K9YA Telegraph

Robert F. Heytow Memorial Radio Club

Volume 9, Issue 9, September 2012

Two Amazing Amateurs

Richard Upjohn Light & Robert French Wilson, W1FJ - Part I

Philip Cala-Lazar, K9PL

In August 1934 two amateurs, one a private pilot, the other a ham radio operator, began an epic 30,000-mile around the world flight. Avoiding publicity throughout their monumental endeavor, they at first denied their goal was anything over a short hop. However, unknown to the news media, and with the support of the U.S. Departments of Commerce and State, they had quietly secured overflight permission from more than 35 countries.

Five months later, completing their long air cruise, both the ham radio and national press acclaimed their meandering circumnavigation of the globe the crowning success—of amateurs. In addition to their amateur appellation, every newspaper report emphasized the pilot, Dr. Richard Upjohn Light and radio operator/navigator, Robert F. Wilson, W1FJ/W2EBM, were both "Yale men."

> *"…the crowning success—of amateurs…"*

Their itinerary included stops in Labrador, Greenland, Iceland, Faeroe Islands, Scotland, England, Belgium, Netherlands, Italy and Greece. In Europe, five weeks were spent meeting with government dignitaries, sightseeing; eyeball QSOs with local hams and visiting hospitals and medical clinics where Dr. Light observed surgical procedures. All this is revealed in Light's highly detailed 269-page flight journal.

Then on to the Middle East and Asia with layovers in Iraq, the Persian Gulf, India, Singapore, Java, Bali and the Philippines. From Manila aboard the Canadian Pacific Steamship liner RMS *Empress of Canada* they accompanied their airplane to Vancouver, B.C. From Vancouver there were flights to San Francisco; Los Angeles; San Diego; Mexico; Cuba; Miami; Moorhead City, N.C; and the final hop to College Point, Queens, New York. In total they were aloft 240 hours (one source cites 290 hours) at an average speed of 100 mph.

Amateur Pilot

Dr. Light (1902-1994), a neurosurgeon, instructor and director of the surgical laboratory at Yale, received his medical degree at the University of Michigan. In 1929, as a member of the Army Air Corps, he earned his wings at Kelly Field, San Antonio, Texas. His grandfather, William E. Upjohn, founded the pharmaceutical company of the same name.

Dr. Light's private aircraft, a Bellanca Skyrocket CH 400, was their conveyance for the voyage that spanned August 20, 1934 through January 4, 1935. (Actor Wallace Beery, another Bellanca enthusiast, traded his earlier Skyrocket for a 1935 model fitted with a Pratt & Whitney 550-hp Wasp series H radial engine that boasted a reputed 180 mph top speed.)

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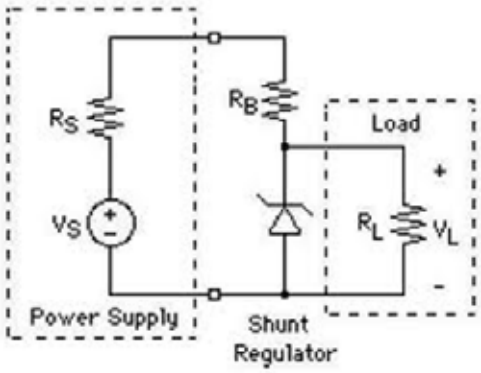
Regulators for your Power Supply

Paul W. Ross, W3FIS



Zener Shunt Regulator Circuit

Hidden in most of our nice radio toys you own is a regulator. What are they? Why are they there? Well, some basic electrical engineering stuff will tell us a lot. For many devices, primarily things like VFOs and regenerative detectors, changes in the supply voltage will cause them to misbehave badly. In the case of VFOs, temperature issues are there as well, but I'd like to focus on how we can provide a constant, stable voltage supply for things that need it.

A "perfect" or "ideal" battery or power supply, or generator could, in theory, provide an infinite current at a constant voltage. We will limit our discussion to DC supplies, though the basic ideas can be applied to giant AC generating stations as well. Theory is theory!

There are a number of problems with real world power supplies versus those of theory:

1. They aren't perfect, as they are limited in the amount of current they can provide. They range from a few milliamperes for "button" cells to hundreds of amperes for storage batteries, such as those in your automobile.

2. Batteries have an apparent "internal resistance" in series with this "ideal" voltage source. This means, as the current draw on the battery increases, the available output voltage decreases. In the case of your car battery, this value of internal resistance is very low, so you can get hundreds of amperes of starting current.

3. An auxiliary problem is that the battery/source voltage is often higher than you might wish. For example, you have a 12-volt SLA gel cell, but you need 9 volts, or 5 volts, or whatever to run some circuit.

4. As an example of this "internal resistance" problem, consider a typical receiver. As the input signal increases, most output amplifiers draw more current. This drops the power supply voltage, and can upset the detector or VFO. Not a good thing. For example, the less expensive Ten Tec regenerative receiver uses two batteries, one for the detector, and the other for the amplifier. One of the standard ways to control regeneration in the old vacuum tube sets was to change the detector voltage!

"Hidden in most of our nice radio toys…"

There are basically two types of regulator configurations—series and shunt. Let's deal with the shunt regulator first, as it is easier to understand and very simple to design.

Many devices, over some reasonable current range present a fairly constant voltage—the old gas discharge regulators, small neon bulbs, zener diodes, LEDs and forward biased silicon rectifiers.

Consider a series combination of one of the above items with a suitable resistor to get the device to the right operating point. If we put a voltmeter across the device, we will see a constant voltage. If we put our load/device in parallel with this device, it will receive a constant voltage. For a reasonable range of current draw for our subject device–regenerative detector, VFO, or whatever, we will get a fairly constant voltage. As the load, say that presented by the detector, varies, more or less current will flow through the shunting regulator device, hence the name "shunt regulator." The voltage at the load will remain fairly constant.

A shunt regulator, as I have described is simple—a regulator device and a single resistor. The problem is that it only works over a modest

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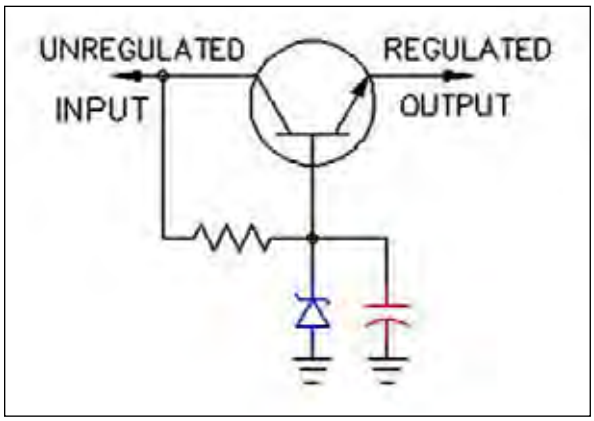
range of current draws to the load. The maximum current you can provide to your circuit will be when the regulator device drops out of operation. The minimum is what is limited by the dissipation of the "wasted" current in the shunt regulator. However, shunt regulators make a good "reference" voltage for more complex regulators. They are easy to design. Ohm's law is your friend.



Series Regulator Circuit

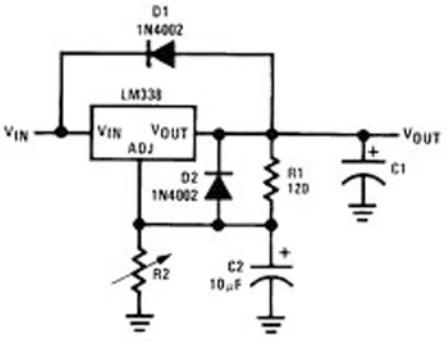
The other strategy, used for more power hungry devices, is the series regulator. If we have a power supply connected through a variable resistor to our load, one would think that you could adjust this resistor to always give a constant voltage to the load– detector, VFO, or whatever. A transistor makes a good variable resistive element. Reference the base of the transistor to a fixed voltage; connect the power supply on the collector, and the load on the emitter.

This is a very simple idea. More elaborate schemes with operational amplifiers creating a real "servo" feedback system allow for more closely regulated output, current limiting, etc.

This series regulator idea is the basis for the nice solid-state regulator packages available. You will notice they get warm (they have heat sink abilities) when the load is high. With some minor modifications, these regulator chips can be turned into a variable regulated power supply.

Another way to skin the proverbial cat, leading to greater efficiency (we don't lose all that wasted current as heat in the shunt or series device) is to have a switching transistor as the series element. We change the pulse width of the output, which varies the *average* voltage at the output. This is *much* more efficient, as the switch is on or off, and not in between generating heat through IR loss. All we need to do is filter out the AC components (a simple low pass filter) and we have a stable DC voltage.

However, the pulses can generate "hash" for sensitive receivers, so you need to make sure to filter both the input and output sides of the regulator well. This is what is back of the infamous "wall-wart." In that case, the incoming AC from the mains is converted to a very high frequency AC signal (which means small, light weight transformers), and the pulse width of the oscillator is altered. It seems complicated, but really is quite simple and inexpensive to implement.



Variable Power Supply Regulator Circuit

The power supply in your PC uses the same strategy. Interestingly enough, the oscillator won't start without a load. The PC power supply I modified as a ham radio supply has a small and toasty resistor on the side of the case to get it started. ■

Ham Quips

DICK SYLVAN, W9CBT

ROTARY HAMSTICK DIPOLE

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Handie Talkies

Some of My Favorite Things...

Paul Signorelli, WØRW

Handie Talkies are some of my favorite things; Motorola used the trademark "Handie Talkie" for all its small radios, including packsets. It has been my habit to use the name "Walkie Talkie" for any radio you have to carry (or lug) around that uses a separate microphone or handset, and use the name "Handie Talkie" for any radio that has a self-contained earphone/microphone and is held in one hand, like a cell phone.

There were various 10-meter Walkie Talkies made back in the 1950s. *RCA Ham Tips*, May 1960, had one by W2VCG; it was crystal controlled, used a 6AK5 and two audio transistors.

Maybe you still have one of those old Walkie Talkies out in the warehouse.

The first really cool 2-meter one I recall was the "Tiny Tim" by W6TWL. It had two 957 acorn tubes in it, measured about 7 x 3 x 1 inch and weighed 1.5 pounds. Originally used on the 112 Mc War Emergency Radio Service (WERS) band it was converted to 2-meters. You can see it in *CQ* magazine, April 1946, Pages 57 and 58. *CQ* magazines are archived at http://hamcall.net/cqcgi. For only $5 you can search the archives for one day and download the schematics.

The one I built when I was in high school was Bill Vogel's, W2MYE, version. I lost it somewhere during the years. It used a 958A acorn tube and a 3A4 audio tube and was built into a LMB box that was about 3 x 3 x 8 inches. It had an old C.F. Cannon, 1,000-ohm earphone and an F1 carbon microphone mounted on the front. A UHF antenna connector was on top and the rig featured a butterfly-tuning cap and a side-mounted push-to-talk button. Power came from an XX67 battery and a D cell. These rigs had super-regen receivers and, if you turned the receiver on at a transmitter hunt starting area, it would jam one MHz of the band and people would come looking for you. They are modulated oscillators and not really legal to operate today.

You won't get much "on-the-air" time but that is OK because the battery is very expensive. I once had a 35-mile QSO with mine. The construction details are in *CQ* magazine, January 1946, pp. 7-11.

These Handie Talkies worked well with the proliferation of the 2-meter Gonset Communicators. Old Gonsets had wide receivers and were easy to tune and track the Handie Talkies as they drifted.

I thought this would be a great radio replica project. The hardest part of building the unit was collecting the parts. The three-winding "Transceiver" transformer is the most difficult to find, but it could be replaced with two individual transformers. There were two types of transformers used for this application back then, the Stancor 3833 or the Inca I-45. I found the Stancor transformer on eBay and built my new "replica" Handie Talkie into an 8 x 3 x 2.75 inch LMB box.

> *"…a great radio replica project."*

My replica has a few variations, but is very similar to the original. I used a blue LMB box and not the old gray type. The microphone is a "T1" carbon button, not the bigger "F1" button. You will also notice there is no antenna connector; I built a telescoping whip into the box like the BC-611.

Please see photos of the Handie Talkie and the inside view of the Handie Talkie wiring.

You will also notice the old *CQ* magazine articles giving instructions on how to make telescoping whips and other things we now take for granted.

There were no solid-state Walkie Talkies at the time. If you were lucky to get your hands on some war surplus you might have found some BC-611s (75-meter AM phone) and later the PRC-6 Handie Talkies (6-meter FM) or the Motorola FTRU Walkie Talkies.

Springfield Enterprises Co. made a "Springfield Walkie Talkie" that was very popular in the 50s. It used three 3A5 tubes with a super-regen receiver.

If you decide to make one of these let me know… ■

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Conan Wyatt Burtram Barger, W3CVE

Part III

Scott B. Laughlin, N7NET

Finally, I got my receiver working and had the thrill of my life when I could pick up 9OA with the receiver I'd built. Also, I tuned in 9DEM. What a thrill. The next thing was to get my sending set going.

My dad had a Ford touring car, and as you probably already know, the four-cylinder engine had four spark coils. So there was nothing else to do but take a coil from the car so I would have enough juice to make a spark (arc) between two nails. For a battery I got several 1-1/2 volt dry cells and a key I made from a hack saw blade. For a knob, I used a thread spool from my mother's sewing box. I put up a four-wire, flattop aerial. For a redheaded kid of twelve I was as happy as two bugs in a rug.

Wire and Quaker Oats boxes were all over the place. I would spend most of my time down in the basement winding and rewinding coils, making helix coils out of half-inch copper ribbon for my almighty Ford spark sender. My folks had to call me to supper at least fifteen times and when I got to the table my appetite left me. My stomach was too full of wire, cat whiskers, Ford spark coils, galena crystals, etc. My folks started to wonder what had happened to their boy. My mother said they thought I was getting a little daffy.

> *"What a thrill it was to sign my call."*

Joe, 9OA, started me on this wonderful road of wireless and I will never forget that kind face of his and how interested he was to get me on the air. He was an old ship operator. As you may already know amateur radio was first started by a group of ship operators who already knew the wonders of wireless. Joe told me to get the book *All About Wireless,* a book about a half-inch thick.

I finally got my station on the air. My fist was pretty sloppy and my code copying was S-L-O-W. I had to copy down the dots and dashes and translate later. One day after scratching the galena crystal with the cat whisker to find a sensitive spot I heard another one of my friends, Glen Case, 9BOG. When he signed off I called him and I was thrilled beyond words when he came back with, CB CB de 9BOG–CALL ME ON THE TELEPHONE–CB de 9BOG K [CB-Conan Barger]. That was my first DX. It was three blocks away. I scrammed up to the telephone and called Glen. He wanted me to come over to his house. I jumped on my bike and was soon in another wireless room. Glen had a half-kilowatt Thorardson spark coil, a rotary gap, four-wire flat top aerial, loose-coupler, galena crystal and a pair of Bandies headphones for a receiver.

Model T Ford Spark Coils

We talked for hours and he gave me more information regarding wireless. He said for me to get my license as soon as possible. In those early days you could use your initials for a call until the RI came to your area. When the RI [Radio Inspector] [1] arrived you had to pass the examination or stay off the air. The RI, Mr. Turner, gave me my examination.

The code speed was 10 wpm and the written examination was quite extensive about crystal detectors, spark senders, aerials, damped waves, etc. Everything had to be written out and it took me most of the day to finish.

Lo and behold, I passed. It was 1920 and my first call was 9DAI.

What a thrill it was to sign my call. I got a QSO with 9BSZ, Don Usher, who invited me to come over to visit his apartment, which was a half-mile from my QTH.

Don had a quenched rotary spark gap and I can well remember when he would take off the cover of the rotary gap and fill the room with pure ozone.

Continued - Conan Barger on Page 8

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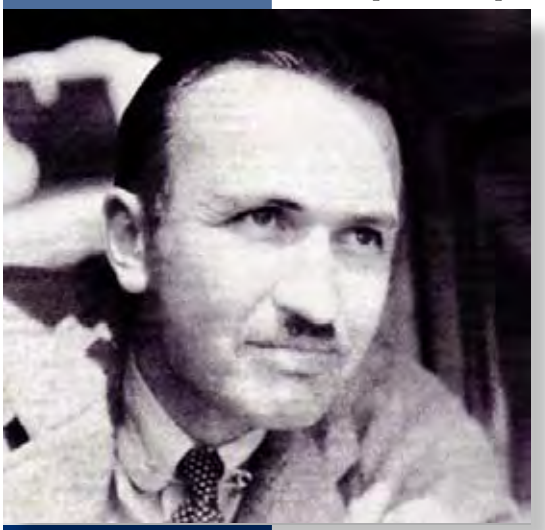
Continued - Amazing Amateurs from Page 1

The Skyrocket, a six-passenger, high-wing, cabin monoplane with a wingspan of 46 ft., 4 in. was a faster, higher rate of climb refinement of the Bellanca Pacemaker. Thirty-thousand-miles worth of radio gear, spares, luggage, medical and other supplies occupied three passenger spaces in the craft's 27 ft., 9 in. long fuselage making it a tight fit for the craft's two occupants.



Dr. Richard Upjohn Light

Light's Skyrocket, assigned call sign KHMZA, was powered by a Pratt & Whitney 420-hp Wasp series C radial engine and fitted out as a seaplane using Edo floats. The floats doubled as supplementary fuel tanks, lending an additional capacity of 100 gallons per float. Maximum range cited, depending on source, was either 1,200 or 1,500 miles. As built the Bellanca's range was specified at 670 miles and a maximum speed of 155 mph, slower with the floats.

During its stopover in Greenland the Skyrocket received the name *Asulinak*, "Greenlandish for 'I'll take a chance' or 'Why worry.'"

"Why worry"

Amateur Radio Operator

Robert French Wilson's (1912-1969), W1FJ/W2EBM, article, "Amateurs Around the World by Plane" appeared in the March 1935 issue of *QST*. Wilson was a recent graduate of Yale's Sheffield Scientific School where he "specialized in radio…" and earned a B.S. degree in electrical engineering.

Dr. French in his flight journal, that included full transcripts of all radio communications, wrote admiringly of W1FJ.

Bob (his full name is Robert French Wilson) has been wonderful all the way through. He was in his last term of electrical engineering at Yale when we met and decided to go off on this jaunt together. His particular accomplishment is a life-long interest and participation in amateur radio operation, so that he is actually one of the best amateur operators in this country and has a wide circle of radio friends. He has introduced me to some of the men in the American Radio Relay League in Hartford, and particularly to Clark Rodimon [W1SZ, *QST*'s managing editor], *who has expected to "work" two-way contacts with us in code during the first part of the flight, as far away as the signals will carry. Bob is to handle the radio, I am to do the flying, and between us we will somehow manage the navigation. Photography--well, that's another of Bob's duties....*

Those photographic duties encompassed a Fairchild model F-8, 5" x 7", aerial camera and a Zeiss, 9 x 12 cm., folding camera. At the flight's end 600 photographs were donated to the Geographical Society of America.

In an appendix to his flight journal Light describes *Asulinak*'s transmitter, receiver and antennas.

Transmitting and Receiving Sets

The radio transmitter was a Westinghouse aircraft radiotelegraph set having a nominal output of 60 watts. In this design, one 210-type tube was employed as master oscillator, and four 210-type tubes constituted the power amplifier output stage. For most purposes, continuous wave telegraphy was used, but tone modulated signals could be produced when an audio oscillator, modulating the power amplifier, was turned on. By the use of plug-in coils, emission on the following frequencies was obtained: 333 kilocycles (900 meters), 500 kilocycles (600 meters), 3,105 kilocycles (96 meters), 5,515 kilocycles (54 meters), 8,340 kilocycles (36 meters), 12,480 kilocycles (24 meters). [The transmitter started life as a 3,105 kc monobander and was modified to add the higher frequency bands later.] *The transmitter output was delivered to a trailing-wire antenna while in flight, and communication from the water was obtained by using a V-antenna supported between the empennage and the wings. In addition to the regular hand key, a semi-automatic high-speed key was used, and also an Omnigraph automatic keying device, which would send out a continuous identifying signal while the radio operator was busy with other duties. The receiver was a 5 Lear super-heterodyne*

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set, having a frequency range of from 200 kilocycles (1500 meters) to 15,000 kilocycles (20 meters). Band-switching from the front of the panel was a convenient feature of the set. High voltage for the receiver (200 volts) and the transmitter (500 volts) was obtained by the use of dynamotors operating from the ship's 12-volt electrical supply.

An interphone system, passing through the receiver's audio amplifier, provided simultaneous radio reception and intercommunication between pilot and radio operator.

With this apparatus, constant communication was maintained with ground stations along the route. 500 kilocycles (800 meters) was used to contact coastal stations and ships within range during the flights from New Haven to Edinburgh. Long wave transmission on the international aircraft wave (333 kc, 900 a.) was chosen from Rochester to Singapore, because of the numerous aeronautical ground stations working on this frequency. For the remainder of the trip, a combination of high and low frequencies was used to keep in touch with the various stations. These included U.S. Naval stations, ships, amateurs, and coastal stations operated by the Mackay Radio Co., Radio Corporation of America, Globe Wireless Ltd., Pan American Airways and the Mexican Government.

It was not expected that either transmitter or receiver would give 6 months of faultless service, and a supply of spare parts was taken along. A number of tubes burned out, and condensers faulted in both sets. Wilson's practiced hand located the troubles promptly however; only once did he fail to repair the fault while in the air. He placed great reliance in an ohmmeter-voltmeter instrument, with which he traced circuits rapidly.

> *"President Franklin Delano Roosevelt…"*

On shortwave bands Wilson reeled out the trailing wire antenna to three-quarters wavelength. A loading coil was added for long wave use, so that "Sparks would not have to wind all day to get his three-quarters of nine hundred meters out!"

The Bellanca's fixed wings to tail V-antenna was good for "readable signals… sent 200 miles on 8340 kc. and with the aid of eight feet more of vertical antenna tacked on to it an S9 signal was put into West Hartford [W1SZ] from North Carolina early one evening."

Electronic and communications eventualities were well considered:

- *500 ft. antenna wire*
- *Regular antenna weight* [a two-pound "fish"]
- *Emergency (thru fairlead) antenna weights*
- *Wooden antenna weight pattern*
- *1 each of receiver tubes*
- *1 each receiver resistors*
- *1 each receiver condensers*
- *1 receiver motor-generator*
- *4 UX 210 transmitter tubes*
- *5 resistors for transmitter (low wattage values)*
- *3 transmitter P.A. unit condensers*
- *Transmitter M.G. brushes*
- *Insulators, porcelain*
- *Radio Reference Books*
- *Radio receiver wiring diagram*
- *Transmitter service bulletin*
- *List of coastal radio stations*
- *List of stations performing special services (compass, time-tick, weather)*
- *List of amateur radio stations*
- *List of marine and aero radio stations along route, compilation of all available details thereof*
- *Table of distribution of international call signals*
- *French, Italian and German (to English) dictionaries*

Zeiss 9 x 12 cm. Folding Camera

Here follows a selection of the earliest airborne radio log entries.

Flight Journal, August 20

2102 - Contact 1SZ using 5515 kc. And sent following messages:

W1SZ DE KHMZA: NR 1 AND NR 2: "To Dr. Light Sr. and Wilsons - Left New Haven at 345 all negotiations clear fine weather will dock Probably Bar Harbor or Sorrento Maine tonight - Dick and Bob

NR 3: "To Dr. Harvey Cushing - Took off New Haven Harbor 345 on second try difficult and bumpy under heavy load passed Marion [Maine] *445 flying fast with tail wind will dock on Maine coast tonight regards to Mrs. Cushing - Dick"* [Dr. Harvey Cushing of Cushing's syndrome.]

2106 – W1SZ: 345 ? clear stop fine - will ? Bar Harbor - OK - msgs to MR 1 and 2 OK - you will be interested in knowing that Nichols called this pm to find . . . for flight to Russia starting in 2 weeks - GA fills AR.

CONTINUED - AMAZING AMATEURS ON PAGE 8

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Continued - Conan Barger from Page 5

Boy did that smell good. Don was another good operator and could copy the code at a good 15 wpm. I worked Don many times and he helped me a great deal in getting my station perking.

The wireless bugs were crawling all over me by this time and my interest was so keen that I almost lost the habit of sleep. Both actions soon diminished my school grades and my folks put their foot down. I could only operate my station a few hours per week. When Saturday and Sunday came around I could pound the brass all Friday and Saturday nights if I wished and believe me, I wished about every weekend.

The old Ford spark coil gave my dad the fits because sometimes I would forget to put the coil back in the car. One day my dad got me out of bed before six in the morning and told me in firm words to get the lead out and put the coil back in the Ford. He had been cranking for about an hour trying to get the flivver started.

Finally, he took me down to the junkyard and found me a Ford coil and from then on my big problem was solved.

1 Nine radio inspector districts existed in 1920. Mr. Turner, the inspector Red mentioned, worked out of Chicago, serving: Illinois, Indiana, Wisconsin, Michigan (Upper Peninsula), Minnesota, Kentucky, Missouri, Kansas, Colorado, Iowa, Nebraska, South Dakota, North Dakota. ■

The Last Word

Roswell, NM – A newly launched amateur radio company will concentrate on Software Defined Radios or SDRs.

A press release from the company, Borg-Starr Corporation, stated the new SDR radios will be no larger than a small steamer trunk. The press release went on to list all the new innovations to be included in the SDR package.

According to the press release targeted at amateur radio operators, it will be "Futile to Resist" their new radio.

NR8U

Continued - Amazing Amateurs from Page 7

KHMZA: (send missing parts of messages).

"Mr and Mrs James Roosevelt - Blake cleared us this noon left New Haven 345 you cant believe the thrill of being actually under way everything running smooth as milk stop just finishing leg Cape Cod Canal to Cape Ann all over water with quarter mile error your great week end ste us both up stop regards to the princess - Dick" [James Roosevelt, President Franklin Delano Roosevelt's oldest son, was married to Dr. Cushing's daughter.]

2111 - drift - 14°.

2119 - KHMZA de W1SZ" R all msg ok now - wont be able to keep 8 pm sked sorri but Ross needs op out at hill --- wish my fone transmitter were finished --- ask doc what town I should address James Roosevelt.

KHMZA: (Broke in and said Marion, Maine.)

W1SZ: OK Marion is Dr Cushing at New Haven per my chart or in Marion ? Thot he migt be on vac . . . in last txt two surely you did not go . . . oh yes see your route diff last time nw. (He has evidently been worrying about our route, which is different from last trip we made up this way.)

2125 - Passed Cape Ann.

2153 - Photo of Isle of Shoals Life Guard Station (2).

2200 - Finished successful contact with W1SZ, he using 7290 for last half hour, after starting on 3670. Dial setting 65, coil band C, next sked noon dst tomorrow, KHMZA 5515, W1SZ 7290. [Wilson, KHMZA, working crossband with Rodimon, W1SZ.]

Flight Journal, August 21

Course 62°r. 83°M, 90°C, drift + 11°, Steer 101°. Radiodisc [reference to Omnigraph disc] *on from 8 to 8:13. (dst) then called "CQ" on 5515. Listened on 7 mc. amateur band, no answers. Hrd CQ de W8KDD His signal strength R9.*

1230 - Bob gives out position report as a termination to the Omnigraph message. He listens for amateurs because a "general broadcast" was sent out last night from A.R.R.L. headquarters. We figure that it is only fair to give them some news at the end of disc time, which is every half hour.

To be continued in Part II. ■

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