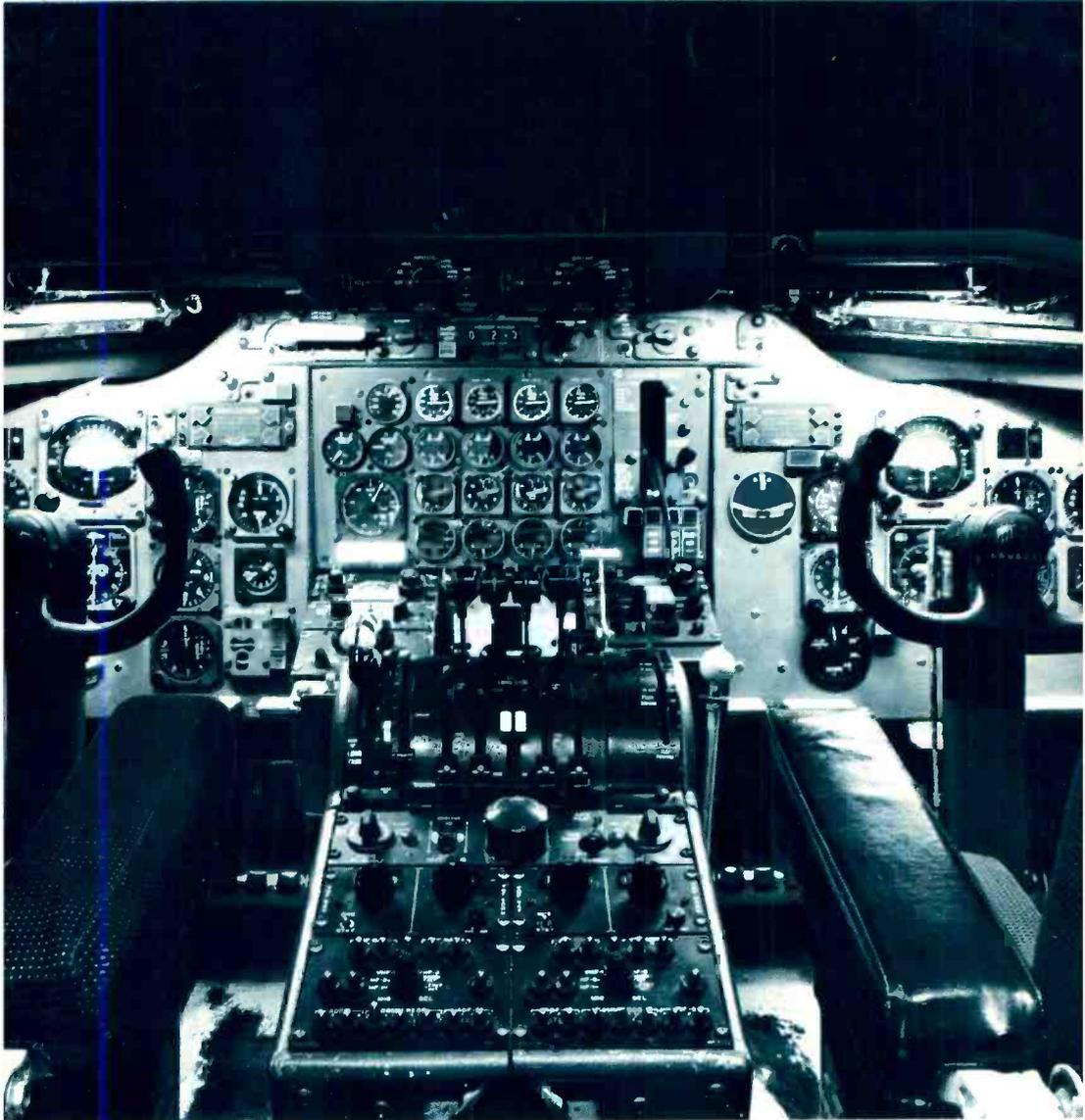




journal



July/August, 1969

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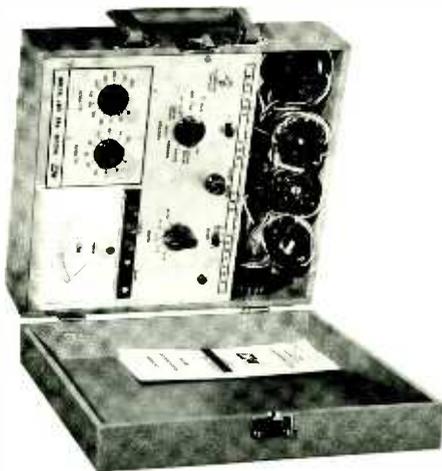
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\$89.95

CONVENIENT ORDER BLANK ON PAGE 23

journal

July/August 1969
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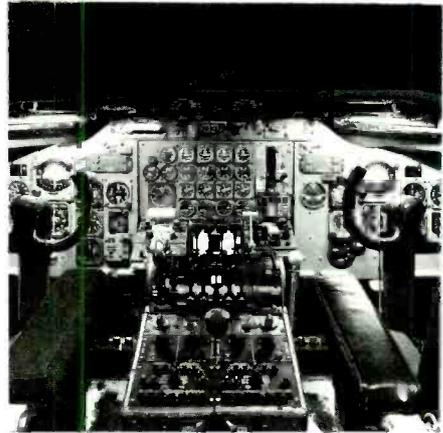
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On Our Cover



Licensed technicians are in constant demand by airlines to maintain the many pieces of electronic equipment used aboard aircraft such as the Douglas DC-8 whose cockpit is shown on our cover.

Your NRI Communications course trains you for this and many other exciting and rewarding opportunities. See story, page 2, for some other ways to further your career.
Photo Courtesy Eastern Airlines.

Achieving Recognition For Your Proficiency in Electronics

by *Louis E. Frenzel, Jr.*

competence in their given fields. All of the states give examinations to certify a man as a professional engineer. In addition, accountants must take a rigorous examination if they are to become CPA's.

Electronics technicians have similar means of being recognized. While not as well known as those for doctors, lawyers, and other professional people, the programs of recognition for electronics technicians are just as important and can be quite beneficial. Let's take a look and see what these are. As an NRI student or graduate you will most assuredly be interested in these means of proving your capability in your field.

YOUR NRI DIPLOMA

Your first and most important form of recognition is your NRI diploma. This diploma signifies that you have completed a rigorous and complete formal training program in electronics. It is the first form of recognition that you receive as a technician. It proves to you, to NRI, and to anyone else that you do have a basic education and proficiency in electronics.

If you work in the electronics industry as a technician, you know that recognition beyond your basic electronics education comes in the form of money, position, responsibility and in other ways. If you



How does an electronics technician go about achieving recognition for his proficiency in electronics? How does he prove to himself and to others that he is competent in his field? Other professional and semi-professional people have several means of achieving this recognition. For example, a doctor can point to his college degree and the state medical license that he receives when he passes the state medical examination. Lawyers, like doctors, can point to their college degrees and their licenses to practice. They receive this license to practice only after they pass the Bar examination. Engineers and accountants have similar means of achieving recognition and proving their

do a good job in your work, you will be given more money. If you continue to perform well in your work, you may be promoted into higher positions and eventually be given more responsibility and in turn more pay. This is the type of recognition that we all want and need. However, there are several other, more formal means of achieving recognition and showing your proficiency in your chosen field. There are three agencies or organizations that are set up for evaluating the qualifications of technicians. They investigate the technician's education and experience and/or formally test his ability in electronics through a written exam. In most cases, none of the certificates or licenses issued by these organizations are actually required in order to work as a technician. However, by voluntarily applying for the certificates or licenses a technician can illustrate his ability to others through this form of recognition.

THE CERTIFIED ELECTRONICS TECHNICIAN

The first means is through a program sponsored by the National Electronics Association Inc., known as the Certified Electronics Technician Program. This is a program whereby electronics technicians with a certain basic minimum amount of training and experience can become certified by this organization as electronics technicians. By meeting the experience and educational requirements as well as passing a comprehensive examination in basic electronics, you are awarded a Certified Electronics Technician diploma. By showing proof of your experience and by passing the required examination, you illustrate to yourself and others that you are capable in your field.

The Certified Electronics Technician program is one developed particularly for those technicians who work in the field of radio and television repair. While the program is aimed primarily at these people, technicians in other fields can also qualify. The program requires four years of experience in electronics, some formal education in electronics through a correspondence course or a residence school, and the passing of a 120-question examination on electronics and television.

As an NRI graduate with sufficient number of years of experience, you are qualified to make application for certification. There is a modest fee of \$5 for taking the test. This fee is used to cover the expenses involved in preparing and grading the test and in processing your certificate.

If you are interested in this program, write to Mr. Leon Howland, Chairman, NEA Certification Program, 4622 East 10th Street, Indianapolis, Indiana 46201 for further information.

THE CERTIFIED ENGINEERING TECHNICIAN

If you are an industrial electronics or engineering technician then there is another program that you can pursue for further recognition in your field. An engineering technician is a person who works with or for engineers in carrying out various types of engineering work. This may involve assisting the engineer in the design of new products or it may involve the installation, operation or maintenance of complex engineering equipment. The work may also involve drafting, sales, education, writing and many other phases of engineering. If your

THE
INSTITUTE
FOR THE
CERTIFICATION OF ENGINEERING TECHNICIANS

Hereby certifies

Louis E. Frenzel, Jr.

as an

ENGINEERING TECHNICIAN

and recognizes that - through education, experience and knowledge - this person has met the standards set forth by this Institute and is capable of properly communicating with engineers and performing appropriate technical functions for the engineering profession.



SAMPLE

June 17, 1965
Date of Certification

Maurice Praney
Chairman of the Board of Trustees
Walter J. Johnson
Secretary-Treasurer

Certificate No. 167

Valid for the year ending July 1,

Sponsored by the National Society of Professional Engineers

THIS CERTIFICATE DOES NOT CONSTITUTE A LICENSE TO PRACTICE ENGINEERING

job involves any of these functions then there is a good possibility that you are qualified to be certified as an engineering technician.

The Institute for the Certification of Engineering Technicians (ICET) is the organization set up to evaluate the qualifications of those technicians who voluntarily apply for certification. If a technician is found qualified by his education and experience, then he is awarded a certificate verifying that he is a qualified engineering technician.

To become certified as an engineering technician you must have a certain amount of basic education and experience in your field. There are three grades of certification in the ICET program. The junior engineering technician grade requires that the applicant have at least two

years of work experience in his technical field. If the applicant has the necessary experience and receives the endorsement or recommendation of an engineer for whom he has worked, he can be certified as a junior engineering technician.

After five additional years of applicable experience, the junior engineering technician can upgrade to the engineering technician level. He must be at least 25 years of age to hold this position and must be endorsed or recommended by two professional engineers or the equivalent. In some instances he may be required to take a basic examination to further prove his qualifications for this rating.

The highest grade of certification is that of senior engineering technician. For this position the engineering technician must

have had at least ten years of experience beyond that required for the engineering technician positions. In addition he must be at least 35 years of age. Again he must be recommended or endorsed by professional engineers or someone of authority to recognize his capability.

The ICET program for technician certification is a widely recognized program. At the present time there are nearly 15,000 certified engineering technicians in the United States. Many employers recognize certification as a valid means of showing recognition and proving capability. Many technicians have received increases in salary and position by achieving certification. Because of the various grade levels in the program, it does give the technician some incentive to work toward a higher grade through improved capability and experience.

In most cases, certification can be achieved by simply making application. If you have the necessary number of years of appropriate experience plus some formal electronics training you will be certified. In cases where your experience may not be in the proper area, you may be required to pass an examination to show your capability in the desired area. The fee for becoming certified is \$10. This covers the cost of administering the program and of the certification diploma. A fee of \$2 per year is charged for renewal of your certification.

If you are an NRI graduate and have a number of years of experience as an engineering technician or as an industrial electronics technician who has done some

form of engineering support work, then you may be qualified for certification. Write the Institute for the Certification of Engineering Technicians, 2029 K Street, N. W., Washington, D. C. 20006 for further information.

As you can see, there are a good number of ways of achieving recognition as an electronics technician. Your NRI diploma marks the beginning of this recognition while the Certified Electronics Technician program, the Engineering Technician Certification Program, and the FCC license are all additional ways of proving your competency in electronics. You may find that one or possibly all these programs are suited to your particular situation. In any case, it is most certainly worthwhile to investigate these means of achieving the recognition you deserve as an electronics technician.

WHAT IS AN FCC LICENSE?

An FCC license is a certificate awarded by the Federal Communications Commission to individuals who pass a technical examination in basic electronics and communications. The license is the government's authorization to a person that will permit him to operate, repair, adjust and maintain the electronic equipment used in the various communications services -- broadcasting, mobile radio, marine radio and others. The government wants to be sure that the equipment used in the communications services, particularly the transmitting equipment, is properly adjusted so that it meets the rules and regulations established by law. It can't permit distorted or off-frequency signals to occur, nor can it allow interference between stations. For that reason, the technicians who operate and maintain

RENEWAL *The United States of America* NUMBER P1-17-5396

FEDERAL COMMUNICATIONS COMMISSION

RADIO TELEPHONE OPERATOR LICENSE

FIRST CLASS
(General Radiotelephone Certificate)

This certifies that
** HAROLD JOSEPH TURNER, Jr. **

SEX M	HEIGHT 5 7/2	WEIGHT 150	COLOR EYES Hazel	COLOR HAIR Brown	DATE OF BIRTH MAY 26 1943
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IS A LICENSED RADIO OPERATOR, AUTHORIZED, SUBJECT TO ANY SPECIAL ENDORSEMENT PLACED HEREON TO OPERATE THE CLASSES OF LICENSED RADIO STATIONS FOR WHICH THIS CLASS OF LICENSE IS VALID UNDER THE ORDERS, RULES AND REGULATIONS OF THE FEDERAL COMMUNICATIONS COMMISSION, ANY STATUTE OF THE UNITED STATES AND ANY TREATY TO WHICH THE UNITED STATES IS A PARTY.

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PLACE AND DATE OF ISSUANCE: KANSAS CITY, MO. MAY 21 1968

DATE AND TIME OF EXPIRATION: MAY 21 1971 AT THREE O'CLOCK A.M. EASTERN STANDARD TIME.

SPECIAL ENDORSEMENT: Special Radiotelephone Endorsement, issued May 21, 1968, Kansas City, Mo.

Thas Bourall
Issuing Officer

Harold J. Turner, Jr.
(Licensee)

Thas Bourall
(Issuing Officer)

Don F. Waffle
(Secretary)

NOT VALID UNTIL SIGNED

the equipment must know what they are doing. The FCC tests these technicians to determine if they do have the basic knowledge and skills to ensure success in handling the equipment, and then awards a license attesting to the fact that the technician is qualified.

JUSTIFICATION FOR A LICENSE

Why should you get an FCC license? If you plan to work in the radio or TV broadcasting, two-way mobile radio or marine radio fields, then you need an FCC license. The law requires it. However, even if you aren't working in one of these fields there are several reasons why you should consider a license. While it may not be directly necessary to your

work or goals, it can be of value. Here's why. First, since the FCC license is awarded only after you pass a test in basic electronics and communications, it proves that you do know electronics. It's pretty tough to pass the FCC tests without a knowledge of fundamental electronics. For that reason, having an FCC license tells the world that you do have a certain level of knowledge and competence in electronics. The license, like your NRI diploma, is a measure of your achievement as an electronics technician.

Another reason why you may want an FCC license, even though you may not need it, is that the feeling of accomplishment that comes from passing the tests is a big boost to your pride and morale. Getting an FCC license is a real shot in

the arm for most people. It helps to give you the self-confidence you need to get ahead in this world.

It doesn't matter whether you are a radio-TV serviceman, an industrial electronics technician or a hobbyist, an FCC license could help put a few extra bucks in your pocket. As a radio-TV service technician, having an FCC license may give you the incentive to get into the lucrative mobile radio field. There are thousands of mobile radios in taxis, police and fire vehicles, and in industrial and commercial vehicles, like trucks that need frequent repair, adjustment and checkout. There is always a demand for people to do this work, and an FCC license is required.

Then there is citizen's band (CB) radio equipment. Many non-technical individuals and businesses use CB radio for their communications. There are literally millions of CB radios in existence and they frequently require the services of an FCC licensed man to adjust or repair them. This could be a good money-making sideline for you.

Marine radio equipment also needs repair and adjustment occasionally. Many boat owners with radio gear often wonder who to turn to for this service. Since most boating seems to be done on the weekends, you may be able to pick up some spare cash on the weekends by providing this needed service.

If you are looking for a part-time job, you may be able to get on as a transmitter engineer in the evenings at a radio or TV station – if you have an FCC license. All radio/TV broadcast stations must have FCC licensed transmitter engi-

neers. And since many stations operate very long hours, they always have a problem in finding licensed personnel to fill these positions. Possibly they could interest you.

Many employers of technicians recognize the FCC license as an achievement and many times base their evaluation of a man's qualifications on this license. It can literally pay to have one.

These are only a few examples of how an FCC license could be of benefit to you. Today, there are so many opportunities that require this license that it is tough to list them all. You can't tell when one of them may come your way. Be prepared and have your license so that you can take advantage of these opportunities when they do occur.

STEPS TO TAKE IN GETTING A LICENSE

Getting an FCC license isn't an easy job, but then if it were so easy anyone could get one and it wouldn't mean a thing. You must have a good understanding of electronics to pass the rather comprehensive tests they give. But if you have had some electronics training and you are willing to spend a little time boning up on the basics, then you shouldn't have any trouble.

There are many different types of FCC licenses. There are amateur radio licenses for the "ham" hobbyist. Then there are the commercial radiotelephone and radiotelegraph licenses. Ship radio operators and coastal telegraph station operators are required to have a radiotelegraph license. These licenses of course require skill in sending and receiving code. While

the license is valuable to people in these fields, it has little practical value elsewhere.

The radiotelephone license is the most useful and widely held. It is the type of license required by radio and TV station engineers, mobile radio repair men and others. It is the most useful and widely accepted. No knowledge of the code is required. There are also several grades of this license, but you should try for either the 1st or 2nd class license. The 2nd class radiotelephone license exam tests your knowledge of basic rules and regulations, radio operating procedure, and basic radio electronics. The license itself permits you to service CB and all other mobile radios and to serve as an assistant or junior engineer in a radio station. The 1st class license requirements are identical to those of the 2nd class, but you must take an additional 50-question test on advanced radiotelephone electronics including TV. This license will permit you full privileges in any radio or TV station. This is "the" license so to speak, as it carries more weight and prestige. Shoot for it. The best approach is to do it step-by-step. Get your 2nd class license first, then you can study further and later take the additional test for the 1st class license.

There are numerous ways to go about preparing for the test. If you've already had some training in electronics, then half the battle is won. All you really need to do is to get hold of one of the many FCC license study guides published by several book companies. Check your local bookstore or electronics dealer. Most stock these books. If you want, try your library. Almost every library in the country has one of these books, so it

shouldn't be a problem. In either case, do try to get an up-to-date issue.

These study guides give many sample test questions and their answers. Typical test problems are explained in detail. In some cases you may want a reference text or two to refer to for additional information. Your library should be able to supply this as well. Oh yes, don't forget your NRI texts for basic electronic reference information.

The NRI FCC license and communications courses cover all the material you need to pass the FCC tests. If you are enrolled for one of these courses, then you are all set. The other NRI courses, radio-TV servicing and industrial electronics also cover most of the basic electronics material you need, but you will have to learn something about AM/FM radio transmitting and receiving equipment to pass the test. The study guide suggested earlier will help.

Once you've done your homework, you are then ready for the test. Get in touch with your local FCC office. FCC offices are located in most major cities. Check your phone book under U.S. Government offices for the number and then call. The engineer there will give you the details on time, date and place of the exams. These vary from place to place so be sure to call first. Also request an application form 756. This is the form used in applying for the license. It must be accompanied by \$5 for a 1st class license or \$4 for a 2nd class license.

Now you're all set to go. You can do it. Best of luck. Wouldn't an FCC license or one of the certification diplomas look good hanging on the wall of your shop or den next to your NRI diploma?

NRI Founder J.E. Smith Honored

WASHINGTON, D.C. (Special to the NRI Journal) --- James E. Smith, Founder and Chairman of the Board of the National Radio Institute, 3939 Wisconsin Avenue, Washington, D. C., received an Honorary Degree of Doctor of Engineering from Worcester Polytechnic Institute, Worcester, Massachusetts at Commencement exercises on June 8.

An Alumnus of Worcester Polytechnic, Mr. Smith received the B.S. Degree in Electrical Engineering in 1906. Previous Honorary degrees include an L.L.D. from Southeastern University, Washington, D. C. and a Doctor of Space Education from the Florida Institute of Technology, Melbourne, Florida. He received the Robert H. Goddard Award for outstanding professional achievements from W.P.I. in 1965. Mr. Smith began his career with Westinghouse Electric & Mfg. Co. in East Pittsburgh, Pa. He was an Instructor of Applied Electricity and Steam Engineering at McKinley Technical High School, Washington, D. C. from 1907 to 1918. He introduced Wireless in the public schools of Washington, D. C. in 1909. Realizing the growth potential of Wireless Telegraphy, Mr. Smith founded the National Radio School in 1914.

The growth of National Radio Institute has kept pace with the growth of Electronics. The school has developed into the largest school teaching Electronics and related subjects by the home-study method -- with over 30,000 active students. Over 800,000 students have been enrolled since 1914.

Mr. Smith's activities haven't been limited to the National Radio Institute nor to Electronics. He has served as Chairman of the Advisory Board of the Young Men's Christian Association of Metropolitan Washington and as Vice-President; President of the Round Table of Washington and President of Round Table International; and as Director of the George Everett Partridge Memorial Foundation for handicapped children. He also established the Macamor Foundation in 1955.



Awards include: National Home Study Council Hall of Fame; International Knight of Achievement of Loyal Knights conferred by Round Table International; Life Member, Board of Associates of Florida Institute of Technology. He also is a Fellow of the Radio Club of America; Life Member, Institute of Electrical and Electronic Engineers; Past President of Washington Branch, Worcester Polytechnic Institute Alumni Association; Phi Sigma Kappa; American Radio Relay League; Association of Oldest Inhabitants of the District of Columbia; Arlington Round Table; Washington Golf & Country Club, University Club; and Humane Lodge No. 21 (K. T. Shriner).

CQ DE W3NRI

The Spring 1969 Callbook shows that the call - W3NRI - is not currently in use, and if the many suggestions so far received by us from NRI hams is any incentive, we just may have to apply for the call for an NRI club station! While we here at NRI are working types (?), we just may give some consideration to this suggestion for the convenience of our students and graduates who drop by for a visit in the nation's capital. Do you agree?

For this issue of the Journal, we are going to reprint in part a letter from Brother Ben Frey, WA1FKE, who summarizes quite well the several reports we received concerning the results of the initial G5AMG/NRI Net, mentioned briefly in the May/June Journal:

"...Yesterday I got on the air and we got the NRI net going. I heard WB4JPQ, Bill from Piney Flats, Tenn. talking to K3ZKB, Dick in Delaware and got in with them. Then I heard VE500, Marv from Estevan, Canada and brought him in. K8KFO, Paul from Toledo, Ohio and K9FYM, Larry from Fond Du Lac, Wisconsin then joined us. Oh yes, just before these last two I turned my beam to Europe and picked up Ron, G5AMG whose signal was rather weak. He could only copy me at times so I acted as go-between for him. W3FSP, Russ then joined us; I could not copy him because he was too near me for 20 meters - Bill took care of him and WA3AFI, Bill from Malvern, Pa. and WA2JVO, Lyle from Clifton, N.J. - WA9KKC, Rick from Pleasant Mills, Indiana; WA8NJZ, John from Waterford, Mich.; Jim, K8RZF from Columbus, Ohio also checked in. We couldn't carry on much conversation because conditions on the air at that time of the day, and Sunday at that, are barbarous. I'm sure there were many others who were looking for us and couldn't find us or some we could not hear who would like to have checked in. The query came up - what now? - so tentatively we will meet at the same time every Sunday. Some will try to listen on Saturday also. We are toying with the idea of once or twice a month or even every week. I suppose it will depend on conditions as to who will take Net Control. It seemed to fall on me Sunday because I was the only one copying G5AMG, Ron. On 20 meters a mid-west station would be best Net Control because he may copy the West Coast better, along with the East Coast. All in all ... it was a delightful experience meeting up with fellow NRI men on the air and I hope it keeps up. Easter Sunday I may be in New York and may not get on the air. But if I can, I'll join the boys even then.

Happy Easter to you and Ted (Rose) and all the Staff and to Russ.

*Fraternally yours,
Br. Bernard Frey O.F.M. Cap. WA1FKE
(signed)*

We must note with some regret that Russ, W3FSP, has felt the Call of Spring (and DX and Golf and other such frivolous things), and has decided to retire his editorial position with NRI. We will all miss him, but wish him the very best in the future - may all his QSO's be 5 by 9 and may he get his HW100 neutralized on 15 meters. Anyway, his departure has gotten you Ham types another correspondent - K4MKX, Ted - who is one of the "Headquarters types scared off by the 20 wpm Extra test" Russ referred to in the March/April Journal. (Since then, we went downtown and at LEAST got the Advanced!) We have been so inactive the contacts on our key have rusted together. But, come summer we hope to string up another antenna and cart the SX100 home and get active again. Incidentally, the SX100 being at the office is one reason you won't get any "first hand" accounts of the NRI net - we can't get in the building on Sundays! Besides, the XYL likes to see her husband once in a while.

We also had a nice newsy letter from that maritime novice WN3KKG/MM, Charlie now aboard the S.S. Australian Galaxy. Charlie says he is homeward bound and may stop and see us if he docks in Baltimore. He also says DX on 15 meters has been rather rotten lately so he had to slack off and build an oscilloscope kit to occupy himself in Liberia. Things are tough all over!

Several fellows who dropped us a QSL card suggested the possibility of an NRI cw net. Any takers? A suggestion would be 40 meters, in the novice band to let everyone in on the fun. Possibly a weekday evening? Let us know who wants to go for it and we'll spread the word. With school letting out and vacation time coming up, this summer could be real interesting on 40 cw! (Maybe I could get my code speed up?)

We have a bunch of calls received since the last Journal, and to help you know your NRI Ham neighbors, in this issue we will list the call, the license class and the QTH. This may have to be discontinued if we keep on getting so many replies, but for now, here goes:

WN1KDN	N	Rutland VT	W4TZJ	G	Knoxville TN
WA1LCV	G	Brockton MA	W5AZM	G	Houma LA
K2MUI	T	Trumansburg NY	K5GGL	G	Okarche OK
W2PDW	T	Baldwinsville NY	W5PKC	A	Oklahoma City OK
W8GMM/3	A	Washington DC	WA5SCQ	E	Pearl River LA
WA3GPB	G	Glen Burnie MD	WA5UDL	C	Irving TX
K3HWQ	G	Newcastle PA	K6RMI	G	Norwalk CA
WA3MEM	T	Dover PA	WB6VDS	E	San Pablo CA
WN4MTV	N	Nashville TN	WB4HIR/6	C	Pacifica CA
WB4FFY	A	Salem VA	W7KI	E	Spokane WA
K4IZU	A	Memphis TN	WN7MBL	N	Logan UT
WB4JPQ	(G)	Piney Flats TN	W7OCX	A	Ogden UT
WA4KRR	T	Oxford AL	WA3RLY	A	Detroit MI
WB4LRO	(G)	Louisburg NC	WB8BUE	(G)	Dayton OH
W4SVM	E	Huntsville AL	K8KFO	G	Toledo OH

K8RZJ	A	Columbus OH	WAØNXJ	G	Princeton MN
WA8TGN	G	Columbus OH	WAØTAV	G	Colorado Springs CO
W8ZJE	A	Adrian MI	WNØVPN	N	Starkville MS
K9ESJ	G	Chicago IL	WNØWGO	N	Garnett KS
K9GJM	C	Highland IL	KØZZG	C	La Crescent MN
K9HGW	C	Oaklandon IN	KZ5DQ	A	Albrook AFB CZ
K9INI	G	Fisher IL	KA8YD	?	APO San Francisco
K9QWP	A	Muncie IN	VE1JM	-	Truro NS Can.
WA9YUJ	(G)	Albany IL	VE3GSX	-	Ottawa PQ Can.
WAØGCO	C	Stephen MN	VE6XC	-	Fort Sask Alta Can.
WAØICV	G	Clarkson NB	VO1AZ	-	Newfoundland Can.
KØIOT	G	Berkeley MO	WA3AFI	E*	Malvern PA
WØJYJ	C	Abilene KS	WA3EFI	E	Harmony PA

* Just upgraded to Extra Class - Congratulations!

The (G) in the listing means that our Callbook shows Novice class - if Advanced, please excuse. WA5SCQ, Bill, has family ham problems - his wife, Bee, is also a ham (general) WA5SIF. Anybody else? WB6VDS, Art, is ex W1KFM, a real old timer and KZ5DQ, Mario, has really held a lot of calls: HP1XHJ, WB6IHJ, AH6EC, K7GXN, K7GXN/VO2 and KA2DB. Our current DX champ is probably KA8YD, Harmon, in Japan. Ron, G5AMG, has a new stateside call, WA6BDM. K9HGW, Larry, says he wrote in a long time ago, but either the Post Office or our in-mail section didn't let us know his call until now. Sorry about that.

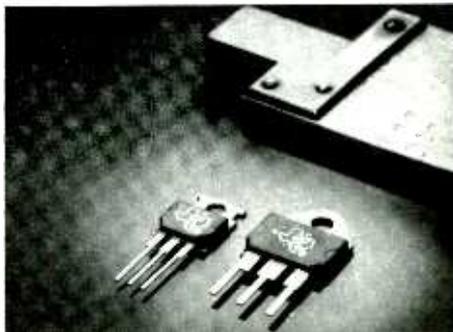
That's about it for this time - keep those cards coming in, and for your efforts you will receive a genuine 8-½ X 11" copy of all the Ham bands and subbands showing how much better off you will be when you get your Extra Class license. (NRI now has a Ham Course, you know.) Very 73 and BCNU, Ted - K4MKX

Plastic-Encapsulated Power Transistors Replace Metal Devices at Lower Costs

DALLAS, TEX. A new line of 1-25 amp NPN and PNP complementary silicon single-diffused power transistors from Texas Instruments, encapsulated in plastic, will help equipment designers reduce component costs by replacing metal can TO-3 and TO-66 devices with plastic equivalents.

Rated at 30 to 90 watts, the new transistors meet a wide range of power and polarity requirements. The transistors shown in the photograph are making

their appearance in commercial equipment.





'Harmonics in the i-f again, eh?'

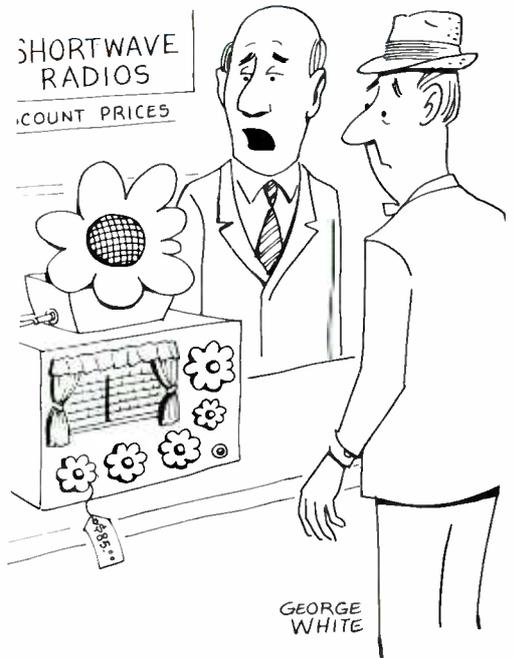


'Wilma, have you seen the two grommets that came with my kit?'

Laugh Lines by george white



'Aren't you the DX-er who picked up that witch doctor's chant on the 25-meter band?'



'The manufacturer's chief designer is his wife.'



BY DAVID TURPIN

DEAR DAVE,

I am studying Lesson B111 and I just don't get it. How does a grounded cathode amplifier work? Does current flow to the grid? Why don't all the electrons flow to ground?

Fig. 1 shows a simplified diagram of a grounded cathode amplifier. Let's analyze its operation.

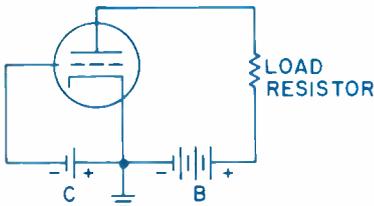


Fig. 1

First of all, remember that one of the requirements for current flow is a complete circuit. Remember that the cathode of a vacuum tube will emit electrons when heated. We have a complete path for electron flow from the negative terminal of the "B" battery, to the cathode of the tube, from the cathode to the plate, from the plate through the load resistor back to the positive terminal of the "B" battery.

We have no other complete paths in the circuit shown. Electrons cannot "flow to ground" because there is nowhere for them to go. Current cannot flow from the

negative to the positive terminal of the "C" battery because the grid will not emit electrons - thus there is no complete path.

Notice that the tube and the load resistor are in series. The same current flows through both components and the battery voltage divides between them according to their respective sizes. Thus, the voltage we measure on the plate with respect to ground will depend on the size of the voltage drop across the load resistor.

Even though there is no current flowing from the grid to the cathode, we can measure a negative voltage on the grid with respect to the cathode. In fact, we will measure a voltage equal to the output of the "C" battery. This negative voltage is important. Since the grid is negative with respect to the cathode, the number of electrons which can leave the cathode and flow to the plate is limited. If we change the difference of potential from the grid to the cathode we will change the number of electrons which can flow through the tube.

Let's suppose that we have an ac input to the amplifier, as I have shown in Fig. 2. This ac voltage adds to and subtracts from the "C" battery voltage in the same way that the battery and generator outputs were combined that you studied in

Lesson B103. When the input swings positive it subtracts from the “C” battery voltage and the grid becomes less negative with respect to the cathode. When this happens more current can flow through the tube from cathode to plate. Since the same current flows through the tube and load resistor, an increased current also flows through the load resistor. This results in an increased voltage drop across the load resistor so that the voltage on the plate of the tube is reduced. Thus, a relatively positive voltage on the grid has produced a relatively negative voltage on the plate. This is what we mean when we say that the input and output signals are 180° out-of-phase.

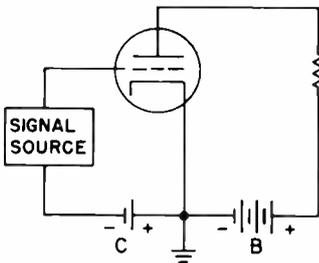


Fig. 2

In the same way, a negative signal on the grid will add to the negative voltage of the “C” battery and increase the difference of potential from the grid to the cathode. The more negative grid will decrease the flow of current through the tube and through the load resistor. The

voltage drop across the load resistor decreases and the voltage on the plate rises. The negative voltage on the grid has produced a more positive voltage on the plate of the tube.

DEAR DAVE,

I keep hearing about regenerative feedback and interelectrode capacitance, but how can interelectrode capacitance cause regenerative feedback if the signal in the output is 180° out-of-phase with the input signal? Doesn't the interelectrode capacity only shift the phase by 90° ?

As you know, “regenerative feedback” refers to a signal fed back through a circuit in such a way that it will be in phase with the input signal and will reinforce it.

Only when the plate load is purely resistive will the output signal of a grounded cathode amplifier be 180° out-of-phase with the input signal. But what if we have an inductive load, such as the primary of a transformer?

In this situation, the plate voltage and the plate current must be 90° out-of-phase with each other; the voltage will lead the current by 90° .

Now, remember that the plate and grid of a tube act exactly like a capacitor. They

will act exactly like a coupling capacitor from plate to grid and feed plate voltage back to the grid.

Since this is a capacitive effect the voltage fed back to the grid will lag the current by 90°, the same amount that it is shifted by the inductance of the plate load, but now in an opposite direction! It will now be in phase with the signal on the grid and will reinforce it.

DEAR DAVE,

How many ohms in an amp? And what are volts? I don't understand Ohm's Law at all.

The answer may surprise you at first - there are no ohms in an amp. Ohms and amps are entirely different things. There cannot be ohms in amps, just as there are no apples in an orange. However, ohms, amps and volts are related to each other by Ohm's Law. Let's see how.

Current flow is the movement of electrons in a circuit. In order to have this current flow, we must have two things: a complete closed path for the electrons to move in and a force which makes them move. Without the force, no electrons will move; without the path, they have nowhere to go. Current is measured in amps.

The force which causes current flow is called electromotive force, or voltage, and is measured in volts. The amount of current depends directly on the amount of voltage in the circuit.

Any circuit has the property of resistance; that is, it tries to oppose the flow of current. If a circuit has very little resistance to the current flow, a large

current can flow in the circuit. If a circuit has a large amount of resistance to the current flow, only a small current can flow in the circuit. We can then say that the current in a circuit will vary inversely with the resistance. That is: small resistance, large current; large resistance, small current. Resistance is measured in ohms.

In order to simplify things we can assign symbols to the three quantities, ohms, volts and amperes: Ohms = R, Volts = E, Amps = I. We can use these symbols to write a mathematical summary of the statements we have just made:

$$I = \frac{E}{R}$$

Notice that we have both the conditions we stated. When voltage (E) goes up, current (I) will go up; when voltage goes down, current will go down. When resistance (R) goes up, current will go down; when resistance goes down, current will go up. We can rearrange this formula to provide two other forms:

$$E = IR \qquad R = \frac{E}{I}$$

These different forms can be used in different problems. If we know any two of the factors in the formula, we can use the formula to find the third.

If we know how much voltage and resistance we have we can find how much current there must be. If we know how much current flows in a circuit and how much resistance is in that circuit we can find the amount of voltage that we have. If we know voltage and current we can find resistance. This is Ohm's Law.



NOMINATIONS

OPEN

FOR

OFFICERS

While the astronauts are whirling around the moon, NRI Alumni Association must turn its attention to the election of officers for 1970. It seems early, but these elections take time, so we must start early.

We will nominate two candidates for President, eight for Vice President. These nominations must appear at NRI by July 25. The winning candidates will appear in the next issue of the Journal.

Only members of the NRI Alumni Association are eligible to vote or to serve as officers of the association.

In considering whom to nominate, members should keep in mind the restrictions on the re-election of incumbent and past officers, as set forth in Article VI, Section II of the constitution, quoted below:

“The President shall not be eligible for re-election until after expiration of at least 8 years following his last term of office and, further, may be a candidate for Vice President only after expiration of at least a year following his term of office as President. Vice Presidents may not serve more than two consecutive terms; when re-elected for a second consecutive term they shall not thereafter be candidates for Vice President until after expiration of at least three years following their second term of office.”

Of the present officers, the President, Walter Adamiec, is affected by both of the above restrictions. Also Franklin Lucas, James J. Kelley, and E. J. Meyer have all served two consecutive terms and are not eligible for Vice President

until after expiration of at least three years from the end of this term of office. However, the above mentioned Vice Presidents are eligible for election to President of NRIAA.

You may nominate any NRIAA members you wish. If you have no preference in nominating a candidate for President, we would like to suggest Sam Stinebaugh of San Antonio Chapter for his many years of service to that Chapter and to the National Association. Other members, selected geographically, are given under "Nomination Suggestions" and a ballot is on Page 27.



Mr. Eugene P. Swift
Wilmington, DE

Mr. Manning W. Chamblee
Washington, DC

Mr. Walter B. Harrell
Washington, DC

Mr. Clarence E. Davis
Pompano Beach, FL

Mr. Carl R. Jones
Orlando, FL

Mr. Willie A. Cox
Atlanta, GA

Mr. Horace Simmons, Jr.
Macon, GA

Mr. F. D. Pope
Idaho Falls, ID

Mr. Joseph E. Conner
Payette, ID

Mr. Robert N. Spain
Moline, IL

Mr. Alexander Kolosovsky
Chicago, IL

Mr. Paul M. Ledak
Gary, IN

Mr. Harold E. Tomey
Muncie, IN

Mr. James W. Gullick
Muscle Shoals, AL

Mr. Harvie B. White
Chickasaw, AL

Mr. John A. Palumbo
Avondale, AZ

Mr. George R. Larsen
Mesa, AZ

Mr. Paul A. Boeckmann
North Little Rock, AR

Mr. Veryl L. Dunn
Hot Springs, AR

Mr. Ken Kellogg
Santa Ana, CA

Mr. Peter Salvatti
San Francisco, CA

Mr. R. Tomlinson
San Francisco, CA

Mr. John A. McDonald
Denver, CO

Mr. Glenn B. Long
Longmont, CO

Mr. James C. Failla
New Britain, CT

Mr. John Chessnek
Plainville, CT

Mr. James L. Crouse
Dover, DE

Mr. Irving B. Hawk Colfax, IA	Mr. Clement R. Clemencig Great Falls, MT	Mr. Carl E. Schweitzer Oklahoma City, OK
Mr. Gerald E. Olmstead Cedar Rapids, IA	Mr. Richard L. Robinson Carter, MT	Mr. Rheuben B. Allen Lawton, OK
Mr. Albert J. Meeting, Jr. Topeka, KS	Mr. Forrest Duane Bandt Sutherland, NB	Mr. Bert H. Glendenning Portland, OR
Mr. Roy Dix Newton, KS	Mr. Joseph J. Lenz Omaha, NB	Mr. Wallace P. Seguin Salem, OR
Mr. Herman S. Barlow Paducah, KY	Mr. Richard K. Miller Reno, NV	Mr. James Wheeler Pittsburgh, PA
Mr. Joseph H. Bates Lexington, KY	Mr. Glenn T. Jenkins Las Vegas, NV	Mr. William Sames Pittsburgh, PA
Mr. Elward J. Stevens Morgan City, LA	Mr. Erwin Grant Dover, NH	Mr. Stanley C. Kasior West Warwick, RI
Mr. Spencer J. Coudray, Jr. New Orleans, LA	Mr. Arnold N. Russell Concord, NH	Mr. Albert E. Deschenes Pawtucket, RI
Mr. Gerald Louis Louley South Portland, ME	Mr. Lawrence G. Ham Roswell, NM	Mr. James B. Winchester Columbia, SC
Mr. Walter L. Errington W. Peru, ME	Mr. Louis R. Stanley Albuquerque, NM	Mr. Oron L. Scott Clinton, SC
Mr. John T. Park Springfield, MA	Mr. Pete Carter New York, NY	Mr. Marvin H. Kappel Woonsocket, SD
Mr. Alfred Petersen Springfield, MA	Mr. Samuel Antman New York, NY	Mr. Rupert W. Potter Rapid City, SD
Mr. Gill Sager Detroit, MI	Mr. David Huneycutt Charlotte, NC	Mr. Ernest A. Clay Kingsport, TN
Mr. Roosevelt Paton, Jr. Detroit, MI	Mr. John H. Norwood, Jr. Greensboro, NC	Mr. Carmel D. Lee Cookeville, TN
Mr. Joe H. Hitt Biloxi, MS	Mr. Leonard A. Larson Grand Forks, ND	Mr. Sam Stinebaugh San Antonio, TX
Mr. Dudley B. Connally McComb, MS	Mr. Leo H. Oye Bismarck, ND	Mr. Robert E. Bongo San Antonio, TX
Mr. Harold S. Hagen St. Louis, MO	Mr. Charlie Radney Warrensville Heights, OH	Mr. Lynn D. Draper Provo, UT
Mr. Steve M. Benkovich Sugar Creek, MO	Mr. John J. Cairns Dayton, OH	Mr. Darven C. Nelson Brigham City, UT

(Nomination Suggestions cont. on page 27)

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<p>BREESEE'S Oneonta Department Store, Inc.</p> <p>Located in a mid-New York community, this store is looking for qualified men to work in the service department. Excellent benefits.</p> <p>Write: 155-165 Main Street, Oneonta, N.Y. Phone: 432-6000</p>		<p>Looking for a permanent position with a future? TV-Stereo service and sales. Excellent retirement. Contact:</p> <p>Jim Renier RENIER'S Dubuque, Ia.</p>
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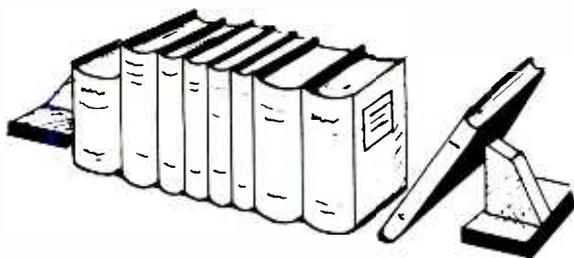
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NRI Book Editor

ELECTRONICS IN PHOTOGRAPHY, By **Byron G. Wels. Howard W. Sams and Co., Indianapolis, Indiana. 128 pp, \$3.50 Paperbound.**

I found this book interesting to read. It has quite a lot of photographic information. I do not think however, that it helps the electronics man to understand the various electronics involved in photographic products today. Instead, I think this might be a good book for either a photographer who might want to learn a little about electronics, or for an electronics man who might want to learn a little about photography.

Only three diagrams are to be found in the whole book. One is a diagram of how to connect two photo flood lamps up, so that they can be connected either in series or in parallel. Another shows how to switch a diode in series with a lamp so that the lamp will be dimmed when the diode is switched in series with the lamp. The third is the hook-up of a microswitch in a paper "safe", so that the regular light will be disconnected and a safe light connected, when the door of the paper safe is opened.

A few complicated electronic devices, such as Heath's new Fotoval meter for the darkroom are mentioned. However,

they are not discussed as to electronic operation, circuit, or repair. If there ever were an area for electronic discussion, this would have been it.

Unless you are interested in learning more about photographic fundamentals, photography equipment from a non-electronic standpoint, or just find the subject interesting (as I do), I doubt that this would be your book.

HAM RADIO INCENTIVE LICENSING GUIDE, by **Bert Simon, W2UUN. Tab Books, Blue Ridge Summit, Pa. 17214. 16 pp, \$6.95 Hardbound, \$3.95 Paperbound.**

Reading the title of this book gives the impression that it is for the experienced Radio Amateur who wants his Advanced or Extra Class License, and it is. It is however also written for those who are just learning. It contains information which is necessary for the beginning Novice and Technician tests, including theory and code.

In the first chapters, the reader is told how to get a license, tips on learning the International Morse Code and the requirements of each class of Amateur license. Chapter 3 discusses the FCC's new incentive licensing program, explaining what privileges come with each license.

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Thomas F. Nolan
Executive Secretary
NRI Alumni Association
3939 Wisconsin Avenue, N.W.
Washington, D.C.

1970 NOMINATION BALLOT (Polls Close July 25)

I am submitting this Nomination Ballot for my choice of candidates for the coming election. The men below are those whom I would like to see elected officers for '70.

MY CHOICE FOR PRESIDENT IS _____

City _____ State _____

MY CHOICE FOR FOUR VICE-PRESIDENTS IS

1. _____ 3. _____

City _____ State _____ City _____ State _____

2. _____ 4. _____

City _____ State _____ City _____ State _____

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| T. F. Nolan, Jr. | Exec. Sec. |

DETROIT CHAPTER HAS BUSY MEETING

DETROIT CHAPTER's secretary Charles Cope reports that they had one of the best meetings of the season when John Nagy, who specializes in installing and servicing P.A. systems, demonstrated his work. He covered everything from installing a single speaker to several, and how to install a complete intercom system. The members now believe that none of them will have any trouble installing speakers hereafter.

Charles Giller of Lansing dropped in at the Chapter and both he and the members enjoyed his visit. He said he was assembling a CONAR Model 600 Color TV and that the experience he is gaining from this will be useful when he undertakes servicing color TV sets.

GENE DE CAUSSIN ENTERTAINS LOS ANGELES CHAPTER

LOS ANGELES CHAPTER members always look forward to the lectures and demonstrations of their Chairman, Gene De Caussin. On one recent occasion he devoted himself to a discussion of the business side of TV-Radio servicing. This, of course, is of utmost importance to every service technician and sales/service shop.

One of the Chapter's new members, Student L. N. Booher, acquitted himself well in demonstrating troubleshooting audio circuits in an Olympic television receiver which had no sound. Using resistance, voltage, and capacitor checks, he finally found that two bad electrolytic capacitors were the cause of the trouble.

NEW YORK CITY CHAPTER SEES DEMONSTRATIONS BY LIONEL WILLIAMS

NEW YORK CITY CHAPTER welcomed a new member, Michael Esposito, a new graduate.

Lionel Williams brought in his partially-assembled CONAR Color TV Set and demonstrated some of the experiments called for in the lessons, which included tracing waveforms through the circuit with a scope and testing response time of various circuits with a square-wave generator, also constructed as part of the course.

A Heathkit marker generator and a Heathkit FET ohm-ammeter were demonstrated and discussed. Various servicing aids constructed by members were shown, including test leads, pin-crimpers and a high voltage voltmeter were displayed, also a magnifier attached to a headband for use with transistorized equipment. Along with a quick demonstration of servicing a table radio, the dangers of altering circuit response in high frequency circuits by the use of wire-wound resistors when carbon ones were called for was brought out.

Stephen Kross talked on various magic-eye devices and the accompanying circuitry, and Ontie Crowe on gated agc. Animated discussion of various circuits to be found in an automobile occupied half of one session. There were in addition the usual service problems brought in by members.

TOM NOLAN VISITS NORTH JERSEY CHAPTER

NORTH JERSEY CHAPTER members

found that Executive Secretary Tom Nolan's annual visit and lecture/demonstration was by far their best meeting of the season. Chapter Secretary Harry Weitz reports "one guest traveled 70 miles to be at the meeting. Expressions of regret were made by those unable to appear. Mr. Nolan's excellent lecture held the audience spellbound; his superb methods and explanations were so simplified that the audience was never lost. He makes every effort to keep the members up to date with the latest information. The question and answer period was very interesting and informative, with no questions left unanswered".

The Chapter was saddened at the loss of George F. Fee, Ervington, NJ. He joined the Chapter in May, 1967, while an NRI student and graduated with high honors in September, 1968. The National Radio Institute joins with the North Jersey Chapter in extending our sympathy to Mr. Fee's family.

PHILLY-CAMDEN CHAPTER CELEBRATES 35th ANNIVERSARY

PHILADELPHIA-CAMDEN CHAPTER enjoyed another of its always excellent meetings with the General Electric Company. GE's George Walker (an honorary member of the Chapter) gave the members a thorough going over of the new GE portable Color TV. The members got a great deal out of it. There were door prizes and refreshments and each member received a schematic and service bulletin of the receiver.

The 35th Anniversary was celebrated at Sciola's Night Club and Restaurant. There were plenty of door prizes here, too. They were donated by the local parts

houses and distributors. The climax of the evening came when Executive Secretary Tom Nolan played a tape containing messages from Morrison Smith, President of NRI, and Associate Executive Secretary Ted Rose. The tape recording was good and clear, and the members enjoyed these features. In fact, the tape was played over the night club's PA and the whole club heard it.

The food was tasty and the show very entertaining. Everybody expressed their wish that they hoped to keep in good health and be able to celebrate their 50th Anniversary together.

The tape recorder was won by Mrs. Jules Cohen, a set of Teflon pots and pans donated by GE was won by Mrs. Tom Nolan, and George Walker won a Zenith Radio. Everyone took home a door prize of some kind, no one went empty-handed. This was truly a grand party and a fitting celebration of the Chapter's 35th Anniversary.

PITTSBURGH CHAPTER KEEPS BUSY

PITTSBURGH CHAPTER was happy to welcome new member Frank De Augustine to its ranks. Congratulations, Frank!

At the same meeting Tom Dapra discussed Sony Video and Al Hirsch talked on tape recorders.

At the next meeting the Chapter members were pleased to find that Executive Secretary Tom Nolan, on his annual visit, had settled on a surprise subject for part of his lecture. The subject was air navigation. It was fascinating to the members; very few had ever heard any programs on

the subject or had any idea of the electronic equipment carried on even a small plane.

Tom then followed with a discussion on Color TV in which he eliminated much of the meaningless and got right to the material that really interests the serviceman.

SAN ANTONIO ALAMO CHAPTER LISTENS TO LECTURES GIVEN BY TOM NOLAN

SAN ANTONIO ALAMO CHAPTER was greatly impressed -- as all the chapters always are -- with Executive Secretary Tom Nolan's annual visit to the chapter and the lecture/demonstration he brought with him. It was the biggest meeting they ever had.

Secretary Stinebaugh reported that Tom first covered the new RCA solid state TV chassis CTC-40, explaining its outstanding features. Then he demonstrated a Color TV setup, using the Conar 600. Sam particularly noted Tom's ability to talk at the serviceman's level even though he



Officers of the Pittsburgh Chapter, l to r: Tom Schnader, Board Member; Bill Lundy, Board Member; George McElwain, Recording Sec'y; Charles Kelly, Board Member; William Sames, Treasurer; Jim Wheeler, Chairman; Joe Burnelis, Vice-Chairman.

himself is a fully qualified engineer. Several of the other members expressed this same opinion.

SAN FRANCISCO CHAPTER TAKES ON PROJECT

SAN FRANCISCO CHAPTER has been constructing simple, inexpensive transistor circuits to become familiar with the application of transistor fundamentals and see the results of the members' handiwork. One project is the construction of ten wireless broadcaster units. These low power transmitters will operate at the low end of the AM band and are good for short distances only as specified by FCC regulations. The operation of these units will be discussed at the next meeting.

Our congratulations to the two new members of the Chapter, Howard Anderson and Steve Thomas.



A group of San Francisco Chapter members in an earnest discussion just before the Chapter's Tenth Anniversary Party. l to r, Messrs. Jenkins, Chairman Ragsdale, Salvotti and Tomlinson.

SOUTHEASTERN MASSACHUSETTS CHAPTER WELCOMES NEW MEMBERS

SOUTHEASTERN MASSACHUSETTS CHAPTER undertook a lengthy and detailed discussion of capacitors. The results were rewarding; everyone enjoyed the program.

Equally engrossing was a discussion on the relative profit in the sales, service or rental of television receivers. We wonder which of the three was concluded by the members to be the most lucrative? Will Secretary Adamiec tell us in his next report?

The Chapter was pleased to welcome two new members, John Vieira, Fall River, and R. V. Allaire, Holbrook. We here at National Headquarters would like to add our own welcome, gentlemen.

STAN CALL IS GUEST SPEAKER AT SPRINGFIELD (MASS.) CHAPTER

SPRINGFIELD (MASS.) CHAPTER had a real treat: a program conducted by guest speaker Mr. Stan Call, Regional Service Manager for the Zenith Corporation. During his lecture he showed slides of various Color Television receivers and their special points.

He left the Chapter a set of books on Color TV servicing which all the members were very pleased to have. This was an outstanding and valuable meeting -- one of the best of the year, according to Secretary Robert Jensen. Bob also reports that Mr. Call told him that the local Chapter of the NRI Alumni Association is a very valuable thing for the members.

DIRECTORY OF CHAPTERS

CHAMBERSBURG (CUMBERLAND VALLEY) CHAPTER meets 8:00 p.m. 2nd Tuesday of each month at Bob Erford's Radio-TV Service Shop, Chambersburg, Pa. Chairman: Gerald Strite, RR1, Chambersburg, Pa.

DETROIT CHAPTER meets 8 p.m., 2nd Friday of each month at St. Andrews Hall, 431 E. Congress St., Detroit. Chairman: James Kelley, 1140 Livernois, Detroit, Mich. VI 1-4972.

FLINT (SAGINAW VALLEY) CHAPTER meets 7:30 p.m., 2nd Wednesday of each month at Andrew Jobbagy's shop, G-5507 S. Saginaw Rd., Flint. Chairman: Arthur Clapp, 705 Bradley Ave., Flint, Mich. 234-7923.

LOS ANGELES CHAPTER meets 8 p.m., 2nd and last Saturday of each month at Chairman Eugene DeCaussin's Radio-TV Shop, 4912 Fountain Ave., L. A., Calif., NO 4-3455.

NEW ORLEANS CHAPTER meets 8 p.m., 2nd Tuesday of each month at Galjour's TV, 809 N. Broad St., New Orleans, La. Chairman: Herman Blackford, 5301 Tchoupitoulas St., New Orleans, La.

NEW YORK CITY CHAPTER meets 8:30 p.m. 1st and 3rd Thursday of each month at 264 E. 10th St., New York City. Chairman: Samuel Antman, 1669 45th St., Brooklyn, N.Y.

NORTH JERSEY CHAPTER meets 8 p.m., last Friday of each month at Midland Hardware, 155 Midland Ave.,

Kearney, N.J. Chairman: William Colton, 191 Prospect Ave., North Arlington, N.J.

PHILADELPHIA-CAMDEN CHAPTER meets 8 p.m., 2nd and 4th Monday of each month at K of C Hall, Tulip and Tyson Sts., Philadelphia. Chairman: Herbert Emrich, 2826 Garden Lane, Cornwell Heights, Pa.

PITTSBURGH CHAPTER meets 8 p.m., 1st Thursday of each month at 436 Forbes Ave., Pittsburgh. Chairman: James Wheeler, 1436 Riverview Dr., Verona, Pa.

SAN ANTONIO (ALAMO) CHAPTER meets 7 p.m., 4th Friday of each month at Alamo Heights Christian Church Scout House, 350 Primrose St., 6500 block of N. New Braunfels St. (3 blocks north of Austin Hwy.), San Antonio. Chairman: R. E. Bonge, 222 Amador Lane, San Antonio, Texas.

SAN FRANCISCO CHAPTER meets 8 p.m., 2nd Wednesday of each month at the home of J. Arthur Ragsdale, 1526 27th Ave., San Francisco. Chairman: Isaiah Randolph, 60 Santa Fe Ave., San Francisco, Calif.

SOUTHEASTERN MASSACHUSETTS CHAPTER meets 8 p.m., last Wednesday of each month at the home of John Alves, 57 Allen Blvd., Swansea, Mass. Chairman: Oliva J. Laprise, 55 Tecumseh St., Fall River, Mass.

SPRINGFIELD (MASS.) CHAPTER meets 7 p.m., last Saturday of each month at the shop of Norman Charest, 74 Redfern Dr., Springfield. Chairman: Br. Bernard Frey, 254 Bridge St., Springfield, Mass.

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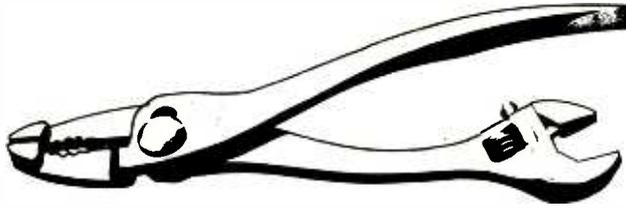
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