The Oscillator

"All the Electrons that are Fit to Flow . . . "

The Official Newsletter of the DVHRC **January 2012**

Annual Election for DVHRC Board of Directors

The following individuals, in alphabetical order, were elected to the DVHRC Board of Directors for 2012.

Dave Dean
Mike Koste
Walt Peters
Stan Saeger
Dave Snellman

The Board will meet in early January to elect officers, including President, Vice-President, and Secretary-Treasurer, Remaining members will serve in an at-large capacity.

The new Board would like to recognize and thank outgoing board member Dave Abramson for his many years of service to the club. We know Dave isn't going anywhere and will continue to be an active club member. Thanks, Dave.

Christmas Meeting

On December 13, the DVHRC met for the annual Christmas Dinner. Limited business was conducted, including Board elections.

A new food vendor was chosen, and judging by the amount of food left over at the end, was a success.

The annual gift exchange was held with some nice gifts exchanged.

Regency TR-1 Back needed

The DVHRC is looking for a Ivory back for the club's recently acquired Regency TR-1 transistor radio. If anyone knows of a lead in finding one in good condition, please contact Dave Dean at dw.dean@verizon.net or 610-933-0330. The club is more than willing to pay a fair price.

Thanks . . .

… to member Ludwell Sibley for his recent contribution of tubes on the club's 'want' list.

2012 Kutztown Dates

The dates for the 2012 Kutztown Radio Shows are firm:
Kutztown XXVI - May 11-12, 2012
Kutztown XXVII - Sept 21-22, 2012

Member Radio Pictures for the DVHRC website

In 2011, I proposed creating a member's favorite radio page on the club's website, www.dvhrc.info. To date, there has been just one submission. To make it worthwhile, a minimum of 5-10 members is needed.

What do you have to do? Send me (saegers@ptd.net) a digital image of you favorite radio along with a description and any other information.

This is not meant to be a vehicle to sell radios, but rather a way to show-off your favorite radios to the online world..

Hopefully, enough members will come forward over the next few months to make this happen.

Oscillator Articles

Winter and the annual Christmas Dinner meeting always makes for a very sparse January newsletter.

You can help 'beef-up' your club's newsletters by submitting articles for publishing.

You editor will format and edit any submissions and give full credit to the author. Digital images always adds to the quality of articles.

Think about submitting something this year. Some suggested topics to get your mind spinning:

"My Favorite Radio"
"How I got started in Vintage Radios"
"Repair Hints and Tips"
"Auction/Flea Market Finds"
"The One that got Away"

Upcoming Meetings

As always, meetings for 2012 are held the 2nd Tuesday of each month at the Telford Community Center in Telford, PA. Other events are posted to the club's website, www.dvhrc.info.

Delaware Valley Historic Radio Club
PO Box 5053
New Britain, PA 18901
www.dvhrc.info

The Oscillator is the monthly newsletter of the Delaware Valley Historic Radio Club.
Articles on radio and television history and collecting can be submitted by the 25th of the prior month to saegers@ptd.net. Personal views, opinions and technical advice do not necessarily reflect those of members, officers or Board of Directors of the DVHRC, nor is the DVHRC responsible for any buying or selling transactions.

Dues are $20 per year and can be paid at a meeting or mailed to the above address.

DVHRC Board of Directors

To allow for proper formatting of the following article, the rest of this page is blank. Thanks to Mike Koste for donating this article.

Popular Radio

VOLUME XII October, 1927 NUMBER 4

The Effect of Moonlight on Reception

At one time or another in the past history of mankind the moon has been blamed for nearly everything. The very word "lunacy" means nothing but "moon-struck." Radio has not escaped its theories of lunar influence. Mr. Shannon, a well-known British amateur, provides, however, something more than theories; he has made careful experiments. He finds that the moon *does* influence radio—at least in so far as long-distance reception of short waves is concerned. A full moon means good reception; a dark moon means poor reception. His observations are sure to attract the attention which they so well deserve. With Mr. Shannon's brief theoretical suggestion of a direct effect of the moon in bending the paths of the ether waves we cannot agree. The bendings due to the action of gravity, in accordance with the theory of relativity, are far too small.

There is a more plausible possibility. Both the moon and the sun raise tides in the sea. They also create tides in the atmosphere, although minute ones. There is reason to believe that they produce tides in the upper atmospheric region so important in radio transmission—in the region of the Heaviside Layer. Probably it is some fluctuation of these aerial tides, varying with the relative positions of the sun and the moon and perhaps creating bulges or hollows in the ionized Heaviside region, which must be held responsible for the interesting variations of reception which Mr. Shannon observes. We share his hope that other observers will repeat and extend his work, as undoubtedly they will.

—THE EDITOR.

By DEREK SHANNON, F.R.S.A.

ONE of the outstanding radio problems still to be solved is that of the mysterious variations of signal strength often observed in long-distance reception, even when the power input to the transmitter and all other conditions at both receiving and transmitting ends remain unaltered.

Some station may be received satisfactorily for a considerable time, perhaps for some weeks. Suddenly, for some unknown reason, the signals from that station will become inaudible, or nearly so, on the same receiver. This condition may last for some days, when, for no apparent reason, the signal will again become normal.

Meanwhile nothing has been altered in either transmitter or receiver. This effect has nothing to do, of course, with the well-known phenomena of increased signal strength at night, believed to be due to the layer of ionized gas in the upper atmosphere, known as the Heaviside Layer.

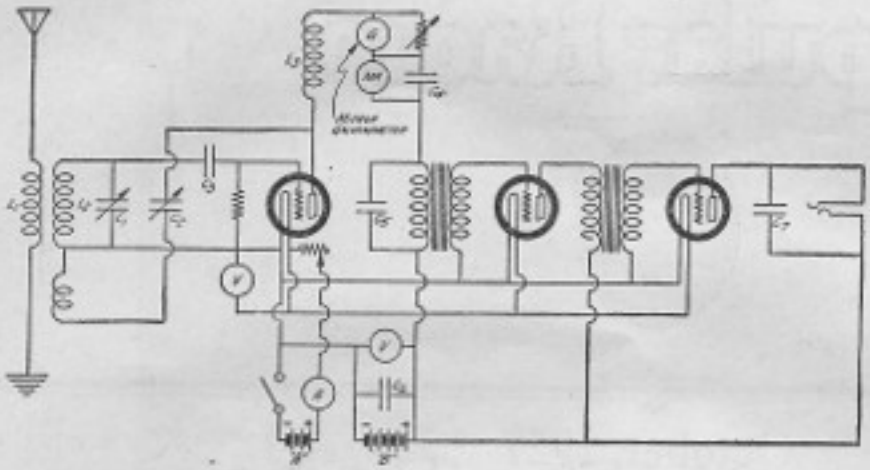
My purpose here is to suggest an entirely new theory to account for these variations in signal strength from time to time, about which so little appears to be known.

I have carried out much experimental work to reach this theory, and I have arrived at some definite results. Other workers in the field may follow up these, I hope, for the benefit of radio science.

When listening to radio transmissions from distant stations I noticed from time to time that on highly moonlit nights the results always appeared much better than at other times. This was true especially for transmissions from the distant stations. This led me to wonder whether the moonlight might have something to do with the effect. I began to make notes of good nights and of bad nights for reception. After a time I found that good reception almost always occurred during the period of full moon, even when the moon itself was obscured by clouds or by bad weather. The moon affects the matter somehow, but I have come to the conclusion that it is not the moonlight which increases the signal strength, but the rotation of the moon round the earth.

I made detailed observations on my reception of the short-wave transmission of KDKA at East Pittsburgh, Pennsylvania, as this station has a fairly constant transmission and is at a distance—3,500 miles—sufficient to make changes in signal strength apparent. My observations were as follows:

As the moon commences to decline from full, the received signal strength of this station also declines. As the moon declines still further the signal strength continues to diminish. At the time when the moon is between the



THE CIRCUIT USED IN MAKING THE TESTS

FIGURE 1: *Here is a schematic diagram of the sensitive regenerative circuit used by Mr. Shaunon in England for receiving the signals from station KDKA, in East Pittsburgh, Pennsylvania. Notice that the galvanometer for measuring signal strength is coupled directly to the detector circuit.*

earth and the sun, so that it is dark, the signal strength is at its lowest point. As the moon then begins to increase towards its first quarter, the signals of KDKA show an increase in strength. At first this is very slight; afterward it rapidly increases, and about three days before the moon is full the maximum of signal strength is reached. This maximum remains until about three days past the full, when the signals begin to fade again, and the cycle is repeated throughout the next lunar month.

There were many factors to be considered in the choice of a constant and stable receiver for these tests, especially so because of the short wavelength of 63 meters on which KDKA transmits. After much consideration and many tests I decided to use a simple one-tube circuit with two stages of low-frequency amplification. The chief trouble anticipated was in the use of regeneration, which had to be employed in order to receive KDKA regularly. Being more or less variable, this was the greatest problem.

This difficulty was overcome by using the Reinartz circuit and fitting the regeneration control with a fine vernier adjustment for accurate setting. Once this was set at a critical point, it was never touched again during the test period. Thus handled, the receiver remained quite constant in action. The set was fitted, also, with a filament voltmeter and ammeter and with a plate voltmeter and milliammeter, to insure having exactly the same conditions in the receiver each time that it was used.

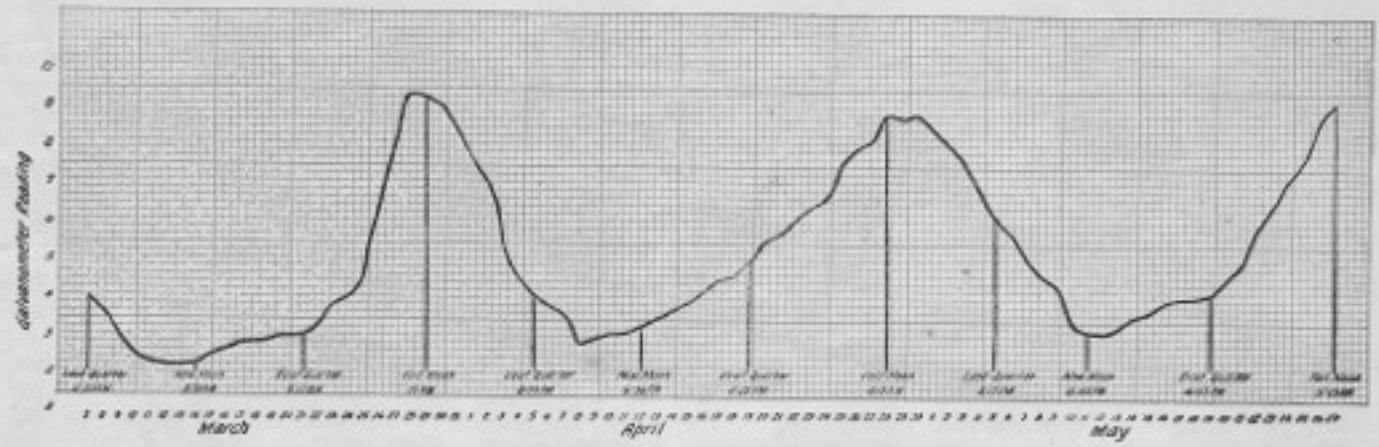
The aerial was of the single-wire, "L" type, fifty feet long, with a twenty-foot down lead. It was forty feet high at both ends, was stretched as tightly as possible between the masts and was kept strained by means of a weight on one halliard. No capacity change could take place by means of the aerial swinging or moving in some other way. It was coupled aperiodically to the receiver.

The ground was only ten feet long, of single fourteen-gauge copper, taken straight to a main water pipe below the set. Every part of the apparatus was fixed rigidly to the test bench. No loose leads were allowed to hang about. The whole of the wiring was done with four feet of square, tinned copper wire. V-24 tubes were used both for the detector and for the low-frequency stages. The low-frequency amplifier was used, of course, for listening to the transmission on telephones. For the actual measurements of the signal strength a sensitive mirror galvanometer was employed.

The deflection of this instrument was not very great, but was magnified by focusing its light spot on a special screen. I so arranged matters that a full-scale deflection of the light spot travelled over a scale of ten inches. The screen was of ground glass, with a scale marked thereon in ten divisions, each division being again split into ten.

In operation, the galvonometer was inserted in series with the plate of the detector tube and was shunted by a variable resistance, to enable adjustments to be made. The light spot was then adjusted to zero on the ground-glass scale, with no signals coming in, but with the receiver switched on and turned to 63 meters. The scale was so arranged that when the carrier wave of the station came in it showed as an increased reading, commencing at zero and finishing at ten. The circuit arrangements are shown in Figure 1.

When all was prepared, preliminary trials were made every night for a week, to determine whether the apparatus would remain stable without adjustments. This was found to be the case, provided all values of voltage and amperage on filaments and plates were



HOW RECEPTION VARIED WITH THE PHASE OF THE MOON

FIGURE 2: *This chart, covering three months, shows how the signal strength, as measured by a sensitive galvanometer, increased and decreased with the waxing and waning of the moon.*

From a photograph made for POPULAR RADIO

LISTENING IN FOR SIGNALS FROM ACROSS THE WORLD

Here is Mr. Derek Shannon, author of this article, with the apparatus that he used in determining the effect of the moon's phases on radio reception. Notice the complete shielding of the receiving set; this and other measures were adopted to prevent any outside influence from affecting the received signal strength.

kept adjusted to exactly the same values used when the apparatus was first set.

A start of the actual readings was made on January 10, 1925 at 11.30 P. M., this being the night of full moon. Observations were taken until 12 o'clock. Slight variations took place during the half-hour, but a reading was taken every five minutes and an average was struck; this average was entered on the curve. This test was then repeated every night until February 8, that being the night of the next full moon. A second test was made commencing on February 23, 1925, the night of a new moon; this test continued every night until March 24, 1925, the night of the next new moon. Since KDKA did not transmit on the short wavelength on Sundays, no readings were made on those days.

The curves for each test show a rise in the signal strength as the full moon approaches. This falls off again as the moon declines. The curves do not show straight lines up and down, but we must take into consideration the fact that slight alterations may take place in the transmitter, which would account for this. This does not alter the clear conclusion that the signal strength rises as the moon waxes and falls as it waves, as the chart in Figure 2 shows.

At present I am attempting to devise a receiver with a number of stages of high-frequency amplification and a carborundum rectifier, in which no regeneration will be used. This will be used on a higher wavelength, and I would suggest to anyone who wishes to carry out experiments along this line that some receiver of this type be perfected. The elimination of regeneration would remove the greatest variable factor—something which is most desirable. It is necessary to lay great stress on the additional necessity of making everything as rigid as possible. The whole apparatus must be untouched during the period of the test. I must add, also, that the galvanometer readings indicate the strength of the carrier wave, not the amount of modulation. This is very important, as the modulation of a telephone transmitter, especially at a broadcasting station, is being altered continually and would provide no indication of the strength of reception.

Many nights, when listening to KDKA during these tests, the speech transmission was nearly inaudiable, but the carrier wave was extremely strong. Anyone making these tests should take no notice of the loudness of the speech or music received, but should deal only with the strength of the carrier wave, as shown on the galvanometer.

This mirror galvanometer must be of a sensitive type, and the variable resistance placed in a shunt around it must be of sufficiently low resistance to pass the plate current. When adjusting this resistance to obtain the zero reading, great care must be taken that the galvanometer is not burnt out. It is advisable to set this resistance at its lowest value, so that the galvanometer is practically short-circuited, when first switching on the set. The station is then tuned in and all meter readings are carefully noted. Then wait until the station has closed down and adjust the galvanometer to zero by means of the shunt resistance. When the next transmission takes place, the galvanometer will read the strength of the carrier wave. When taking the readings of the galvanometer, it is advisable to stand as far away from the apparatus as possible, in case the set is affected by body capacity.

I have spent so many months making these observations and have checked so carefully the results of the nightly tests that there seems to me no possible doubt that the effect is real and is produced by the moon. About the cause, it is not possible to be so certain. Perhaps the variations of signal strength are caused by the gravitational effect of the moon and the sun, acting on the ether waves and deflecting them from their course in the same manner that light rays are deflected by gravitation. In Einstein's theory of relativity, every kind of matter distorts the ether around itself. Could we not assume that two bodies as near together as the earth and moon, and as constantly changing their positions in relation to each other, might cause a considerable and complicated ether distortion? But this is purely a hypothesis.

There exists one small factor which should not be overlooked. It is that on very bright moonlight nights the atmosphere is usually much more free from moisture than at other times. This may have some bearing on the alteration of signal, although I think not, for it is noticeable that the signal strength usually remains good whenever the moon is full, even on damp nights.

At the present I am engaged on a new series of observations, using more delicate instruments for measuring and recording the variations of signal strength and taking much greater precautions to exclude any possible factor which might give false results. I hope to place on record later on the results of these further tests.