." It was called "Using Mathematics in Radio," and it quickly became the guild's focus–all the additional Junior Radio Guild columns were devoted to it. As the reproduction of one page of the column from March 1931 (next page) suggests, it must have caused many scouts' eyes to glaze over.

While the Junior Radio Guild column continued to appear, promotions for it, invitations to join and get the guild pin, etc. soon disappeared. However, optimism

about the guild was expressed in an April 1931 editorial review of the magazine by its new editor, Laurence M. Cockaday. "Many of our younger readers, who are seriously trying to learn the rudiments of radio, seem to be getting real information from The Junior Radio Guild," he said, noting that plans were afoot to increase its scope and make it "more helpful than ever."



RADIO NEWS FOR MARCH, 1931 827

To indicate the method:

$a^2 - 2ax + 4x^2$
$a^2 + 2ax + 4x^2$

$a^4 - 2a^3x + 4a^2x^2$
$+ 2a^3x - 4a^2x^2 + 8ax^3$
$+ 4a^2x^2 - 8ax^3 + 16x^4$

$a^4 + 4a^2x^2 + 16x^4$ Ans.

19. $x^5 - 2xy + y^2$ and $x^2 + 2xy + y^2$.
20. $27x^3 - 36ax^2 + 48a^2x - 64a^3$ and $3x + 4a$.

An application:
Multiply $10a + 5$ by $10a + 5$

$10a + 5$
$10a + 5$

$100a^2 + 50a$
$+ 50a + 25$

(I) $100a^2 + 100a + 25$

Now, from (I) above, we have a method of applying the algebra to simplify certain arithmetical operations.

To Square Numbers Ending in 5

(A) Let us square the number 45; this number is equal to $10a + 5$ where $a = 4$.

(I) Above is $100a^2 + 100a + 25$, which can be put in the form:

(II) $100a\ (a + 1) + 25$.

Substituting for $a = 4$ we have $100 \times 4 \times 5 + 25 = 2025$, which is the square of 45.

(B) Square the number 35.

Applying II, where $a = 3$ we have $100 \times 3 \times 4 = 1200$
adding $25 = 25$
1225 Ans.

(C) Square the number 75:
we have $100 \times 7 \times 8 = 5600$
adding 25
5625 Ans.

(D) Square the number 95:
$100 \times 9 \times 10 = 9000$
adding 25
9025 Ans.

The Division of Algebraic Expressions

Division is the inverse operation of multiplication, and the division of algebraic expressions is as important as the multiplication and is used extensively in all mathematical discussions.

If $2 \times 2 \times 2 = a \times a \times a$ and we divide this by $2 \times 2 = a \times a$, we have

$$\frac{2 \times 2 \times 2}{2 \times 2} = \frac{a \times a \times a}{a \times a}$$

The numerical part of this expression is $\frac{8}{4}$, which we know is 2, and can be obtained by cancellation, as follows:

$$\frac{2 \times 2 \times 2}{2 \times 2} = 2 \quad \text{Likewise,}$$

$$\frac{a \times a \times a}{a \times a} = a = \frac{a^3}{a^2}$$

We see that in the quotient:

(a) The index of any letter in the quotient is the difference of the respective indexes of the letters. This a very important rule, and much use is made of it when dividing numerous complicated expressions.

If the expression $35a^2$ is divided by the expression $-7a$, we have

$$\frac{35a^2}{-7a} = -5a$$

We have, here the rule of signs for dividing, which can be stated:

(b) Like signs give plus (+) for the quotient and unlike signs give minus (—).

Examples:
Divide—

1. $3x^3$ by x^2. To indicate the method:

$$\frac{3x^3}{x^2} = 3x^{3-2} = 3x \quad \text{Ans.}$$

2. 27×4 by $-9x^3$.

To indicate the method:

$$\frac{27x^4}{-9x^3} = -3x^{4-3} = -3x. \quad \text{Ans.}$$

3. x^5y by x^3y.
4. $12a^6b^5c^4$ by $-3a^4b^2c$.
5. $15x^5y^7y^4$ by $5x^2y^2z^2$.
6. $-48a^3$ by $-8a^2$.
7. $28a^4b^3$ by $-4a^2b$.
8. $x^6 - 7x^5 + 4x^4$ by x^2.

To indicate the method:

$$\frac{x^6 - 7x^5 + 4x^4}{x^2} =$$

Now, dividing the denominator into each factor of the numerator, we have:

$$\frac{x^6}{x^2} - \frac{7x^5}{x^2} + \frac{4x^4}{x^2} = x^4 - 7x^3 + 4x^2 \quad \text{Ans.}$$

This method can be checked as follows:
If we have the numerical expression—

$$\frac{9 + 6 + 12}{3} = \frac{9}{3} + \frac{6}{3} + \frac{12}{3} = 3 + 2 + 4 = 9$$

and $\frac{9 + 6 + 12}{3} = \frac{27}{3} = 9$ Ans. and check

9. $15x^5 - 25x^4$ by $-5x^3$.
10. $34x^3y^2 - 51x^2y^2$ by $17xy$.
11. $3x^4 - 9x^2y - 12xy^2$ by $-3x$.

The Division of Compound Expressions

Dividing two compound algebraic expressions is a little more complicated than the previous algebra but the operations can be appreciated by applying a set rule.

Let us divide $x^2 + 3x + 2$ by $x + 1$.

Let us assume that $x + 1$ will go into $x^3 + 3x + 2$ just $x + 2$ times. This can be compared to dividing $\frac{28}{7}$ where 7 will go into 28 just 4 times. If the above assumption is correct and remembering that division is only the inverse operation of multiplication, if we multiply $x + 1$ by $x + 2$, we should obtain the numerator $x^3 + 3 \times x + 2$. Thus:

$x + 1$
$x + 2$

$x^2 + x$
$2x + 2$

$x^2 + 3x + 2$ Check

Examples:
Divide—

1. $x^2 + 3x + 2$ by $x + 1$.

To indicate the method:

$x + 1\ (x^2 + 3x + 2)$

(a) Divide x^2, the first term of the dividend, by x, the first term of the divisor.

$x + 1)\ x^2 + 3x + 2\ (x$

(b) Multiply the whole divisor $(x + 1)$ by x, and put the product $(x^2 + 1)$ under the dividend:

$x + 1)\ x^2 + 3x + 2\ (x$
$x^2 + x$

(c) Subtract and bring down from the dividend the next number:

(*Continued on page 847*)

FIG. 12

FIG. 13

FIG. 14

FIG. 15

But without explanation, the Junior Radio Guild disappeared after the July 1931 issue of the magazine. Some new columns were announced, but no mention was made of the demise of the Junior Radio Guild. In August 1931, Radio News announced that a book, "23 Lessons in Radio," which was a compilation of all the Junior Radio Guild columns, was now available free with a two-year subscription to the magazine. The "Mathematics of Radio" series was untethered from the guild and continued long after, into 1933, when the whole undertaking came to an end.

Shake Hands With "Sparks"

To all Scouts and readers of BOYS' LIFE we introduce with this issue, "Sparks" Chard, who will tell you interesting things about radio each month.

Sparks, so nicknamed by the boys in his neighborhood, because of his deep interest in radio, will talk to you just as one boy talks to another about his radio experiences.

Sparks is a licensed amateur and his short wave wireless station is the marvel of his town because of its world-wide range, so he is likely to have many hints that will be of good service to scouts, amateurs and broadcast listeners.

If you have any particular radio topic you would like to have Sparks write about send him a letter in care of BOYS' LIFE.

We take pleasure in introducing Sparks and hope you will all enjoy meeting him each month.

Note: A slightly edited version of this article appeared in the February 2017 issue of *The Spectrum Monitor*.