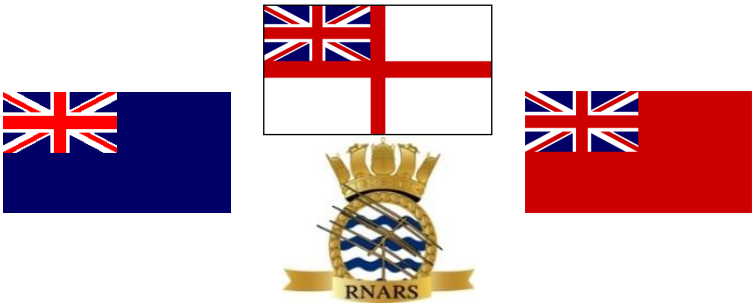

The Newsletter of the

Royal Naval Amateur Radio Society

Autumn 2017

Where it all began; G3BZU the first RNARS HQ shack
HMS Mercury - Circa 1960 / 61
See also page 30

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Contents:

Chairman's Chat

It is Autumn and we seem to be receiving the worst of the sun spot cycle at this time, while others are somewhat excited about accessing the 50MHz band. Another aspect of radio is WSPR which was introduced to us in a very practical way by one of our newer members to the HQ Shack, Tony Koeller. Imagine pushing out a signal at around 250mWatts and getting replies as far apart as the Canaries and Sweden in one afternoon! Well, we all saw the results on-screen in the HQ Shack, and it seems radio is always going to amaze us with some of the new ideas we stumble across as we tinker in our shacks at home. Ian Hutchinson (HMS Daring) has already acquired a kit of parts, while Joe Kirk (Hon. Sec.) has adapted his software to participate in this new activity. I must admit to being sorely tempted. It spurs me on to replace my home brew end-fed wire with a tuned monopole to see if I can muster any improvements to all round reception. Meanwhile, the 'Bubblies' are getting by quite well using SDR dongles here and there as the radio spectrum deteriorates. This is perhaps, the best part of our hobby - exploring new ideas!

What's happening in the HQ shack? You may well ask. We will be installing patch panels to improve aerial distribution to the bays - remember Tempest Testing? A true definition for chasing a will o' the wisp (ignis fatuus)... and band pass filtering in the HF bays. All in all, we hope to achieve better operational flexibility.

We recently received a bequest from the relatives of silent key Roger Smith (G7NEG) who was a past member. Ian Hutchinson kindly drove up to Leicestershire and returned with his car crammed to the gunn'ls with boxes of radios and paraphernalia. From the resulting auction-at-table we received £217-50 which will be donated to the RNRM charity (the old KGV fund for sailors, etc).

I wish you all fair winds and calm seas.

Yours, Aye

David (2E0GLL)

Sea Story Continued – © Eric Bray

When I turned in, that night, I made sure that my zipper was up as far as I could get it, and still breathe, and had jammed a bit of rag into the teeth at that point, so that I couldn't be completely zipped in by someone, for fun. Next day, after a breakfast that the 'chefs' couldn't mess up, as it was cornflakes, still in the packet with the cockerel on the front, I led my 'chickens' up to the EWO for duty muster. An LRO was in charge. As he was married, he was living ashore while we were in dry-dock. He introduced himself as Tony Jackman, and was acting RS, while the real ones were on leave, as were half of the Ships Company. "– so if I say jump, when you are on the way up, you ask 'how high'!" He declared. "You new sprogs, stop here. The rest of you lads, you know what to do, so finish your 'wets' and push off."

That left me, Bagsy Baker, Slinger Roap, and Tommo. We didn't have 'wets', as we didn't exist.

"Right. How good is your Morse? Tony asked.

"Really? We'll see! First off, what is that?" He pointed at a B40. "Can you work it?"

Nods of assent.

"Well, as the aerials have been removed, ready for replacing, we can't find out, can we? What is that?" He pointed at a cluster of racks of grey painted metal, festooned with knobs, switches, and cathode ray tubes. Blank looks all round, as we hadn't a clue.

"What did they train you on, at Mercury?"

"UA3, LRO."

"UA3? We don't use them anymore, they're prehistoric! Forget all about it! Starting on the left, is the S band jammer, then the UA8, the UAZ in the middle, the UA9 next, and on the right is the X band jammer. Well, these are just the control and display units. There's a whole pile of other bits in the room outside, and on the next two decks going up. There's a hatch in the corner, there." He pointed at the cubby where the kettle lived. "Don't worry about it, you won't be allowed to touch it just yet! In the meantime, I have a tape recorder, and a Morse practice tape. Get a pen, and paper, find a seat, and start writing.

Two bleeping hours later, we broke for a wet. We made it, he drank it, then it was a radar noise exercise tape, until lunch. "Right, push off. Back here at one, on the dot!" Lunch was edible. Cheesie-hammie-eggie's on toast, with thoroughly boiled baked beans, and tea or coffee.

At thirteen hundred less one minute, we all arrived at the EWO, which was locked. We hung around outside, waiting. LRO Jackman wandered in at two, with a writing pad and some letters in his grasp. "Oh! I'd forgotten about you lot! Shove off, keep out of sight until four-thirty, then knock off."

We had learned to not need telling twice! That was the routine for the next fortnight, Morse tape, radar tape, lunch, and hide for the afternoon. I 'found' a clipboard, and spent a lot of time wandering around clutching it, and looking busy. Sunday was slightly different. We started at nine, knocked off at ten past, and hid until twelve.

On the second Friday afternoon, Tony went off on his leave. We were left in the care of RO2 Fred (Daisy) Blossom until the other watch came back, on Monday. On Saturday morning, we rolled up at nine, as usual, to find the place locked. After a while we volunteered Slinger to go and find Daisy. After a while, he came back with the instruction to 'Sod Off, and keep out of sight!' so we did.

On Sunday, Daisy stayed in his pit, so we stayed in the mess. He crawled out at eleven, went for lunch, then went off on leave, with a parting – "See you in a fortnight."

The mess was empty, except us four, and an RO3 Bunts, who had the sulks, and wasn't speaking to anybody.
"What do you think of it, so far?"
"Load of crap!"
"Dead easy."
"Someone's got the telly going, in the canteen!" A foreign head poked through the mess doorway, and yelled the message. "Great, it has to be better than watching the paint discolour."

We watched 'Magic Roundabout' with an ad-libbed sound-track. What Zebedee was going to do with Florence is not what the writer of the original script had intended! Later, it was Jon Pertwee, as Doctor Who, waging war on the Daleks.

When the galley shutters crashed up, at teatime, we were at the front of the queue. We went round twice, as the meal was fairly edible. There

isn't much the 'chef' could do to 'herrings in', (really Pilchards in tomato), and salad. Slinger was evicted as he went round a third time. "Oy! You been round once already!" (Thus proving that the 'chef' couldn't count, either!) He escaped, grinning cheerfully, with a pilchard butty that dripped red juice everywhere.

On Monday, at a minute to eight, having been sat on repeatedly since six, when the first of the returnees stumbled in from the five-thirty arrival at Pompey Harbour train station, we were all outside the EWO, waiting for someone to unlock the door. We were carefully not early, and equally carefully not late! RO2 Pete Snark was the first to show up. He looked at us, then said, - "You the new lot?"
We introduced ourselves.
"I'm Sharkie, Pete Snark. The rest should be here in a minute. Who's got the key?" "Daisy left it somewhere. He didn't tell us where."
"It's probably in the General Office. I'll go and check.
Tell 'em where I've gone."
Harry Siddall was next. We told him that Sharkie had gone to find the key. He went back down, two decks, onto the flight deck, for a ciggy and a good cough.

Next was a Chief RS. He asked who we were, and where everyone else was. We told him. "Right, I'm going for a jimmy. I'll be back shortly." He disappeared, too. A few minutes later, two LRO's rolled up, literally. They were still stoned. They leaned carefully on the wall, holding their skulls together with their hands.

At twenty past, RS Garfe marched up. His suit was spotless, and his shoes shone like mirrors, like his head, apart from the horse-shoe of stubble that would stop his cap from sliding about. "Who has the key?" He barked.
"Sharkie, - er, Pete Snark went for it."
RS Garfe about-turned, and marched himself off down the passageway, clanged down the ladder, and up another - nearby. After a pause, the tannoy whistled, then announced that RO2 Snark should ring 120. That seemed to open a floodgate, because from then on, an almost continuous stream of instructions and requests for people to perform various duties poured from the speakers. Faintly, from somewhere, a 'phone rang a few times, then stopped.

RS Garfe marched himself back again, stood himself at ease, and waited. The Chief came back. “No key, yet? Call me in my mess.”
“Yes, Chief!” RS Garfe snapped to attention as he spoke, then at-eased, again.
Harry came back.
“Where have you been, Siddall?”
“On the flight deck, having a smoke, RS!”
“Well, you aren’t on leave now. Smoke in your own time, not mine!”
“Yes. I mean, no, RS.”

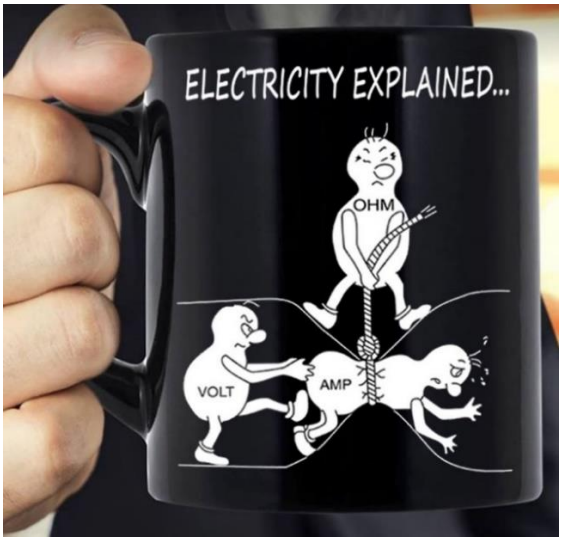
Feet clattered on ladders, getting closer, then Sharkie appeared, his skin leaking. “Got the key?” RS Garfe demanded.
“No, RS. Pots ‘G’ thinks Taff the Tiff has it, but I can’t find him. He isn’t in his mess, or the sheds.”
“Shcush me, gonna puke!” One of the LRO’s reeled unsteadily for the ladder, his face pasty white.
“Bet he doesn’t make it!” Henry whispered to Pete.
“No bet.”
The hesitant feet on ladders noises stopped, then there was a groan, and a splattering noise.
“Told you!”
“Forgone conclusion!”
“I bet WE get sent to clean it up!” Slinger whispered.
“You new boys. Go and find some cleaning gear, and dispose of that mess!”
“Yes. RS.”
While we were doing that, the tannoy bellowed, - “Artificer Morgan, ring 120. Tiffy Morgan, `120!”
“Hitler’s getting mad!” Bagsy was trying to scoop slimy puke up with a dustpan, pouring the result into a bucket. Slinger added some of his own, then apologized. Bagsy was swallowing hard, too. “At least, you got the (puke!) bucket!”
“And you got my feet!”
(Puke!) - (Puke!)

We all dashed for the heads, taking it in turns with the bucket.
“What’s up with you three?” An Officer demanded.
“Food poisoning, Sir!” Bagsy gasped.
The smell reached the Officer, who beat a hasty retreat in any direction that we hadn’t been going. “Carry on!” his voice lingered.

"Food poisoning, Why'd you day that?"
"That drunken bastard's food is poisoning us!"
Later, recovered, and with aching guts, we returned to the EWO.
"It took you long enough!" RS Garfe commented.
"We had to clean up where he didn't make it, several times!" We offered in explanation.
"Where is LRO Rorke now?"
"Who?"
"The ill one."
"Is that his name? As far as we know, he's holding a conversation with a porcelain voice-pipe."
"Ah. How is your Morse? Here's some paper, and there's the tape recorder!"

In the afternoon, we scrubbed the EWO deck, then polished it. When it satisfied RS Garfe, we scrubbed the tea boat table. Why it was a tea-boat, we never found out.
"That will do. Push off, and keep out of sight until five."
"Yes, RS." Off we pushed.

To be continued



Electrickery for mugs

Has the capacity variation of a parallel resonant circuit an influence on the bandwidth or not?

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Chapter A: Introduction

Anthony Sedman, G3LAA, presented in the NEWSLETTER Spring 2015 an interesting mathematical derivation to find by this way his answer to one part of my investigations at ring core coils (toroids): how does the capacity variation influence the bandwidth? In his treatise he pointed out the following four statements:

One: „…since the term 2π is a constant then f_o is proportional to $1/(LxC)^{0,5}$…

Two: „…since the term 1/R is a constant, then Q is proportional to $(L/C)^{0,5}$…

Three: „The term R above refers to the loss resistance of the capacitor C and the coil windings in the inductance L. We want these to be negligibly small, so I have not included R in the equation above."

Four: „The significance of this is that the variation of capacitor C has NO effect on the bandwidth."

Are these statements acceptable? Especially the fourth with the conclusion? Has the capacity variation really no effect on the bandwidth? In this case the bandwidth of a parallel resonant circuit?

I do not agree with these statements in all and will point out why not.

In this report I use the measured data of my investigations at ring core coils (toroids), of which I published the results in the NEWSLETTER Summer 2009

Note 1: For the capacitance C, the inductance L, the resistance R and the frequency f I used, dependent on that what I explained, either the

physical correct dimensions or the abbreviations of the corresponding names FARAD (F), HENRY (H), OHM (Ω) and HERTZ (Hz):

- Capacitance (Capacity) C: 1 [As/V] = 1 [F]
- Inductance (Inductivity) L: 1 [Vs/A] = 1 [H]
- Resistance R: 1 [V/A] = 1 [Ω]
- Frequency f: 1 [1/s] = 1 [Hz]

Note 2, inductance: In some equations of this treatise is mentioned „L [H]“. If these equations are derivated to simplify the calculations and a numerical value appears (Chapter F: „The loss resistance R of the used ring core coil“) the inductance is always L = 14,1 [µH] (measured value of the test coil of my mentioned investigations on ring core coils).

Note 3, capacitance: It has to be observed, that the calculated values of „C“ (Chapter D: „Measured and calculated values“) contains also the wiring capacity, therefore is: $C = C_{\text{variable disk capacitor}} + C_{\text{wiring capacitance}}$!

Note 4: numerical values: The most of the measured and calculated values are neither rounded up nor rounded down. Therefore check-calculations for comparison are very easily to make without the danger of inadmissible deviations of the results.

Chapter B: Derivation of the Thomson equation

To call the Thomson equation to mind I start with its derivation.

At the frequency of resonance f_r is valid: $X_C = X_L$ (see figure 1)

$X_C = 1 / 2\pi f_r C$ $X_L = 2\pi f_r L$ and hence it follows: $1 = 2\pi f_r C \times 2\pi f_r L = 4\pi^2 f_r^2 CL$

With the physical correct dimensions is valid:

f_r [1/s] $= 1 / 2\pi(L$ [Vs/A] x C [As/V]$)^{0,5}$ *(equation 1)*

or with Hz, H and F: f_r [Hz] $= 1 / 2\pi(L$ [H] x C [F]$)^{0,5}$ *(equation 2)*

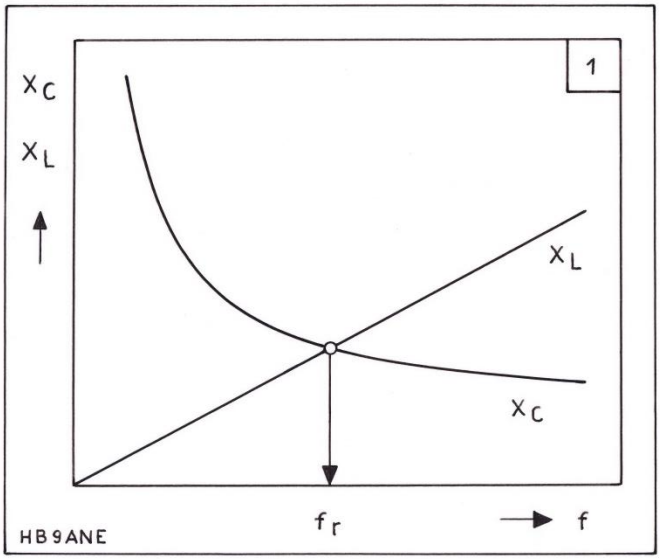

Figure 1
X_C and X_L = f(f)

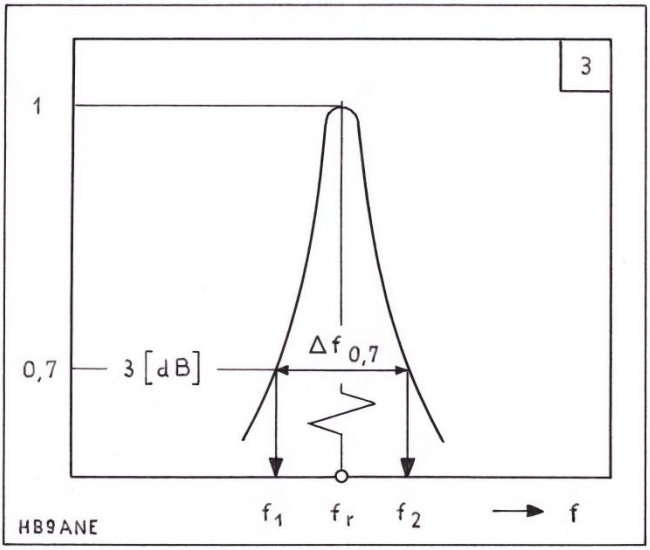

Figure 3
Determination
of $\Delta f_{0,7}$

Chapter C: Simplification of the Thomson equation for a tunable parallel resonant circuit

For practical use *equation 2* can be correspondingly derived and the result is the well-known equation:

$f\,[MHz] = 159{,}155 / (L\,[\mu H] \times C\,[pF])^{0,5}$ *(equation 3)*

In a tunable parallel resonant circuit with C-variation the inductance L is constant and in the case of my investigations it was L = 14,1 [µH]. With this value *equation 3* can derived to:

$f\,[MHz] = 42{,}385 / (C\,[pF])^{0,5}$ *(equation 4)*

Chapter D: Measured and calculated values

Figure 2 shows the measured (columns A) and the calculated (columns B) values from my investigations on ring core coils.

For the calculation of C (column 2) the *equation 4* was derived to:
$C\,[pF] = 1796{,}488 / (f\,[MHz])^2$ (*equation 5)*

Figure 3 shows the principle presentation of a resonance curve with the frequencies f_1 and f_2 to determine the bandwidth $\Delta f_{0,7} = f_2 - f_1$

For the quality factor $Q_{0,7}$ at 3 [dB] voltage drop, with $(f_2 - f_1)$ [MHz] = $\Delta f_{0,7}$ [MHz], is valid:

$Q_{0,7}\,[-] = f_r\,[MHz] / \Delta f_{0,7}\,[MHz]$ (*equation 6)*

Figure 4 presents f_r, $\Delta f_{0,7}$ and $Q_{0,7}$ dependent on the variable capacity C, based on the values from figure 2

Furthermore I will show the influence of $Q_{0,7}$ and the variable capacity C on the loss resistance R in general (Chapter E) and on the loss resistance R of the ring core coil which was used for my investigations (Chapter F).

To complete all these connections is shown in chapter G in which way the loss resistance R will be influenced by the skin effect, dependent on the increase of the frequency.

2	A	B	A	A	B	B
	1	2	3	4	5	6
	f_r	C	f_2	f_1	$\Delta f_{0,7}$	$Q_{0,7}$
	MHz	pF	MHz			–
1	1,866	515,94	1,870	1,861	0,009	207,3
2	1,963	466,21	1,967	1,957	0,010	196,3
3	2,052	426,65	2,056	2,046	0,010	205,2
4	2,158	385,76	2,163	2,152	0,011	196,2
5	2,344	326,97	2,351	2,338	0,013	180,3
6	2,439	302,00	2,447	2,433	0,014	174,3
7	2,560	274,12	2,568	2,553	0,015	170,7
8	2,665	252,95	2,673	2,657	0,016	166,6
9	2,819	226,07	2,828	2,810	0,018	156,6
10	2,978	202,57	2,987	2,967	0,020	148,9
11	3,188	176,76	3,199	3,175	0,024	132,8
12	3,470	149,20	3,485	3,457	0,028	123,9
13	3,728	129,26	3,744	3,711	0,033	113,0
14	4,144	104,61	4,165	4,122	0,043	96,4
15	4,764	79,16	4,795	4,734	0,061	78,1

Figure 2
Various measured (A) and calculated (B) values

Chapter E: The loss resistant in general

With reference to the well-known equation:

$Q = (1/R) \times L^{0,5} / C^{0,5}$ (*equation 7)*

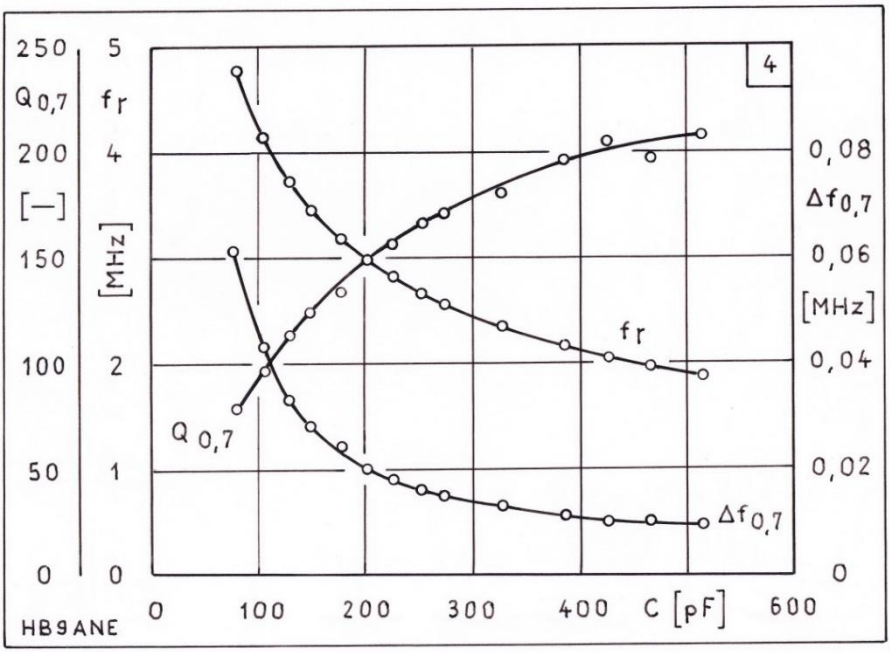

Figure 4
Frequency of resonance f_r, bandwidth $\Delta f_{0,7}$ and quality factor $Q_{0,7}$ dependent on the variable capacity C of a parallel resonant circuit:

The loss resistant R can be determined as $R = (1/Q) \times L^{0,5} / C^{0,5}$ and with the physical correct dimensions is valid:

$R\ [\Omega] = (1/Q\ [-]) \times (L\ [Vs/A])^{0,5} / (C\ [As/V])^{0,5}$ (*equation 8)*

or with H and F: $R\ [\Omega] = (1/Q\ [-]) \times (L\ [H])^{0,5} / (C\ [F])^{0,5}$ (*equation 9)*

So far to the loss resistant R in general. But: how would the elimination of „R“ (statement 3 by G3LAA) influence the dimension of „Q“? Independent of the numerical value of „1/R [Ω]“ leads its elimination to a wrong dimension of „Q“! Why? It will be shown in the following derivation.

It is valid (*equation 7* with physical correct dimensions):
$Q\ [-] = (1/R\ [\Omega]) \times (L\ [Vs/A] / C\ [As/V])^{0,5} = (1/R\ [\Omega]) \times (L/C\ [V^2 / A^2])^{0,5}$

however, without 1/R [Ω] „Q“ has the dimension „Ω„, because $[V^2 / A^2]^{0,5}$ leads to V/A = Ω, which is, of course, not possible!

Chapter F: The loss resistant R of the used ring core coil

For a tunable resonant circuit *equation 9* can be changed to:

$R\ [\Omega] = (L\ [H])^{0,5} / \{Q_{0,7}\ [-] \times (C\ [F])^{0,5}\}$ (*equation 10)*

With L = 14,1 [µH] = const and the conversion from “F“ into „pF“ follows for practical use:

$R\ [\Omega] = 3755 / \{Q_{0,7}\ [-] \times (C\ [pF])^{0,5}\}$ (*equation 11)*

To see the connection between the R- and A*-values (treated in chapter G) the latter are already shown here in figure 5

Chapter G: The influence of the skin effect on the current-carrying wire circular area

In the chapter F, „The loss resistant R of the used ring core coil“, can be seen in figure 5 that R increases with the frequency.

How can this be explained taking into account, that during the various measurements no alterations at the test coil were made?

The reason of the increase of R with the frequency is the influence of the „skin effect“! The proof will be shown as follows.

5	A	B	B	B	B
	1	2	3	4	5
	f_r	C	$Q_{0,7}$	R	A*
	MHz	pF	–	Ω	mm²
1	1,866	515,94	207,3	0,797	1,255
2	1,963	466,21	196,3	0,886	1,129
3	2,052	426,65	205,2	0,886	1,129
4	2,158	385,76	196,2	0,974	1,027
5	2,344	326,97	180,3	1,152	0,868
6	2,439	302,00	174,3	1,240	0,806
7	2,560	274,12	170,7	1,336	0,749
8	2,665	252,95	166,6	1,417	0,706
9	2,819	226,07	156,6	1,595	0,627
10	2,978	202,57	148,9	1,772	0,564
11	3,188	176,76	132,8	2,127	0,470
12	3,470	149,20	123,9	2,481	0,403
13	3,728	129,26	113,0	2,923	0,342
14	4,144	104,61	96,4	3,808	0,263
15	4,764	79,16	78,1	5,404	0,185

Figure 5
Calculated (B) values of R and A*

As known the following equation is valid to calculate the resistance of a wire:

$R\ [\Omega] = \rho\ [\Omega mm^2/m] \times l\ [m] / A\ [mm^2]$ (*equation 12)*

For a given coil one can introduce: $\rho\ [\Omega mm^2/m] \times l\ [m] = const$, with the dimension $[\Omega mm^2]$ for this constant and then is:

$R\ [\Omega] = const\ [\Omega mm^2] / A\ [mm^2]$ (*equation 13)*

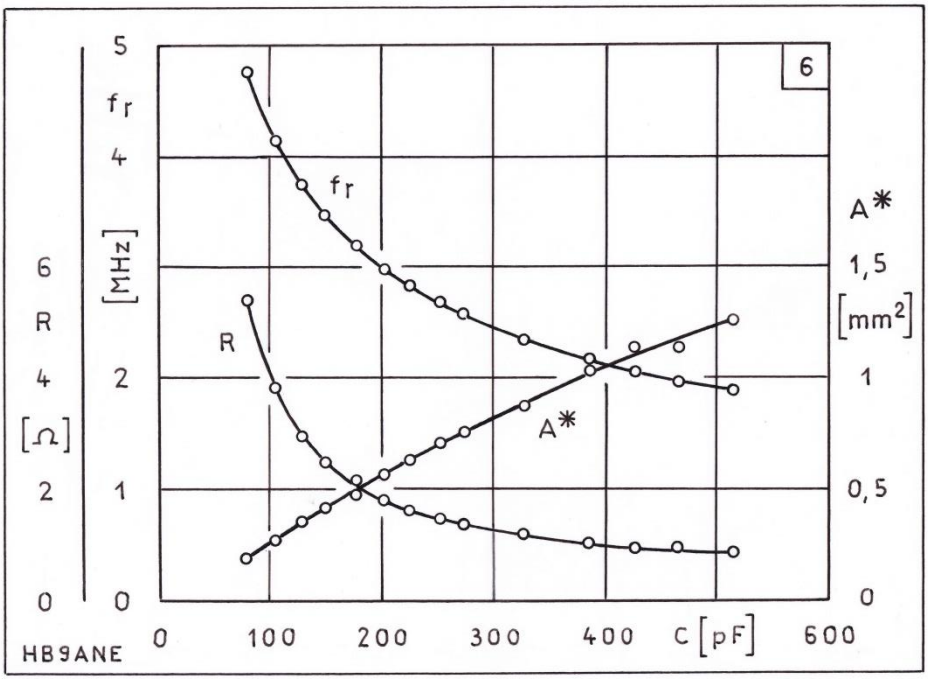

Figure 6
Loss resistant R, wire circular area A* and frequency f_r dependent on the variable capacity C of a parallel resonant circuit:

Hence it follows: A [mm²] = const [Ωmm²] / R [Ω] (*equation 14)*

Of interest are here not the exact numerical values of „A", but only their tendency dependent on the frequency f_r and the resistance R. Therefore one can set the value of the const to „1 [Ωmm²]" and calculate:

A* [mm²] = 1 [Ωmm²] / R [Ω] (*equation 15)*
To show the difference in comparison with exact numerical values „A" the not exact numerical values are designated in equation 15 with „A*" and presented in figure 5. Very clearly one can see that:

< with increase of the frequency f_r and the resistance R the current-carrying wire area A* decreases because of the influence of the skin effect, which needed clarifying!

In figure 6 are concluding presented R and A*, dependent on the variable capacity C and based on the values from figure 5. To show the connections is additionally presented $f_r = f(C)$, values from figure 4

Final word

By myself I do not like to make a comparison of the four mentioned statements by G3LAA with the results of my in this treatise in detail expounded investigations, equations, derivations, explanations, principle diagrams and those diagrams with numerical values at the X- and Y-axis, in which all measured or calculated data are presented with circles.

I leave it to the reader to make his own comparisons and assessments of all here demonstrated connections with the mentioned four statements by G3LAA.

Comments by the readers about this article would be not only very welcome, but also a great joy for me!

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[5] Helmut Pitsch
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Akademische Verlagsgesellschaft Geest & Portig K.-G., Leipzig

[6] Jürgen H. Timcke (HB9ANE)
A Study on Ring Core Coils
(Collection of measurements data)

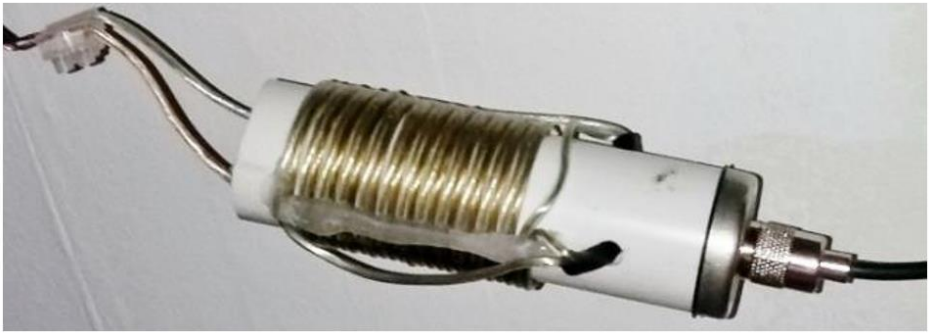
Diagrams and table-drafts: Author
Tables: Carmen Aschinger
Layout: Author (Draft), Rolf Rüttimann

More on Doublet aerials

Since writing about my attic aerial (zig-zagged doublet) in the 2016 Autumn edition, a few members have contacted me for more information on doublet aerials.

The G5RV offers a number of solutions, simplicity being one; but if you can make and rig a G5RV, why bother with the co-ax, just use twin feed straight to the matching unit and rig a doublet, honest, it is much more versatile and from my experience, far out performs a G5RV.

Matching appears to be the only thing that operators get worked up about when considering a doublet. If you don't have a matching unit that supports balanced feed line, no problem, all you need is a 4:1 balun to use it with an unbalanced coax fed ATU. At this point panic sets in at the very mention of building something and then the blood pressure rises with anything that involves winding a very simple bifilar coil and cardiac arrest at the thought of soldering a SO239 connector.



But fear not and don't panic; a 4:1 balun isn't difficult to make; there are many examples on the internet with clear instruction and if you don't have access to the internet, I'll send you instructions, measurements aren't too critical. Mine was built on a short length of 1¾ inch diameter plastic waste pipe with heavy speaker wire. But if you baulk at the idea of winding coils and using a soldering iron, a 4:1 balun can be purchased from various outlets. Just one consideration, twin feed has to be kept clear of metal, such as pipes, window frames and cabling for it to retain its balanced properties, four inches or so should do it.

Once you've built and used a doublet, I doubt you'll ever go back to a G5RV. In theory, my doublet shouldn't tune below seven Meg, but it actually works on the five Meg band. Which proves what I said in my Autumn 2016 article; aerials can't read theory.

Two well tested adages I use in any project; KISS (keep it simple stupid) and PPPPPP (proper planning prevents p*ss poor performance).

Colin GM6HGW

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The operating position of the society's first station
Within HMS Mercury; G3BZU.


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A very warm welcome to our new members and up-dates

New Members		
Anthony "Tony" Koeller	M5AGB	5033
Jon Carp	G3NHS	5034
Mathew "Matt" Taylor	M6HMS	5035
Re-joiners		
J Allan	GM8VNT	1621
Fyodor "Ted" Kondratyev	RN1NW	4263
Paul Stevenson	GW7KDI	4601
Douglas "Doug" Mulloy	K7AGX	1486
Jack "John" McLeod	G4MWW	1257
Eugene "Hugh" Purvis	MØHMS	3999
Changes		
Karl Thwaites was M6IJV	2EØIJV	5028
Keith was 2EØKMZ	MØIHN	5029
Resigned		
Silent Keys		
Len Evans	GØSJQ	2075
Alan Pampling	G3RSP	0510
Harry Myers	G4PTN	2139
Kevin Wood	G4JOA	2336

Staying on a membership theme, congratulations to **Bill Mahoney** (G3TZM) who joined the society on the 1st August 1967 and given the membership number; 328. Bill has now completed fifty years of continues membership, well done Bill, here's to the next fifty.

Welcome back to re-joiner Doug Mulloy K7AGX who sent in this picture of himself (far right) outside the amateur radio shack on Diego Garcia.

RNARS member Carl Mason GWØVSW (right) has had another busy summer, this time on the staff of a "Gold" flying course for sea cadets.

How to test a suspect aerial feeder

1. Carry out a visual test all the way along the whole feeder looking for any damage
2. Inspect the ends of the coax for water ingress.
3. Connect a suitable dummy load to the aerial end of the feeder.
4. Connect a SWR meter between the TX and the feeder.
5. Transmit a suitable carrier to test the SWR. If it is anything much higher than 1:1, then the feeder is suspect.
6. Disconnect the dummy load and re-connect the aerial.
7. Re-test for SWR. Having proved the feeder, then any high SWR reading means the aerial is now suspect.

Bill Mahoney G3TZM

Rally Reports

Starting off with the **Mc Michael** rally in July where Phil (G1LKJ) represented the RNARS. Twelve members signed in with Frank (GØLFJ) and Christine (M6UBI) attending from Portsmouth. One member; Alison (G8ROG) rejoined and Phil managed to sell a logbook and lapel badge.

Flight Refuelling Rally - August
I attended the rally at Wimborne and had fifteen members sign in, three down from last year. Members attending; Fred G3ZJY, George G4NFT, Brian G4CJY, Alan M6LFM, Christine M6UBI, Dave G3VXM, Rob G4SPS, Frank GØLFI, Simon GØIEY, Julia GØIUY, Mick GØTZE, Andy 2EØREE, Peter M1AYI, and Dan MØCVR. Furthest travelled; Peter M1AYI from Tavistock and Dan MØCVR from Plymtree.

Phil G1LKJ 2954

Circular Morse Code

Does CW send you round in circles?

New member Tony Koeller (M5AGB) recently came across a coin shaped Morse reminder on e-Bay; clearly of Chinese origin.

Starting at the star you follow the sequence of dots and or dashes to read the characters received.

The 'coin' is 33mm in diameter and Tony has given thought to using a 3D printer to reproduce something similar; perhaps a new line for RNARS commodities?

Phil Whitchurch has recently been in contact with the following information.

RNARS member Joe G3MRC became a silent key in early May 2017 and I am pleased to announce that I have obtained from Joe's widow copies of the logs and a quantity of blank cards for callsigns held by Joe: 7Q7BP, 7Q7FOC, C91MR, C93MR, C96MR, C97MR, 5X1P, 9Q5MRC, 9U5MRC, G3MRC, VK8CP and Z38/G3MRC

The logs had all been uploaded to LoTW by Joe and Phil has also uploaded them to www.g3swh.org.uk, where there are log search facilities for each call.

Joe's RSGB membership lapsed at the time of his passing. Therefore, I am unable to process or respond to any bureau QSL requests as the RSGB QSL bureau will not forward outgoing cards to non-members. Consequently, paper QSLs for this station are only available direct with adequate return postage or via the OQRS facility at www.g3swh.org.uk. There is further information on my web site.

Phil Whitchurch G3SWH / AD5YS

Brian Joseph Poole G3MRC

Joe operating VS1FW

There are not many radio amateurs of whom it can be said that they defined First Class when it comes to CW operating. "Joe" Poole was certainly one of the few. I had the good fortune to contact him from a number of places starting with my own home station and whilst visiting places such as Bletchley Park, Cyprus, Malta and other people's shacks like that of Mick G3LIK and the Bromsgrove Club G3VGG. A number of us have had the good fortune to spend a number of days with him and his wife Janet, once on a canal boat trip and on another occasion, a week in the Lake District for his 70th birthday. He thought he was on his way to Scotland for a fishing holiday but we held a surprise birthday party for him and even ran a special event station on site as GB4LBP which became known as "Life of Brian Poole".

Brian Joseph Poole was born in Slough, Buckinghamshire in June 1938. He joined the Royal Navy as a Boy Telegraphist in September 1953 at HMS Ganges, the training college near Ipswich. In 1955 he qualified as a Telegraphist and joined the fleet on the first HMS Ark Royal and followed by serving in the Communications Branch of the Royal Navy at various locations including Singapore, Mauritius, Gibraltar and Malta as well as in HM Submarines. He retired from the Royal Navy as a Chief Radio Supervisor in 1978**.** It is his skill working as a Telegraphist during this service that made him the superb operator that he was on the amateur bands.

Working as a Water Bailiff in the South West of England he met and married Janet. A little while later, he worked as a warden on a country park near Birmingham and after he left that job, he worked for Oxfam in communications and IT. He later went on to work for a number of other relief organisations including the World Food Programme, etc. in many locations. It was during that time that he had the many radio callsigns from the various locations in which he worked in trouble spots around the world. These included The Congo, Rwanda, Burundi,

Mozambique, Macedonia/Kosovo, East Timor, etc. and Malawi. He also had calls in other places including the Northern Territories in Australia. Janet was able to accompany him on a number of the journeys.

In amongst all this, in 2002 he had a triple-heart bypass operation back in Birmingham followed by a holiday in Africa where he was approached to take up a job in Malawi, again in communications for UNICEF. He and Janet decided that they liked Malawi enough to build themselves a house by the lake towards the end of 2004. Joe retired there and stayed on. He and Janet moved into the house by the lake early in 2005.

Janet & Joe

Among the many callsigns Joe held were: G3MRC, 5X1P, 7Q7BP, 9M2AN, 9Q5MRC, 9U5MRC, 9X5/G3MRC, C91MR, C91MR/3, C93MR, C96MR, C97MR, G3MRC/C9, VK8CP, VS1FW, VS2FW, Z38/G3MRC, ZB2/G3MRC as well as operating from the Singapore Naval Base radio club VS1HU and the Amateur Radio Club GM3OAE located in Faslane, Helensburgh, Dumbartonshire whilst he was in the Third Submarine Squadron. It is probably for his operations from Malawi as 7Q7BP that he was best known. Joe was a member of a number of clubs and societies including as a founder member of the Royal Naval Amateur Radio Society (RNARS), the First Class Operators Club (FOC), and a member of Bromsgrove & District Amateur Radio Club.

He had been suffering from a chest infection which turned to pneumonia and he died on 2nd May 2017. He will be missed by many throughout the world.

Bill Mahoney
G3TZM - 9H1BX - RNARS 328

A useful appliance for experimental work

In my flat the lighting lines are protected by means of fuses with the nominal current value of 10 ampere. During experimental work one cannot rule out, even not with all caution, that a short circuit occurs; and the result? Not only the 10A-fuse must be replaced, which is not a problem, but also all electrical connections are failed and, if it happens in the late evening or in the night, I would sit in the darkness.

To avoid this situation, I have built this little appliance. On one hand, it is connected at the wall-socket of the lighting lines, while on the other hand the power supplies for the Grid-dip-meter, the square wave signal generator and, e.g. the receiver which I am testing, can be connected at the triple-socket of this appliance, see figure 1

In the case of a short circuit only one of the built-in over-current releases (either the one for 1 ampere or the other for 2 ampere) failed and it can be switched-on again very easily.

Figure 1 The finished appliance. On the left the switches of the both overcurrent releases: above “1A“, below “2A“.

The circuit and its components

Figure 2 shows the circuit, special explanations to it are not required. However, it is to mention that I have installed some “luxury“ details as following listed (the numbers in quotation-marks correspond to the numbers in the circuit):

< “2“ indicates the correct phase connection.

< Even if “4/1A“ or “6/2A“ is failed, then “5“ and “7“ are still glowing, which indicates that the 10 ampere fuse in the lighting lines is not destroyed.

< “8“ indicates that at the triple-socket “9“ the outlet voltage is available.

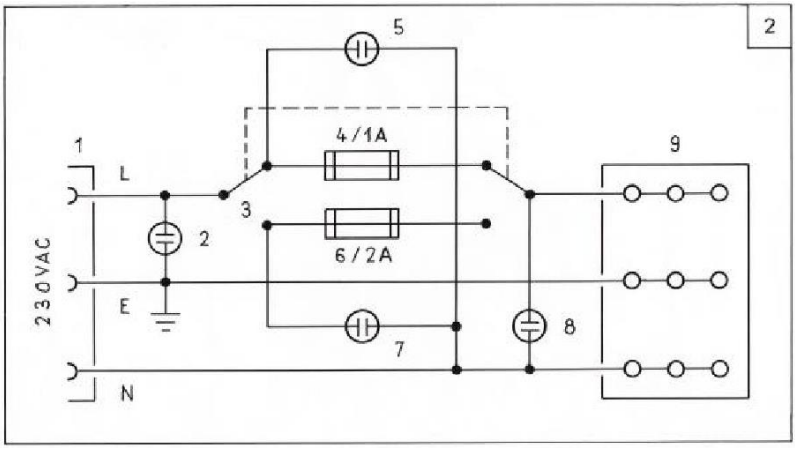

Figure 2 The circuit and its components.

1 Appliance inlet 250 VAC, 10 A	2 Glow lamp 230 VAC, red
3 Throw-over switch 250 VAC, 2A	4 Over-current release 230 VAC, 1A
5 Mini glow lamp 230 VAC, red	6 Over-current release 230 VAC, 2A
7 Mini glow lamp 230 VAC, red	8 Glow lamp 230 VAC, white
9 Triple wall-socket 250 VCA, 10A	

The design

The casing consists of four parts: front panel, rear panel, casing lower part (with the feet) and casing upper part. These parts are made of half-hard aluminium, 2mm thick.

Front panel and rear panel are screwed on at two U-shaped bows, made of flat steel 30mm x 2mm, on which also the casing lower part and the casing upper part are screwed on.

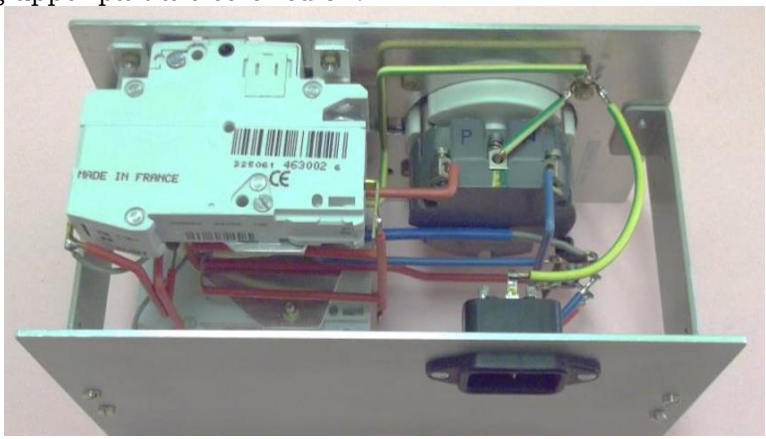

Figure 3 shows a view of the inside.

Aside from the appliance inlet at the rear panel all other components are fixed at the front panel. Without the not screwed on U-shaped bows enables this not only a clear view to the component-connections, but also the carrying-out of the wiring and its check later on is much easier.

Figure 3 View to the inside. Clearly to see the fixation of the front panel and the rear panel at the both U-shaped bows.

This little appliance can be seen in the Newsletter; Autumn 2016, on page 13, figure 5, above. Drawing and photography: Author - Layout: Rolf Rüttimann. jhtimcke@gmx.ch - www.juergen-h-timcke.ch

Dipl.-Ing. *Jürgen H. Timcke*
HB9ANE RN 3493

Me In My Shack

Or rather, Mike Gloistein (GMØHCQ) in his work place and amateur shack aboard RRS James Clark Ross.

Thanks to Richard Turner for permision to use this image.

Mike's shack doubles as the ship's digital com-cen. Mike is normally active on amateur bands using CW in the evenings, check out his web site for daily up-dates and lots of amazing pictures www.gm0hcq.com

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Jurgen Timcke's (HB9ANE) daughter Karin took this picture of the man behind many articles in the Newsletter.

Jurgen is gazing affectionately over his latest acquisition; a FT-450D which replaced his much missed and cherished but sadly broken 101ZD.

Do you have a picture of yourself in your shack; send it in to let others put a face to a voice or keying style.
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An oldie but worth a repeat

Senior Marine Superintendent
Misfortune Shipping Co
London

Date as per postmark

Sir;
It is with much regret and haste that I write to you. Regret, that such a small and simple misunderstanding could lead to the following circumstances; and haste, in order that you will get this report before you form your own pre-conceived opinions from reports in the world's press; for I'm sure they will greatly exaggerate the whole affair.

We had just picked up the pilot, and the apprentice just returned from changing the “G” flag to the “H” and, being his first trip, was having difficulty in rolling the “G” flag up correctly. I therefore proceeded to show him how it should be done. Coming to the last part of the operation, I told him to “let go”. The lad, although willing, was not too bright, requiring me to repeat the order in a sharper tone.

At this moment, the First Mate appeared from the chart-room, having been plotting the ship's progress; and, thinking that it was the anchors that were being refereed to, repeated the order “Let Go” to the Third Mate on the forecastle. The port anchor, having been cleared away, but not walked out, was promptly let go.

The effect of letting the anchor drop from the pipe whilst the vessel was proceeding at harbour-speed proved too much for the windlass-brake, and the entire length of the port cable was pulled out by the roots. I fear that the damage to the chain locker may be quite expensive. The braking effect of the port anchor naturally caused the vessel to sheer towards the swing-bridge, which spans a tributary of the river up which we were proceeding.

The swing-bridge operator showed great presence of mind by opening the bridge for my vessel. Unfortunately, he did not think to stop the vehicular traffic; the result being that the bridge only partly opened; depositing a car, two cyclists and a cattle-truck on the foredeck. My ship's company are at present, trying to round up the contents of the latter; which, from the noise, I would say were pigs.

In his efforts to stop the progress of the vessel, the Third Mate dropped the starboard anchor, too late for it to be of practical use, for it fell on the swing-bridge operator's control cabin. After the anchor was 'let go', I gave a double ring (full astern) on the engine-room telegraph and personally rang the engine room to order maximum astern revolutions. I was informed that the sea temperature was 53 degrees, and asked if there would be a film in the saloon tonight; my reply would not add anything constructive to this report.

Up to now, I have confined my report to the forward end of the vessel. Down aft, they were having their own problems. At the moment the port anchor was let go, the Second Mate was supervising the making-fast of the after tug, and was lowering the towing-spring down to the tug.

The sudden braking effect on the port anchor caused the tug to “run under” the stern of my vessel just at the same time the propeller was answering my double ring. The prompt action of the Second Mate in securing the inboard end of the towing-spring delayed the sinking of the tug by several minutes, thereby allowing the safe abandonment of the tug.

It is strange, but at the very same moment of letting go the port anchor, there was a power-cut ashore. The fact that we were passing over a “cable area” at the time, might suggest we may have touched something on the river bed. It is also lucky that the high-tension cables brought down by the fore-mast were not live, possibly being replaced by the underwater cables; but owing to the shore side blackout, it is impossible to say where the pylon fell.

It never fails to amaze me, the actions of foreigners during moments of minor crisis. The pilot, for instance, is at this moment, huddled in the corner of my day-cabin, alternately crooning to himself and crying, after having consumed a bottle of gin in a time that would be worthy of inclusion in the Guinness Book of Records. The master of the tug, on the other hand, reacted quite violently and had to be restrained by the Chief Steward, and who has him handcuffed in the ship's hospital where he is telling me to do impossible things with my ship and my person.

I enclose the names and addresses of the drivers, and the insurance companies of the vehicles on my foredeck, which the Third Mate

collected, after his somewhat hurried evacuation of the forecastle. These particulars will enable you to claim for the damage that they did to the railings and covers of number one hold.

I am now closing this preliminary report, for I am finding it difficult to concentrate, due the sound of emergency vehicle sirens, and their flashing lights etc.

It is sad to realise that had the apprentice realised there is no need to fly pilotage flags after dark, none of this would have happened.

Signed;

Frank Spencer
Master, MV Hapless

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Congratulations to our Patron; Admiral Sir Philip Jones, First Sea Lord and Chief of Naval Staff who recently received an honarary degree from Liverpool University.

Image from Twitter.


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My passion for amateur radio; how it all began

Alan operating from HMS Belfast

It all began for me around the age of eleven, when I was at school (1955-1960) and a friend of mine brought in various electric shock machines and hand cranked generators and gave us all shocks!

'What was this?' I thought…interesting. At the time, I was already hooked on crystal sets, chemistry, firework making, and of course Meccanno, Hornby Double 0 model railways, and the 'Boy Electrician' book I found in the school library, so a friendship began with frequent visits to the old emporiums in Tottenham Court Road, Lisle Street, Job Stocks, Relda Radio, buying cheap odds and ends, and you know the rest

Every weekend I would visit my friend to see the latest innovation, maybe an oscillator, VHF transmitter and so on. There was always an R.209, B40, 38 set, 18 set, 19 set around to play with and so the bug bit…hard! I painted the back of my father's house for a 19 set!

Time marched on and construction began in a small way, such as two DLR5 headphones joined together with a length of flex between my friend's bedroom and mine as a communication system and it blossomed from there. This was a slow start and as I was still into Meccanno and chemistry all three came together nicely, I got fed up with blowing myself up three times so radio beckoned on and became my main hobby.

I finished school and our friendship continued until I met another friend who introduced me at sixteen to youth clubs and another great hobby…GIRLS, which overtook all my other hobbies…for a while at least. I was working in radio factories, testing and repairing them on

assembly lines and decided I wanted a change, so I ended up in my father's printing works which eventually led to PCB manufacture.

Time again marched on and in 1965 I met a nice girl who eventually became my wife. Once we were settled and had two lovely daughters, the bug bit again and I decided to go for my Amateur Radio licence. I went to evening classes, studied and experimented eventually gaining my G8 (G8NNI) licence which I held and was active on 2m, usually on early morning nets and mobile, until one day I wanted more, so I went to Morse sessions at a local ham's home and got my G4 (G4GQL) licence. The world was now my oyster, and my first HF TX was a bought homebrew job, 10w using a light bulb as a dummy load…tune for maximum smoke and many RF burns. But it worked well.

After a while I bought a Heathkit, then a Yaesu FT-101 which performed great into my G5RV antenna, my first VHF rig was a Carl Braun SE-280 (not very well known, but is on Rigpix). From then on, it continued with me constructing a GDO, tape recorder and record player, SW receiver, signal tracer and too many experiments with ex WD equipment to mention. My main interest was always antennas and I made many dipoles, beams, loops, long wires, and even the old Joystick 'look a like'. Things progressed and many pieces of equipment came and went in the G4GQL shack, and now, having moved into a flat, I had to devise some sort of antenna system to stay on air.

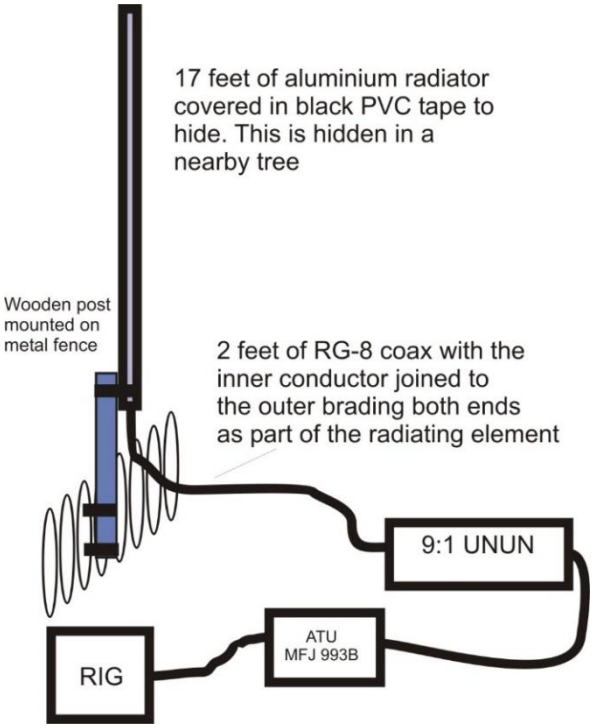
After many, many attempts at stealth antennas, I finally arrived at a system that works well and may be useful for others who have limited space or want a hidden aerial. Here's the details:

17 feet of aluminium swaged tubing. 2 foot of RG-58, with the inner conductor joined to the outer bradding as a flexible extension to the vertical, and this goes to a 9:1 unun. The other end of the unun connects to a PL 259 and coax into the shack and my ATU (MFJ 993B) Finally to my FT-991. See the schematic diagram below for full details

One day, I was on air using PSK 31 when I happened to reply to a local club's CQ. This led to me joining LEFARS, Loughton and Epping Forest ARS and then membership of the RNARS (London Group) so I became QRV on HMS Belfast.

What a great hobby we have, and long may it continue in spite of all the evolving technology. Visitors to HMS Belfast have remarked how boring the new social media is and how can they join us as they are hooked on technology, impressed with our activity, and want more…quite encouraging for us.

My stealth antenna system that took me years of experimentation to fathom out, but seems to work on all bands.



Alan G4GQL

Alan later confirmed that the metal fence is connected to the 'ground' side of the co-ax attached to the 9:1 unun to provide a ground plane.

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CQ RNARS Affiliated Clubs

As well as hearing from members, perhaps some of our affiliated clubs might share their news? Do you have any rallies or ex-peds planned; don't keep it a secret, send in your news and pictures.

Perhaps some our affiliated Sea Cadet units might want to send in pictures of their radio related activities?

Full details of how to contact me are in the editorial.
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Flying The Flag

To help promote our presence at rallies and HMS Collingwood open days, the society has taken delivery of two new free-standing feather banners as modelled outside HQ shack with left to right: David 2EØGLL, Chris M6FUW, Joe M6VLL and Alan M6LFM

RNARS AGM Reminder

Venue: The AGM of the RNARS will take place on 14th October 2017 starting promptly at 14:00 in the: **RNA Club, 66 Fareham Road Gosport, PO13 0AG**

Apologies: To be sent to Joe Kirk; General Secretary, see inside front cover for contact details.

Attendance: Members attending must supply their name, call-sign, membership number and address to Joe Kirk well in advance to arrange catering. Members should muster at the club at 11:00 and up-spirits will take place at 11:30 followed by lunch at 12:30, Joe's contact details are on the inside front cover. Ample car parking is available.

Voting: You may vote on resolutions at the AGM either in person or by appointing a representative or proxy. The Chairman will act as your representative and follow any voting instructions given. If you do not want the Chairman of the AGM to act as your representative and wish to nominate someone else, write to the General Secretary and inform him who that person is at least one week prior to the AGM. Give clear instructions to your representative for each item on whether you wish to vote "For" or "Against". A proxy voting form is supplied on the rear cover, photocopies are acceptable.

Accommodation: Service accommodation is not available. Below are the contact details of the local tourist information office that retains a list of B & B's and suitable hotels, they can provide listings on request. The society cannot be held responsible for the quality of the accommodation, but please note that the list is approved by the local tourist information services.

Gosport Tourist Information Centre
Bus Station Complex
South Street
Gosport
PO12 1EP
Tel: 023 92522944
E-mail: tourism@gosport.co.uk

QRT – Closing Down

My sincere thanks to all who have contributed to this edition of the Newsletter. As you'll see, I had a number of longish articles submitted; what I desperately need are short items to make for a more varied read. Shorter articles and pictures help with layout, being able to adjust things to give a cleaner look. Pictures for the "me in my shack" spot are ideal for this and put a face to a voice or keying style. Don't worry about spelling or grammar, I can sort that out. Please submit your articles by e-mail, on a disc or USB stick, which I will return. Pictures by post are fine, I can scan them and again return them in the post. In short, I can't emphasise enough that although we have a few regular contributors, it is unfair that we have to rely on them so much. All I ask is that you follow the instructions relating to characters in the subject of e-mails to me below.

If you've visited a nautical or radio related museum or location, take pictures and send in a few lines. As the man from TESCO used to say in the adverts; "every little helps", and for members who upload video or pictures to various web sites, send in the links (URL).

Anyway, time to close down now; before I do, just found out an ex-girlfriend has found a job with Greenpeace, they throw her off the stern of their ship to act as a decoy to whaling fleets.

Colin

Contacting me:	Home:	01592 774085
	Mobile:	07871 959654
Out with the UK:	Home:	00441592 774085
	Mobile:	00447871 959654
Skype ID:	colintop	
Postal:	26 Crathes Close, Glenrothes, KY7 4SS, UK	
E-mail:	**news@colinsmagic.com** and **ONLY** enter **RNARS** in the subject. Failure to do so and your e-mail will be automatically deleted.	

RAFARS & Royal Signals ARS Nets

RAFARS	Time	Freq	Control
Daily	1100 A	3.71	GØSYF GI4SAM
	1830 A	3.71	G3HWQ MØRGI
Monday	1900 A	3.7	G3PSG GØBIA
Tuesday	0730 A	14.27	G4IYC
	1400 A	7.015	
	1900 A	3.567	
Wednesday	1500 Z	14.29	?
	1530 Z	21.29	
Thursday	1830 Z	14.17	ZC4RAF
Friday	0730 A	14.055	CW Net
Sunday	0900 Z	5.403	?
First Monday of the month	1000 A	3.71	?
RSARS Nets	**Time**	**Freq**	**Control**
Monday - Friday	1000 A	7.17	GW3KJW M3VRB
Monday	1830 A	3.585	GM3KHH (RTTY)
Tuesday	1400 A	7.17	MØOIC
	1600 Z	14.18	G4BXQ
Wednesday	0600 Z	14.143	Various
	1030 Z	3.615	?
	1830 A	3.565	GM3KHH
	2030 A	1.946	2EØBDS
Thursday	1400 A	7.17	GØRGB
	1800 A	3.743	G6NHY
Friday	1830 A	3.583	GM3KHH (PSK31)
	1830 A	3.565	High speed CW
	2000 Z	14.055	CW
Saturday	0600 Z	14.143	SSB
Sunday	1000 A	3.565	G3JRY (Slow speed CW)
	1100 A	7.17	GW4XKE
	1100 A	3.745	GM4FOZ
Joint Service Net	**Time**	**Freq**	**Control**
Sunday	0900 A	5.4035	G3RAF
Tuesday	1900 A	5.4035	G3RAF

RNARS Nets

All frequencies +/- QRM. DX nets are GMT; UK nets are GMT or BST as appropriate. The list is compiled by Mick Puttick G3LIK mick_g3lik@ntlworld.com – 02392255880 **who must be informed of all changes**.

UK	Time Local	Frequ	Net	Control
Daily	2359-0400	145.727	Midnight Nutters	Vacant
Sun	0800	3.667	News 0830	G3LIK
	1030	7.065	Northern Net	GM4VUG
	1100	145.4	Cornish Net	GØGRY
	1100	7.02	CW Net	G4TNI
Mon-Sat	1030	7.065 / 3.743	Bubbly Rats	GØGBI GØOKA GDØSFI MØZAE
Mon	1400	3.575 / 7.02	QRS CW	GØVCV
	1900	7.088 / 3.743	North West-News 2000	GØGBI
Tue	1900	7.028 / 3.528	CW Net	G3RFH
Wed	1400	3.74 / 7.088	White Rose	G4KGT
	1930	3.743	SSB News 2000	GØOAK
	2000	145.4	Stand Easy	Vacant
Thur	1900	3.542	Scottish CW	Vacant
	2000 GMT	1.835	Top Band CW	GØCHV G4KJD
Fri	1600	10.118	CW	SM4AHM
Sat	0800	3.74/7.088	GØDLH Memorial Net	GØVIX
DX	**Time GMT**	**Frequ**	**Net**	**Control**
Sun	0800	7.015/30555	MARAC CW	PA3EBA/PI4MRC
	1430	21.41/28.94	RNARS DX	WA1HMW
	1800	Echolink	Echolink	VE3OZN / K8BBT
	1900	14.33	N American	WA1HMW
Mon	0930	3.615	VK SSB	VK1RAN/VK2RAN
Wed	0118-0618	7.02	VKCW	VK4RAN
	0148-0648	10.118	VK CW	VK4RAN
	0800	3.62	ZL SSB	ZL1BSA
	0930	7.02	VK SSB	VK5RAN
	0945	7.09	VK SSB	VK1RAN/VK2RAN
Thur	1430	21.41	RNARS DX	WA1HMW
Sat	0400	7.09	VK SSB	VK2CCV
	1330	7.02	VK CW	VK2CCV
	1400	7.09	VK SSB	VK2CCV
	1430	21.41	RNARS DX	WA1HMW

RNARS activity frequencies									
FM	145.4								
CW	1.824	3.52	7.02	10.118	14.052	18.087	21.052	24.897	28.052
SSB	1.965	3.66	3.74	7.088	14.294	14.335	18.15	21.36	28.94

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Gold blazer badge with **new RNARS logo**	£10-00 P&P £2-00
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