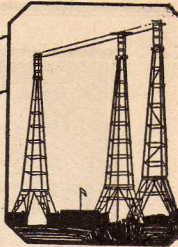


NATIONAL

RADIO

NEWS

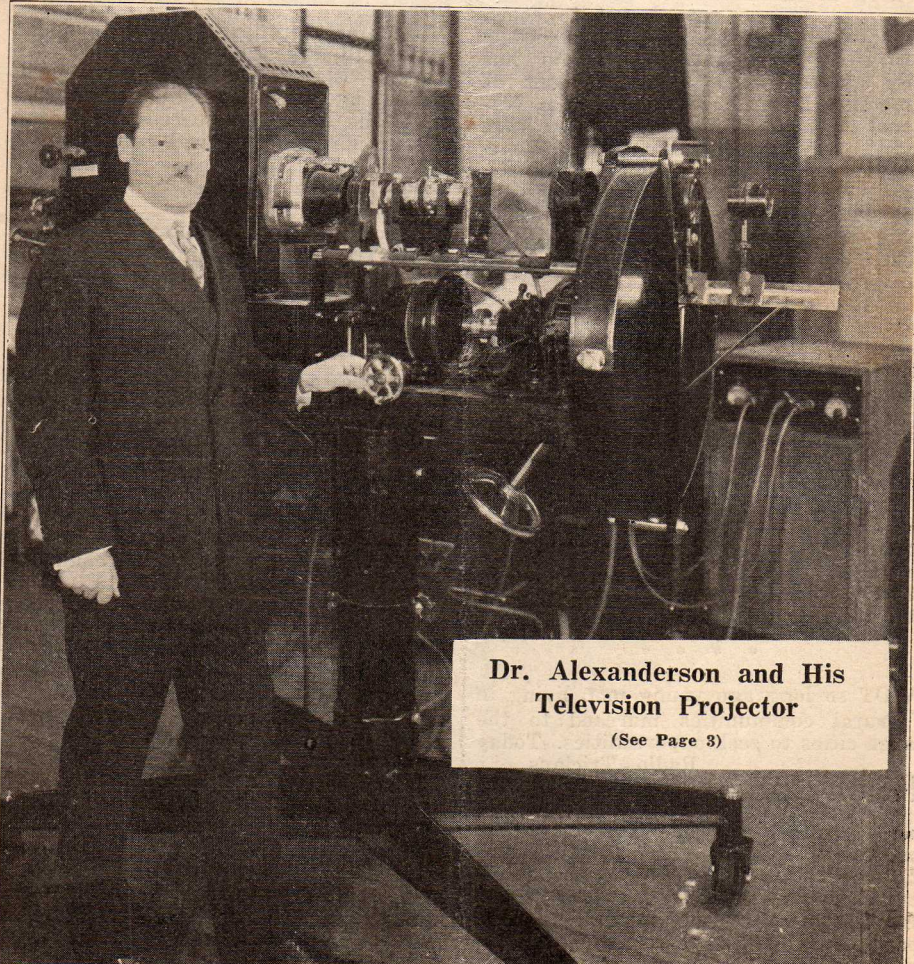


FROM N.R.I. TRAINING HEADQUARTERS

VOL. 3—NO. 1

WASHINGTON, D. C.

AUGUST, 1930



**Dr. Alexanderson and His
Television Projector**

(See Page 3)



J. E. SMITH

The PRESIDENT'S PAGE

THE rapid growth of the Radio Industry up to the present time is but a drop in the bucket compared to the growth yet to come.

63% Unsold As an \$800,000,000.00 industry, Radio has only entered about forty per-cent of American homes. Figures of the National Chamber of Commerce show that out of every one hundred families, fifteen are supplied with up-to-date electric sets, twenty-two with battery operated sets—but sixty-three are getting along without receivers. Just think of it! Out of every one hundred homes, sixty-three are prospects for Radio.

It has been estimated that the average family contains four and one-half persons. What does this mean? Simply that Radio-Tricians living in even small towns of 1,000 population have one hundred and forty Radio prospects (1,000 population \div by $4\frac{1}{2}$ = 223 families, 63% of these families, or 140 families, do not have Radios.)

This big market opens up many profitable opportunities for the trained Radio-Trician. N. R. I. men are going to crash this sixty-three per-cent unscratched market heavily during the next few months.

* * * *

NOT so long ago young men living in rural communities marched to the large cities to seek opportunities. Today

Farm Radio Radio-Tricians in farming centers are sticking close to home because of the vast, untouched market at their doorsteps. Already 2,512,000 Radios are in use on American farms—more receivers than in any European Country. The American farm people are quick to realize the importance of Radio, not only from the standpoint of entertainment, but for the

vitaly important market, weather reports and farm educational features put out by the U. S. Department of Agriculture.

Manufacturers are turning their attention to this scarcely scratched farm market. Elaborate research is being conducted by dry battery manufacturers along the lines of a successful dry battery receiver. Improved battery operated sets will be welcome to the rural homes where electric power is not available.

Keep your eyes on the farming centers. Radio-Tricians are finding rich profits in these communities and will even increase their earnings with the advent of improved battery sets.

* * * *

A SHORT time ago one of my students wrote—"It affords me pleasure to send you another Examination Sheet. I

Courage am sitting in a wheel chair, which has been my sole means of locomotion since September 27, 1929, and probably will be for four or five months more. I hope to pursue my studies in my wheel chair, and to send in lessons promptly."

There is a man who has suffered great pain as the result of an injury—who has been laid up eleven months with prospects of another four or five months to spend in a wheel chair. Yet has he become down-hearted? Not for a minute. He is going ahead with his Radio studies, come what may.

There's real courage for you! He made up his mind to be a Radio success when he enrolled. He was going strong until an accident knocked him out. No! not knocked him out—simply made him more determined than ever to go ahead. He would reach the "top"—walk, if he could; crawl if he could not walk; but get there if he had to use a wheel chair.

My hat is off to that student.

Now—Life Size Television Images

By J. A. DOWIE, Chief Instructor

Recently life-size Television images transmitted by Radio were publicly demonstrated by Dr. E. F. W. Alexander in a theatre at Schenectady, N. Y. The front cover of this issue shows Dr. Alexander and the projector used.

Heretofore Television reception has been on a minute scale and every effort to enlarge the pictures has more or less failed. Three years ago the pictures shown were in a frame three inches square. Last Fall at the Radio Show in New York an image fourteen inches square was exhibited. The images witnessed at this demonstration were a distinct advance over any previously shown.

The images shown at the theatre at Schenectady were life-size and were not simply black and white, on the order of a silhouette. All the gray shades between black and white were reproduced on the screen registering every shadow and shade of the features, giving depth and detail to the image which demonstrated the possibilities clearly of the new art as a medium of entertainment. Through a loud-speaker system the voices of the performers also transmitted by Radio were heard by the audience. The active images of the performers were reproduced on the screen six feet square making them visible by those seated at the back rows of the theatre.

The secret of the great advance over previous demonstrations was made possible by using a permanent high intensity light source such as a motion picture arc, a new light valve, called the Karolus cell

(named after its inventor, a German scientist) and general improvements to existing apparatus. The light valve is really the heart of the system as it changes the plane of polarization of the light beam going through it by means of an electro-static field producing a clear, well defined picture.

Transmitting Equipment

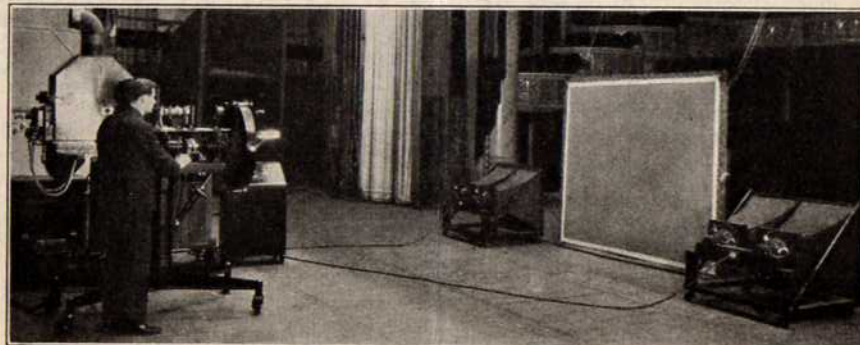
In Radio Broadcasting the frequencies of speech and music modulate the current sent out from the antenna. In Television the antenna radiation is modulated by a succession of light impulses.

In the Television Studio the equipment was similar to that used on previous demonstrations. The performers to be televised appear before the television camera which is shaped like a shallow box around the sides of which are placed

(Please turn to page 14)



Matilda Biglow Russ, Radio soprano, before Television Camera. Circular openings in camera frame contain photo-electric tubes which convert light into electrical impulses.



How the picture is projected back stage. Alongside the screen are loud-speakers for reproducing the Radio voice which accompanies the picture.

Another Big Contest Starts August First!

All Students and Graduates Eligible to Enter

By J. E. SMITH, President



What results are you getting through your course? What results have you gotten since you enrolled—or since you graduated?

Your Institute wants to know. Your fellow-students and fellow-graduates want to know—the richest reward of my years of teaching is when some student or graduate uses the course to good advantage.

So I am staging a "Results" Contest. I am putting up 60 cash prizes. I am going to give one Grand Prize of \$50, a second Grand Prize of \$25, a third Grand Prize of \$15, seven fourth prizes of \$10 and fifty additional prizes, making a total of \$300 in prizes for N. R. I. men.

Mr. Haas, Chief Dowie and myself will award the prizes to the N. R. I. men who between now and the close of the Contest write a letter reporting the best results obtained through the course or through any feature of our course, training or service.

Every student and every graduate is eligible to enter and everyone stands a fair chance to win a prize for this reason—in determining who has been most successful in getting results we are going to consider only definite facts and circumstances you give us. The amount of salary or profits you make, the amount of competition, the difficulty of the job, its interesting side-lights and angles, size of town, general business conditions, amount of experience, education, etc., will all enter into our judgment.

So do not hesitate to enter this Contest because you may think the results you have obtained are not outstanding.

They do not have to be outstanding—but they do have to be RESULTS.

If you have earned any money through our training, done spare time or full time Radio work in any manner, accomplished anything interesting or worthwhile in Radio—and if you can attribute your success in whole or in part to our course, you stand a good chance of winning a prize.

The Contest is divided into several groups to make it easier for you to write your letter and win a prize. Perhaps you can enter in more than one Contest group—you may enter in as many as you feel will be worth while—but only one letter may be entered by one man in each group. I am much more anxious to have every man enter one letter than to have a few men enter several letters because—I give fair warning—I'm going to

size up the results you have obtained from every angle and one real good entry from you will be worth more than two or three hastily written letters.

You know better than I do what results you have obtained as a result of your N. R. I. training, and how you obtained them. You do not realize how delighted I will be—all of us here at the Institute will be—to learn of any results and achievements you can credit to good old N. R. I. And if you win one or more of the prizes, you will be doubly rewarded.

Get busy—decide which Contest group or groups you can make the best showing in and get your entry in. Winning letters will be published from time to time in later issues of the News. You'll see many of your fellow-students' and graduates' names and letters in print—find out how they made good and let them see what you have done with the course.

Remember, this is a RESULTS Contest. Let's hear just what results YOU have obtained.

PRIZES

First Prize.....\$50.00
Second Prize..... 25.00
Third Prize..... 15.00

GROUP PRIZES

GROUP	1	2	3	4	5	6	7
4th Prize....\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10
5th Prize.... 5	5	5	5	5	5	5	5
6th Prize.... 3	3	3	3	3	3	3	3
7th Prize.... 3	3	3	3	3	3	3	3
8th Prize.... 3	3	3	3	3	3	3	3
9th Prize.... 2	2	2	2	2	2	2	2
10th Prize... 2	2	2	2	2	2	2	2
11th Prize... 2	2	2	2	2	2	2	2

SPECIAL PRIZE

\$10

For the most unusual RESULT obtained from a single idea.

CONTEST DIVISIONS

Every student or graduate is eligible to enter one or more of the Result Contest Divisions. These groups have been so divided that everyone has a good chance to win a prize. Decide right now which contest, or contests, you will enter. Then, write your letter, addressed to me, plainly marked "Result Contest, Number 1, Number 2, etc., as the case may be."



NUMBER 1—The largest profit (results) made from any Radio installation or deal, as a result of N. R. I. training. This applies to profits on one particular job—that is, a single installation, sale, service call or Radio deal.

NUMBER 2—The most practical plan for getting spare time work. Explain in your letter what policy or plan made it possible for you to get the largest number of jobs (results). Your letter must state the number of jobs handled and the amount of cash earned.

NUMBER 3—Open to students only. The largest amount of money earned (results) during spare time within three months after enrolling for the course. Simply state the number of jobs you handled and the amount of money earned.

NUMBER 4—Open to graduates only. The largest amount of money earned (results) within three months after graduation in spare time, full time, or salary.

NUMBER 5—The best position secured

(results) as a result of the course. In your letter state the name of your employer, the amount of your salary, and how you landed the job.

NUMBER 6—Most difficult job successfully handled (results) because of knowledge gained from the N. R. I. experimental outfits, Consultation Service, or from any other feature of N. R. I. training. State in your letter the nature of the work done, and the part of the course which directly helped you to do the job, also what you made out of it.

NUMBER 7—Open class. Any special results obtained through the course or any part of our service not falling in one of the divisions already specified. Promotions; high salary; achievement in Radio Engineering; designing; value of our course compared to others by results; unique experience and difficult Radio jobs well handled; success obtained through N. R. I. training which could not have been had otherwise; inventions, etc.

RULES AND REGULATIONS READ CAREFULLY

- Rule 1**—All students and graduates are eligible to enter the contest.
- Rule 2**—The contest will start August 1st, 1930, and will close October 31st, 1930. Entries received after midnight of the latter date will not be eligible for award.
- Rule 3**—Only one letter in each class may be submitted but each contestant may enter in more than one contest.
- Rule 4**—Letters must not be over 200 words long and must be written on one side of the page only. The name, address, and student number must be plainly written on each sheet and the envelope. Facts and figures contained in the letter must be definite and accurate.
- Rule 5**—Entries must be addressed "Mr. J. E. Smith, National Radio Institute," and must be plainly marked "Result Contest." Letters accompanying other letters, lessons, payments, etc., will not be eligible.
- Rule 6**—In the event of a tie, either for the Grand Prize, or any group prizes, the full award will be made to each tying contestant.
- Rule 7**—The Judges for the contest shall be Mr. J. E. Smith, Mr. E. R. Haas, and Mr. J. A. Dowie. The decision of the Judges will be considered final and awards will be made as announced in the National Radio News, as soon as all letters have been judged.

National Radio News

Published monthly in the interest of
N. R. I. students and graduates, by the
NATIONAL RADIO INSTITUTE

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J. E. SMITH, Publisher. E. R. HAAS, Editor.

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NATIONAL RADIO INSTITUTE

Washington, D. C. August, 1930



E. R. HAAS

The Little Bit More

There's a story told about President Garfield.

A fellow classmate earned higher grades regularly in school. Young Garfield couldn't understand this because he knew the other fellow was no brighter than he.

One night after Garfield had quit studying and put out the light, he happened to glance across the street at his rival's house. A lamp was burning in the other fellow's room.

Garfield watched this light for some time—until it was turned down. Then he understood why the other student was earning higher grades. The extra few minutes his classmate studied was the "little bit more" necessary to make him a winner. You can bet your life from that night on, Garfield saw to it that his light was the last to be turned off.

This "little bit more" carried him to the White House.

It's the "little bit more" that separates the champion from the crowd. It's the "little bit more" that determines the successes and the failures. It was the extra time Thomas Edison studied while "hawking" magazines on the trains that equipped him to become the world's foremost inventor. It was the extra study, after long hours splitting rails, that took Abraham Lincoln from the farm to the Presidency.

It's the "little bit more" YOU do today which will decide your fate a year, two years, or ten years from now. Do as much as the next fellow and the future will find you side by side; do less, and you will fall behind. Do MORE—the "little bit more"—and your dust will sting his eyes.

If you give one hour a day to your Radio lessons, do the "little bit more"—study an hour and a quarter. An additional fifteen minutes is not much yet it will bring you twenty-five per cent more knowledge than you would have had if you only studied the regular hour.

Remember—the "little bit more" you do is your margin of profit over the other fellow. You can put yourself as far in the lead of your competitors as you wish—your distance ahead will be measured by the "little bit more" you do.

E. R. HAAS,
Vice-President and Director.

HELP!
"WHERE is my NEWS?" wrote an INDIGNANT grad. I CHECKED up and FOUND that his NEWS was HERE, RETURNED by the POSTMASTER marked "MOVED, NO ADDRESS" MORAL—when you MOVE SEND YOUR NEW address. Then, YOU'LL get your NEWS EVERY MONTH. —Editor.

N. R. I. ALUMNI NEWS

September 1, 1930, will mark the birth of the N. R. I. Alumni News—the official organ of the Alumni Association. This paper will be published by the Alumni Association, edited by its members and maintained by its own treasury.

The Alumni News will be the first publication of its kind that I know of—a paper published by and for the interests of the Alumni Association of a Home-Study School.

We want contributions for the first issue from association members. Address all communications relative to the Alumni News to the writer at Room 301, 1405 You Street, N. W., Washington, D. C.

EARL MERRYMAN, Secretary,
N. R. I. Alumni Association.

WHERE DO YOU BUY RADIO PARTS?

Many students, particularly those who have recently enrolled, wish to be able to buy Radio parts for experimental and other purposes but cannot obtain these items reasonably priced in their own locality. These fellows have to buy this material from Mail Order Houses.

N. R. I. men who have had good service from any Mail Order Radio House, can help their fellow N. R. I. men by sending the names and addresses of these Companies to us. While the Institute cannot make a practice of recommending individual Radio concerns, our students and graduates have that privilege and we will be glad to pass your recommendation along to your fellow N. R. I. men. Send the names of the firms with which you prefer to do business to Mr. Hudiburg, Assistant Editor of the News.

J. E. SMITH.

N. R. I. SERVICE MANUAL

ON

Steinite Screen-Grid Chassis No. 10 Used in Models 70, 80 and 95

Tubes used in this receiver are 3—224, 1—227, 2—245 and 1—280. The schematic wiring diagram is shown in 51 and figure 2 shows the location of the various parts on the chassis.

Tests for Locating Trouble in Steinite Receivers

Assuming that all voltages are correct, place voltmeter terminals between the plate terminal of detector socket (72) and ground of Figure 2. A click will be heard in the speaker if the circuit is OK from the detector plate to the speaker. If a test shows this portion of the circuit OK, place voltmeter between the plate terminal of 3rd R.F. socket (83) (socket adjacent to detector socket) and ground, if a click is heard, the circuit is correct between, the plate of the 3rd R.F. stage and ground. If no click is heard, the trouble lies between the plate of the 3rd R.F. stage and the detector plate. This trouble will then be located in the aligning condenser of the detector stage, open or grounded detector grid coil, or the detector tuning condenser shorted.

If the circuit is found to be operating properly from the 3rd R.F. stage to the speaker, the voltmeter terminals should next be placed between the plate terminal of the 2nd R.F. socket (82) and ground. If the circuit is OK, a click will be heard. If there is no click the trouble is between the plate of the 2nd R.F. stage and the plate of the 3rd R.F. stage. The difficulty will be found in the aligning condenser of the 3rd R.F. stage, open or grounded grid coil, or tuning condenser short circuited.

If the circuit is found correct up to this point, a similar test should be made by connecting the voltmeter to the plate terminal of the 1st R.F. socket (81) and ground. If no click is heard, it indicates trouble between the plate of the 1st R.F. stage and the plate of the 2nd R.F. stage and the difficulty will be found either in the aligning condenser, shorted gang condenser, or open or grounded grid coil.

If these tests have been made and the circuit found correct up to this point, the trouble is between the antenna connection and the plate of the 1st R.F. stage.

The antenna circuit should be tested for continuity as outlined, and the first gang condenser tested for a short circuit.

If tests are made in this manner the source of trouble can be traced to some definite portion of the circuit, and the remedy made without going through the entire circuit.

Method of Aligning Condensers

The aligning condensers are mounted on the shield directly back of the screen-grid tubes and are reached through three small holes in the tube shield cover, which must be in place during aligning operations. First production was equipped with machine screws in the aligning condensers and it will be necessary to use a long shaft screw-driver or a bakelite rod with a screw-driver head in aligning these sets. Later production has a hexagon head screw that can be turned with the balancing wrench as furnished for the Model 40 and 50. It will be necessary to cut the head off the 40 balancing wrench and insert a bakelite or other insulating rod of sufficient length to extend through the tube shield, in the head of the wrench. With the oscillator set to an intermediate frequency (about 750 K.C.) adjust the aligning condenser nearest the detector tube until maximum reading is obtained on the resonance indicating device. Repeat this procedure with the second and third aligning condensers. These settings are very critical and the operation should be repeated until sure that the condensers are accurately aligned.

Continuity Tests

The continuity of the various circuits of the receiver can be tested by the use of the ordinary voltmeter and B battery. In conducting this test reference should be made to figure 2 which shows the location of the various numbers given in the following paragraphs.

A. C. Supply Circuit

1 to 3; 2 to 8; 9 to 5; 10 to 6; 4 to 7; or from 1 and 2 (outlet plug terminals) with off-on switch closed, switching hi-low switch to both positions, this gives

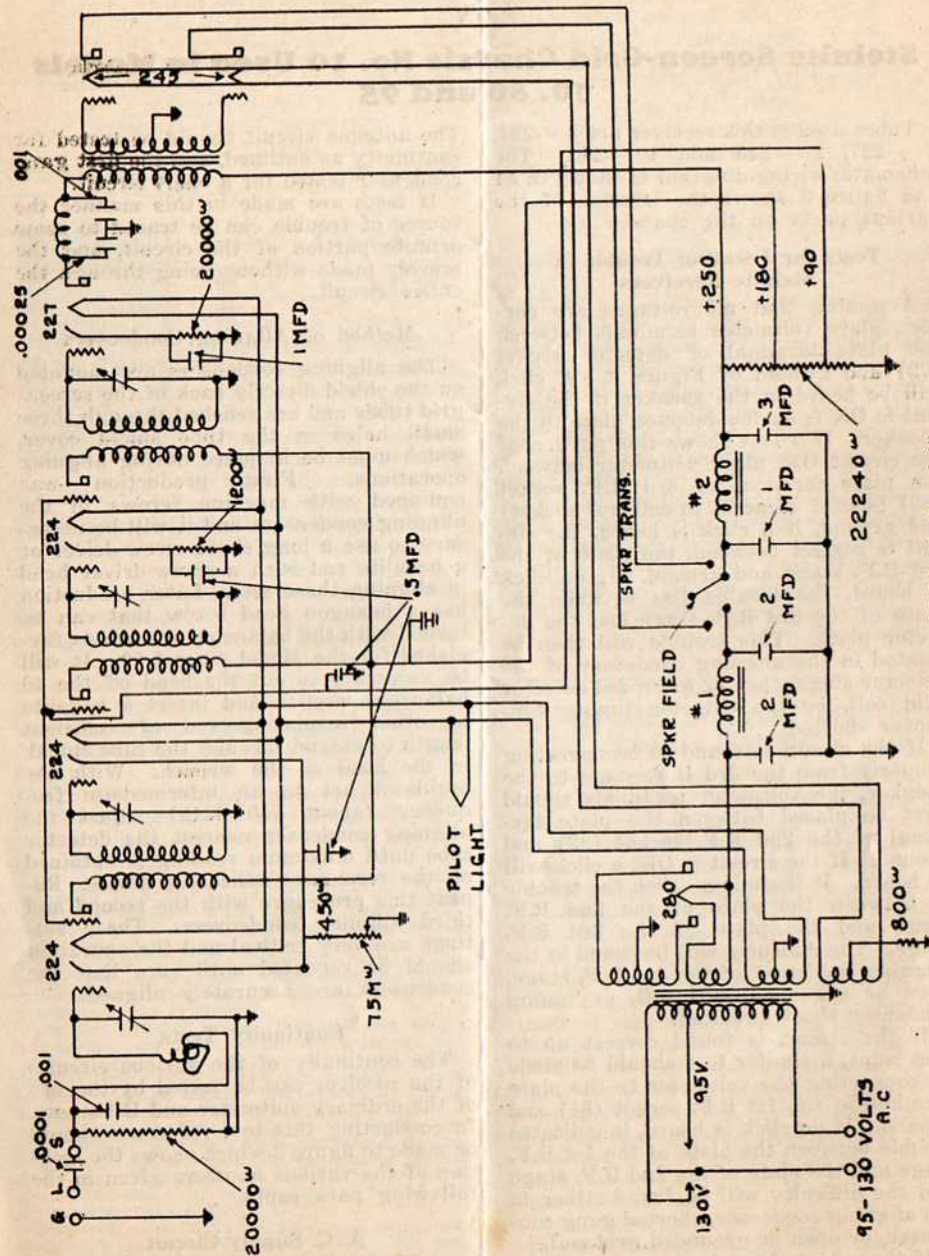


Fig. 1—Wiring Diagram Models 70, 80 and 85.

a complete test of transformer primary.

224 and 227 Fil. Circuits

18 to 19, 20, 21 and 22; 24 to 25, 26, 27 and 28.

Dial Light Circuit

23 to 25; 29 to 19.

Rectifier Fil. Circuit

30 to 31; 32 to 33.

Rectifier Plate Circuit

43 to 44; 45 to 46.

Plate Supply Through Filter Circuit

32 to 47; 47 to 48 (350 ohms); 48 to 49; 49 to 50 (1000 ohms with speaker plugged in); 50 and 51; 51 and 52; 52 and 53 (700 ohms).

245 Fil. Circuit

37 to 38 and 39; 34 to 35 and 36.

245 Plate Circuit

51 to green cord on speaker output transformer. 58 to yellow cord on speaker output transformer. 60 to brown cord on speaker output transformer. 58 to 59; 60 to 61.

245 Grid Circuit

40 to 41; 41 to 42 or ground (800 ohms); 62 to 63; 63 to 66 (7000 ohms); 66 to 67 or ground; 64 to 65; 65 to 66 (7000 ohms).

Det. Plate Circuit

53 to 54; 54 to 68; 68 to 69 (1700 ohms); 69 to 70; 70 to 71; 71 to 72.

R.F. (224) Plate Circuit

73 to 74; 74 to 75; 76 and 77; 77 to 78; 75 to 79; 76 to 80; 78 to 81; 79 to 82; 80 to 83.

Screen-Grid Circuit

84 to 85; 85 to 86, 87 and 88; 85 to ground (10500 ohms). If full reading obtained .5 by-pass condenser is shorted.

1st and 2nd R.F. Cathode Circuit

(Volume Control.) 91 to 89 and 90; 91 to 92; 92 to 93 (volume maximum); 92 to 93 (75,000 ohms volume minimum); 93 to ground (450 ohms).

If no resistance shown .5 by-pass condenser is shorted. If no reading resistors are open.

3rd R.F. Cathode Circuit

94 to 95; 95 to ground (1200 ohms). If no resistance shown .5 mfd. by-pass

condenser is shorted. If no reading resistor is open.

Detector Cathode Circuit

96 to 97; 97 to ground (20,000 ohms). If no resistance shown .1 mfd. by-pass condenser is shorted. If no reading resistor is open.

Antenna Circuit

11 to 13; 13 to 14; 14 to 17 (20,000 ohms). If no resistance shown .001 condenser is shorted. If no reading resistor is open; 17 to ground; 14 to 15; 15 to 16; 16 to first stator of gang condenser.

Voltage Dividing Resistor

54 to 73 (2440 ohms); 73 to 84 (9500 ohms); 84 to 56 or ground (10500 ohms).

An accurate ohmmeter will enable the Radio-Trician to determine the exact condition of the circuit with the greatest degree of accuracy.

A modulated oscillator such as described in the N. R. I. Service Manual on "Servicing A. C. Receivers" should be used in aligning the variable condensers.

Voltage Readings

These readings should be taken with a good high resistance voltmeter having a resistance of approximately 1,000 ohms per volt. The readings obtained should be approximately the same as the readings given below which were taken from the A.C. line voltage which was 115 volts.

- 47 to ground 360 volts.
- 48 to ground 340 volts.
- 51 to ground 270 volts.
- 38 to 59 225 volts 245 plate.
- 39 to 61 225 volts 245 plate.
- 38 to 62 45 volts 245 grid bias.
- 39 to 64 45 volts 245 grid bias.
- 25 to 19
- 26 to 20
- 27 to 21
- 28 to 22
- 38 to 35
- 36 to 39

2.2 volts filament.

- 31 to 33 4½ volts rectifier filament.
- 85 to ground 90 volts (screen grid).
- 74 to ground 180 volts (R.F. plate).
- 72 to ground 240 volts (det. plate).
- 96 to ground 25 volts (det. bias).
- 91 to ground —3 volts vol. max. —11 volts vol. min.
- 95 to ground —3½ volts vol. max.

The speaker must be plugged in while taking these readings. Volume control at maximum except when otherwise specified.

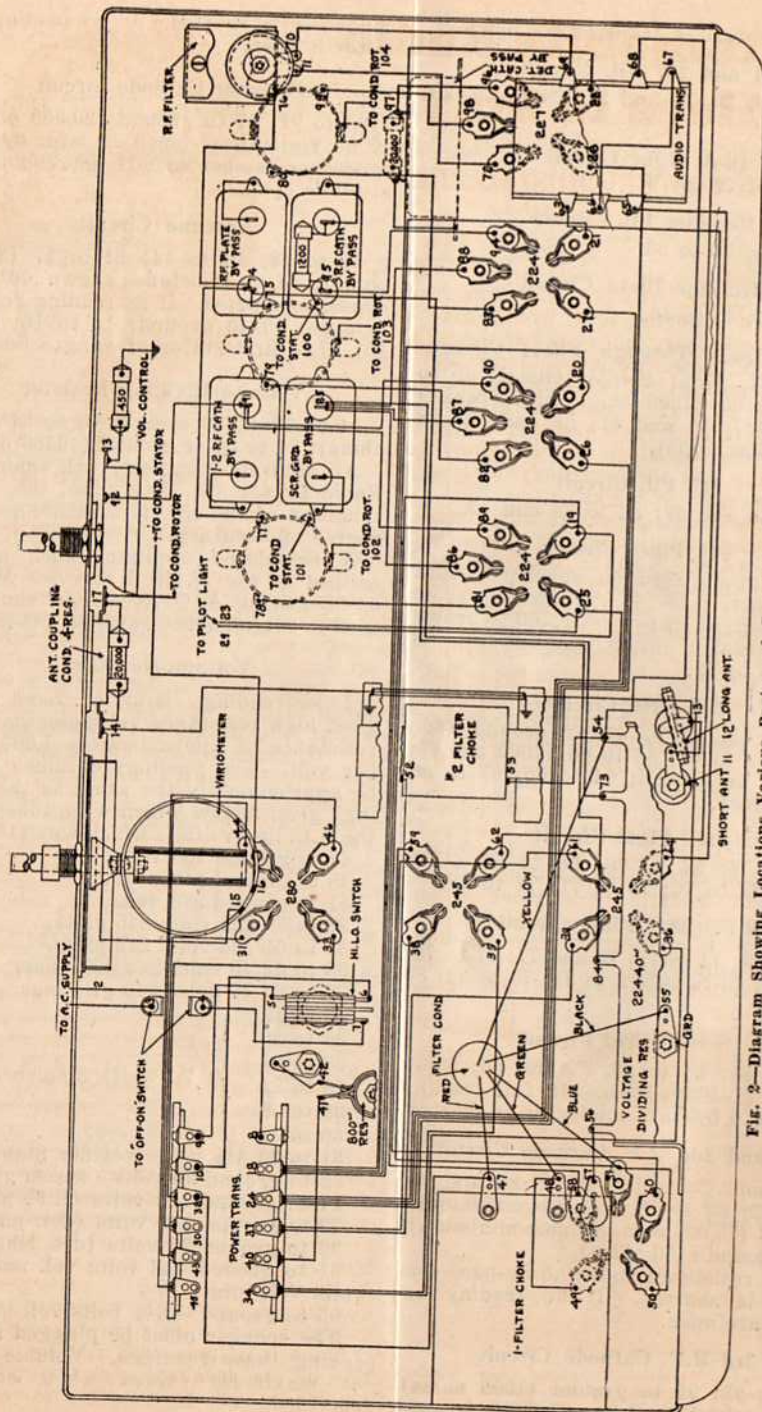


Fig. 2.—Diagram Showing Locations Various Parts and Connections Models 70, 80 and 90.

Automobile Radio Here to Stay

By POWEL CROSLEY, JR.



POWEL CROSLEY, JR.

Think what the automobile Radio would mean to the man starting out alone on a long business trip; what added enjoyment it would give to a ride through the country on a summer evening; what a new thrill of ownership it would create in the owner of a car regardless of whether he has purchased a new model or had it installed in his old car.

For some time I have had a Radio in my car and find when driving alone the programs help to prevent fatigue and the monotony of long trips, especially at night.

The Radio does not require any attention and consequently does not add to the hazard of driving. It really works just the other way and keeps my mind off business, enabling me to attend to the job of driving and to enjoy the ride.

In installing an automobile Radio one usually begins with the antenna or aerial. This is an arrangement of wire or screen in the roof of the car and is necessary for intercepting the Radio messages. A number of cars are now equipped with aerials at the factory.

Of closed cars not so equipped, quite a number are constructed with the roof covering supported on wire chicken netting. Unless this chicken netting is connected to the metal body or frame of the car, it may be used as the antenna. An insulated wire is soldered to the chicken netting at the right-hand front corner and carried down inside or by the right-

hand windshield post to the receiver beneath the cowl.

If no aerial has been installed at the factory, or if the roof is not supported by chicken wire, a small wire or screen antenna may be used. In closed cars this can consist of a section of copper screen (the kind used for screening a house) tacked to the roof bows inside the roof, so that it is hidden by the cloth head lining. The proper size of screen to use varies with the car. The Crosley Roamio installation pictured on the next page uses a screen about 2 by 3 feet.

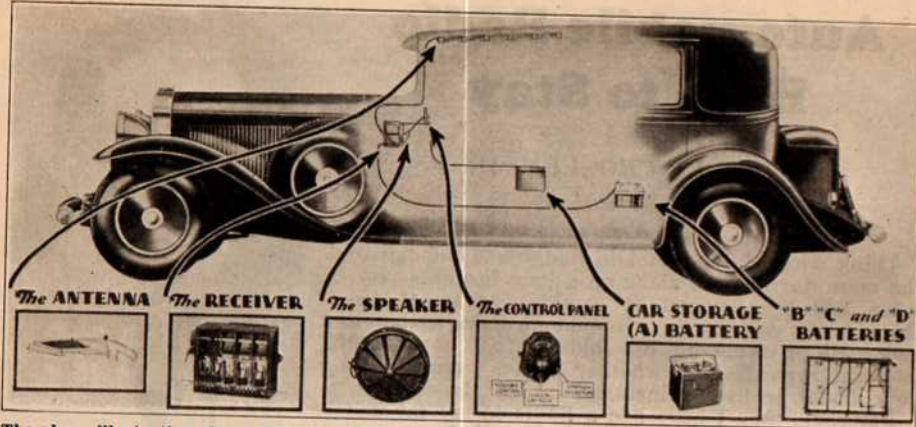
Installing an antenna in the roof of an open car presents a somewhat different problem, because the antenna must not interfere with the collapsing of the roof. A flexible, insulated wire attached to a piece of drill cloth serves admirably for this purpose. The wire is run back and forth across the drill cloth in grid fashion. The top is removed and the drill cloth is stretched over a false head lining and tacked to the end bows. When the top is replaced the antenna is entirely concealed. The lead-in wire is taken from the back, and is run down underneath the chassis to the position of the receiver in the front of the car.

Many different locations have been suggested for the receiver itself, but the preferred one seems to be on the engine bulkhead, just below the cowl. There it is out of the way, and in convenient position for adjustment by means of controls mounted on the instrument panel.

There is no universal rule for the location of the speaker. Some installations are made with the speaker in the back



"It's great — Wonderful!" says Viola Dana, famous movie actress, as she listens to her Roamio Automobile Radio for the first time.



The above illustration shows how the Crosley Roamio Automobile Radio Receiving Set is installed in a car. While the job of installation is comparatively easy, it should be done by one who knows Radio.

of the car; some with it suspended from the roof bows just above the back of the driver's seat. In modern, low-built cars, however, it seems to be advisable to locate the receiver so that it is as inconspicuous and out of the way as possible. In the Roamio installation the speaker is carried on the receiver case, beneath the cowl.

Automobile receivers are operated by batteries. The car storage battery is used for the "A" supply, but in addition there must be dry batteries for the "B" and "C" supply. A battery box, sunk in the floor boards of the rear of the car, is ordinarily used for carrying the batteries; although they are frequently packed below the driver's seat, in a rear compartment, or in some other out-of-the-way location.

Tuning is accomplished from a panel easily attached to the instrument board. Volume may also be regulated at will by turning a dial. The automatic volume control keeps the program at a constant level while the car is being driven from place to place.

Radio manufacturers have found it best to provide a switch of the lock type, operated by a key.

One of the most important factors which must be considered in the installation of automobile Radios is the elimination of interference from the ignition system and other electrical circuits of the car. This must be done in a thorough manner, so that reception is quiet while the car is being driven.

There are several methods of eliminating interference. The usual practice is to install an eliminator unit on the

generator and on the starting motor. In addition, eliminators may be required at the starter switch, and on other electrical devices, such as horns or windshield wipers.

Interference from the spark plug and distributor leads is eliminated by installing small suppressors in the spark plug leads at the plugs and in the center distributor leads at the distributor heads. This is not necessary on some cars in which the ignition wiring and plugs are partially shielded by grounded metal coverings.

The elimination of interference from the automobile electrical system is more or less a special job for each different type of car. Both the Radio and the automobile manufacturer have studied this problem thoroughly, however, with the result that standard, practical methods of elimination have been worked out for each different make of car. In fact, some automobile manufacturers are taking care of this matter by special design and construction, which makes interference elimination by the Radio installer unnecessary.

We believe millions of car owners will want the automobile Radio as soon as they have had it demonstrated to them and can appreciate its many advantages. Radio dealers will find the sale and installation of automobile receiving sets opens a profitable new field. In practically every case either the Radio or automotive dealer will be required to install the Radio. While the task is not difficult, it should be done by "someone who knows how." The dealer who operates a good installation service department seems assured of plenty of profitable business for some time to come. In some cases Radio dealers are planning to provide their own department for this work, while others are making arrangements with automotive service stations to do the actual installation under the direction of a Radio man.

Rubbernecking at the R. M. A. Show

By JOSEPH KAUFFMAN
(Chief Consultant)



The 1930 Fall Radio season officially opened in June when more than 30,000 representatives of the Radio Industry gathered in Atlantic City to view millions of dollars worth of new Radio equipment displayed by leading manufacturers. The monstrous floor of Atlantic City's new \$15,000,000 civic auditorium was crowded with exhibitors, showing everything from automatic time switches to turn a receiver off and on, to elaborate public address systems.

This year's R. M. A. show clearly shows that Radio is entering into one of its biggest years. The Industry is on a firm basis and manufacturers are following policies which will mean more money to distributors, dealers, salesmen and servicemen. Likewise, the showing of new receivers, accessories, etc., presented so many new features that it is evident the public will begin buying just as soon as the new equipment is offered for general sale.

New selling points for receivers are based on engineering refinements. Most of the new receivers are more sensitive and more selective and have greater fidelity of tone reproduction. More sets are equipped for automatic regulation of volume and for remote control of tuning as well as control of tone value.

There is a decided change in Radio furniture. Real artistry is displayed in the new cabinets. There is a tendency toward smaller and less expensive sets—several manufacturers, indeed, introducing midget receivers designed to sell under \$100, with tubes. Another manufacturer com-

bines a short-wave and long-wave receiver in one cabinet.

The Power Pentode Tube was shown, which produces 2½ watts of undistorted output, with an amplification factor of 55. Three new battery tubes were introduced which promise a more efficient receiver for the farmer and for the home without A. C. current.

Automobile Radios are fast coming into use. Manufacturers claim sales by the thousands. Public address systems were also much in evidence, which reminds me that fellows who are not working in this field are overlooking a good "bet." Manufacturers are turning their eyes toward these two new branches of the industry; Radio-Tricians who follow this trend will find some mighty profitable jobs.

What seemed to me the most important observation I made at the show was the attitude of the manufacturers' service managers towards Home-study trained men. The service managers of New York City realize the need for thoroughly trained men for service work. They advocate examinations for service men which are graded "AA," "A," "B."

A grade of 90% is necessary for the first rating, 75% for the second, and 60% for the third. Experience is essential to get to "AA" rating, but the minimum wage paid to those who have it is \$60 a week and these men are eligible to become service managers. Such examinations as these will mean that men with thorough knowledge will get the good jobs while the "half-baked," so-called experts will be pushed out of the picture.

Another group of managers—the Service Manager's Division of the RMA—asked me to address their meeting on the methods and aims of home study schools, as they wanted to know more about the ability of our graduates. They

think home study training is a great thing and feel that Radio-Tricians who wish to make a success as service men should study diligently.

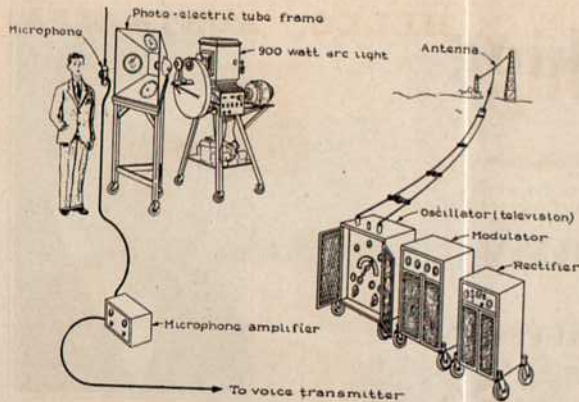
I could go on for hours describing the many new developments that have been made in Radio, but since all new information will be in the course, where you fellows will get it anyway, I am just going to sum up my entire observations of the RMA show into six words: "RADIO HAS A BIG YEAR AHEAD."

\$ ————— \$

Mr. Kauffman's statement, "Radio has a big year ahead," should put every N. R. I. man "on his toes." Wide experience as a manufacturer plus keen merchandising foresight qualifies Chief Consultant Kauffman to accurately predict the big business yet to come in 1930.

\$ ————— \$

J. E. S.



Drawing showing equipment required to transmit television images.

NOW — LIFE-SIZE

TELEVISION IMAGES

(Continued from page 3)

four sensitive photo cells. Through a small opening in the box little pin points of light are played over the performer's face and shoulders. This is accomplished by a common metal scanning disc about the size of a bicycle wheel and drilled with forty-eight holes. This revolving disc covers the complete subject twenty times per second; that is, there are twenty complete pictures made up of light and shade. The four photo-electric cells which are sensitive to light respond 40,000 times per second to impulses reflected back from the subject. These light impulses reflected from the face of the performer are then converted into electrical impulses or radio signals, passed into a powerful amplifier and then finally sent out by a transmitter on a wave-length of 140 meters. A microphone placed close to the artist picked up his speech or song, and converted the sound into electrical impulses which was carried by wire to a short wave transmitter at South Schenectady from which point they went on the air on a wave-length of 92 meters.

Receiving Equipment

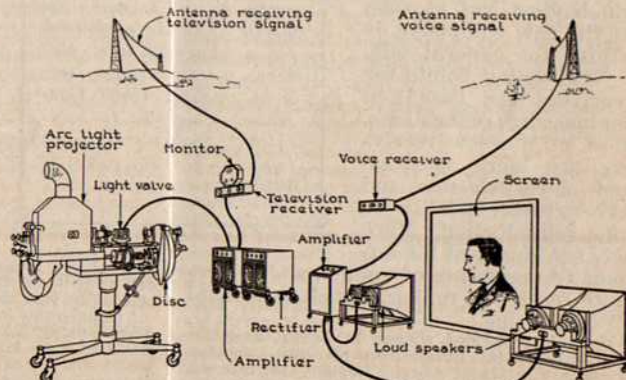
At the theatre the control operator received the picture or light impulses, reproduced them on a small monitor and

television receiver, and then transferred these impulses to a light valve at which point the light was broken up to produce an image corresponding in every detail to the subject at the studio. The light valve is in the middle of an intricate lens system, in front of a high intensity arc lamp of a type similar to those used for the projection of motion pictures.

The light valve operates delicately and accurately to permit the passage of light in correspondence to the impulses received from the Television transmitter. These light emissions are passed on through lens to a disc corresponding in size, number of holes and rate of rotation, to the scanning disc at the camera at the Television transmitter. Additional lens pass the light forward to the screen where these light impulses, at the rate of 40,000 per second, becomes the living, active image of the subject.

The Television projector made up of the arc lamp, with the lens system and the light valve, is placed seventeen feet in the rear of the screen. All the elements in the system, including projector, amplifier, and loud-speakers are mounted on wheels to permit assembling and disassembling when used as part of a vaudeville program. A second receiver picked up the sound signal and fed it into loud-speakers which converted the electromagnetic waves into sound.

The success of this demonstration shows the future possibilities for new inventions in this art of Television for the theatre and home use, and it can be expected that we will soon see a wave of real activity in commercial and amateur Television.



Drawing showing equipment required to reproduce television images (transmitted by Radio) on a screen six feet square.



Dear Mr. Smith: "I bought two Radios for next to nothing. I sold one for \$65.00 and figured \$40.00 profit. Another was a nine-tube Airline—\$50.00 profit on this. I owe it all to you and believe me, N. R. I. are three letters in the alphabet that I cherish above all." Tom Cally, 429 West 3rd South, Salt Lake City, Utah.

Dear Mr. Smith: "I have been doing service work for two years, but still I didn't 'know what it was all about.' Now the jobs that used to worry me for hours I do in a very few minutes. I have accomplished more in a few weeks with your training than in two years plugging along in the old way. N. R. I. training has the 'go' on anything I have ever seen." Howard Hicks, 730 Walnut Street, Lawrence, Kansas.

Dear Mr. Smith: "You have the only system and I am more than pleased that I took up the course. I regret that I was not fortunate enough to have found it ten years ago." P. I. Murvin, 4101 Alhambra Avenue, Los Angeles, California.

Dear Mr. Smith: "I have a lot of spare time work which has made me from \$15.00 to \$50.00 a month. I have more than I can handle at times." Harry Wheeler, Frederic, Wisconsin.

Dear Mr. Smith: "The business cards you sent gave me very good results. I made \$100.00 in six weeks' time erecting aerials, repairing and rebuilding sets." Lee Himmelberger, 105 South 5th Avenue, West Reading, Pa.

Dear Mr. Smith: "I sold a Scott A. C. Nine for \$484.00, making \$225.00 on this sale, and a Scott A. C. Ten for \$381.00, profit of \$177.00 on that sale. Profit to date—\$402.00." Arthur M. Marshall, 6514 Rhodes Ave., Chicago, Ill.

Dear Mr. Smith: "The instructions, work sheets and the latest 'dope' you continue to send would make a Radio-Trician out of an Indian cigar sign. I am now doing work for dealers as well as my own calls in a town of 2,300. Anyone that cannot learn via your method of teaching belongs in the shovel gang for life." C. A. Conklin, Madrid, Iowa.

Dear Mr. Smith: "I have a job already—doing service work in the Radio Department of a store here. The fact that I am taking your course got me the job." Ned Ussher, 917 Rose Road, Miami, Arizona.

Dear Mr. Smith: "Since you sent me the business cards I have done all kinds of Radio work. I am making more money than I ever made before. In three months I have made over \$800.00 net profit. I owe all of my success to the National Radio Institute." B. Costa, Box 83, Station G, Brooklyn, New York.

HELLO, AUSTRALIA!



Major Kingsford-Smith, famed commander of the Southern Cross and conqueror of the Atlantic, talked to his mother, in far away Australia, via Radiotelephone from Station WGY, Schenectady, New York, immediately after completing his successful East-to-West Trans-Atlantic flight.

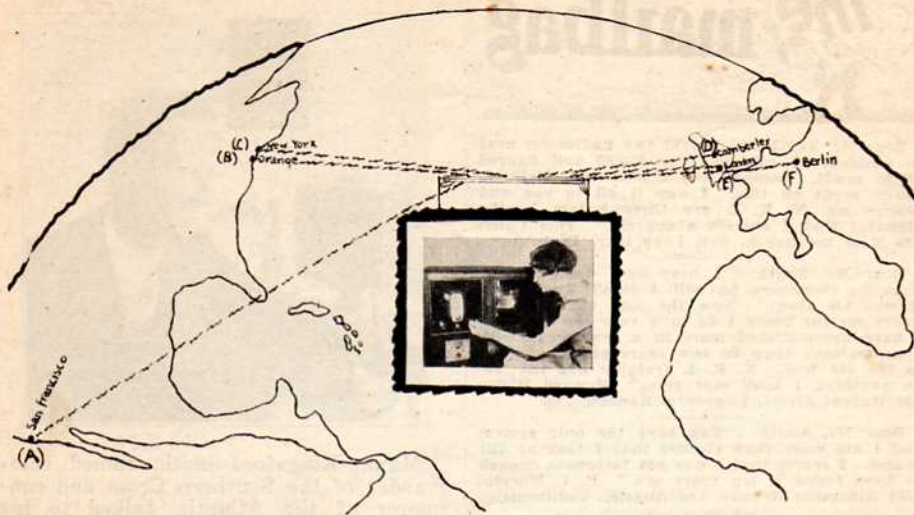
Radio not only made it possible for the Major himself to give the glad tidings of his safe landing to his mother; it played a vital role during the entire flight. Constant communication was maintained with ship and shore stations, thus greatly reducing the hazards of over-sea flying. Weather reports, picked up by the Southern Cross, enabled her daring Commander to avoid dangerous areas; directional beacon signals kept the big ship on its course.

Major Kingsford-Smith recently stated that he believed regular trans-oceanic flying would soon be put on a regular commercial schedule, cutting in half the "time distance" between Europe and the United States. Of course, this will mean that Radio will play a major part as the safety of trans-Atlantic passengers will depend, to a great extent, upon constant communication being maintained with Radio stations on both ship and shore.

Radio is the eyes and ears of Aviation. As the latter industry develops—it's doing so now by leaps and bounds—many Radio-Tricians will be needed. Radio-Aviation is a fascinating, profitable field. Already N. R. I. men are holding responsible positions with Airports, Beacon Stations and Aircraft Manufacturers. Many more will win fame and fortune when they begin to realize the great opportunities for Radio trained men in Aviation.

★ A few more weeks to earn extra bonuses in the Summer Contest. Talk to a friend tonight about N. R. I. training. Get him to enroll before August 16th. Or—send me your friends' names—I'll help you get them started before the Contest closes. ★
J. E. S. ★

Radio Unites NELA and World Power Conventions Held 5,000 Miles Apart



How the big hook-up worked. The program started at San Francisco (A); switched to Berlin (F); then, to Camberley, England (D); back to Berlin (F); next to London (E); again back to San Francisco (A); ending up at West Orange, N. J. (B), N. B. C. headquarters in New York (C), broadcasted through Stations WJZ and WEAJ.

The most elaborate broadcast ever planned, from the standpoint of engineering magnitude and the importance of the persons heard, was made recently by NBC, when six speakers from widely separated points in three different countries addressed the World's Power Conference in Berlin and the National Electric Light Association Convention in San Francisco.

NELA executives addressed the World Power Conference in Berlin and the leaders of the Berlin conference in turn addressed the NELA Convention in San Francisco. Thomas A. Edison spoke from his library in West Orange, New Jersey; Lord Derby, from Camberley, England; Senatore Guglielmo Marconi, from London; Owen D. Young, chairman of the Board of the General Electric Company and Mathew Sloan, president of NELA, from San Francisco; Dr. Karl Koettgen and Dr. Oskar Von Miller, from Berlin. All speakers were heard through the medium of the special international network and the entire world was able to listen in on all proceedings of both conventions.

The gigantic communications systems, planned and engineered by the American Telephone and Telegraph Company and N. B. C. in cooperation with foreign

communications groups, were made up of five separate units. The combined network of N.B.C. formed one unit and delivered the unusual program to American radio listeners. Five short wave transmitters—W3XAL, at Bound Brook, N. J.; W2XK and W2XAD, at Schenectady, N. Y.; W8XK, at Pittsburgh, Pa.; W6XN, at Oakland, California—comprised a second unit, sending the program on short waves to all parts of the world. A third unit was made up of special wire lines in the United States which linked San Francisco with West Orange, New Jersey, and connected with Radio channels to England and with the N.B.C. network. Radio channels between the United States and England were the fourth unit. A special European pick-up network which linked the British Broadcasting Studios in London, with Camberley, the Sports Palace in Berlin, scene of the World's Power Conference, and the trans-Atlantic Radio channels, were the fifth unit.

Hundreds of engineers of N.B.C., A. T. & T., and foreign communications companies were kept busy by the intricate machinery set up for the broadcast. This amazing hook-up opened up new channels for Radio development which, in turn, will require many more trained Radio men to carry on future programs of international importance.