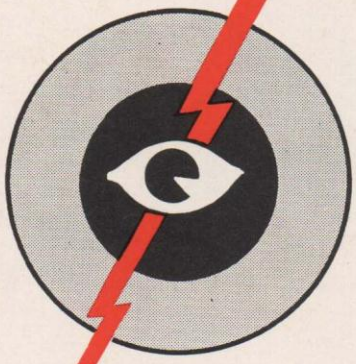
# UNITED RADIO —TELEVISION INSTITUTE, INC.

106 HALSEY STREET, NEWARK, N. J.

# UNITED RADIO —TELEVISION INSTITUTE, INC.



PRACTICAL TRAINING
IN
TELEVISION
RADIO
ELECTRONICS

106 HALSEY ST., NEWARK, N. J.

# R. L. DUNCAN . . . as others know him

by

Fred R. Bristow

Those who have traveled along the friendly road of passing years with R. L. Duncan are of one accord in saying that "R.L.", as he is known to many of us in the radio profession, is an outstanding example of a man who has made friendship and business go hand in hand . . . business is friendship with him. No day ever passes without an added measurement of his cordial, unselfish thoughtfulness and consideration. He needs no introduction to the Radio field, and to those who do not know him intimately I can say nothing more appropriate than to quote what a leading radio publication had to say about him in 1924 — more than sixteen years ago:

> "Today he is one of the best known men in the Radio field. Behind his rapid rise there is, as in every such case, a reason. Those who have met Duncan will say that his manner, pleasing personality and keen business sense are the principle reasons for his success. Intimate friends who enjoy his confidence refer to his ardent ambition, and his everlasting energy which keeps him plugging and forging ahead. Hundreds of young fellows to whom he has been counselor, adviser and friend, point to his real character as a man, none being better able to judge than the students who place themselves in his care. He sees good points in every fellow who comes to him and takes a sincere interest that never swerves. In all he is a square shooter . . . and that means much".

R. L. Duncan is a member of the Institute of Radio Engineers, American Institute of Electrical Engineers, American Academy of Air Law, Committee on Governmental Regulation and Control, Veteran Wireless Operator's Association, and a Major, SCR, United States Army. He is an outstanding author and co-author of many standard texts which are used by government, public and private schools throughout the United States. He participated in the erection of the second broadcasting station in America — WJY — which broadcast the blow-by-blow description of the Dempsey-Carpentier fight on July 2, 1921.

## UNITED RADIO-TELEVISION INSTITUTE, INC.

### ITS AIMS AND IDEALS

THE aims and ideals put forth in the paragraphs below were formulated by me more than twenty years ago. Continual progress in the direction indicated strengthens my faith in their soundness . . . and they remain a very satisfactory statement of present aims and ideals. I am repeating them here, with a confident feeling that a thorough reading of this booklet, combined with the experiences of the thousands of *men* and *young men* who have been trained by me and under my direct supervision, will serve to demonstrate their practical value.

**FIRST:** To conduct training that is practical, modern and up-to-date in every respect.

**SECOND:** To keep pace with developments in the industry so that each student will be instructed accordingly.

**THIRD:** To consider that the enrollment of a student is mutually beneficial only when that student is trained so as to enable him to serve the industry in a thorough and reliable manner.

**FOURTH:** To conduct the Institute for these purposes only . . .

*Training — Instruction — Service*

Behind the foregoing aims and ideals is the resolute purpose to render the most useful and satisfactory service practicable to the Radio and Television industry whose requirements make possible the stability of this Institute.

M. L. Duncan
President

## DEVELOPMENT OF

## THE RADIO AND TELEVISION INDUSTRY

No other industry or art can boast of the rapid growth and development as that of Radio and Television. Just a few short years ago Radio was a laboratory phenomenon called "Wireless". Today, more than 30,000,000 radio receivers are in use in this country alone. Radio, in all its branches, has now become one of our major industries; providing employment for thousands of men, furnishing amusement and educational opportunity for millions of people. We are now witnessing the beginning of a still more important, and more spectacular phase of this development. Television is no longer a scientist's dream . . . it is now a practical reality. These twin fields — Radio and Television — now offer unlimited opportunities to thousands of men . . . opportunities which cannot be denied those who are willing to prepare themselves for this broad field of work.

## TELEVISION

Television is the most remarkable accomplishment to come from the brain of science and the tireless research of the experimenter. Its future promises to be the most dramatic of any in history.

**Testing the circuits of a Television receiver. Training is required to obtain a thorough working knowledge of how to efficiently use delicate instruments.**

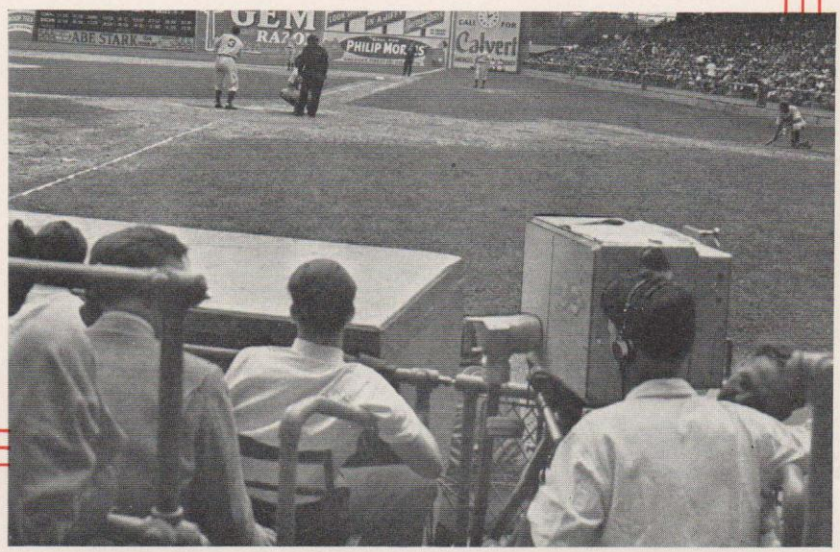
*... Page 4*

The beginning of Television cannot be established from any particular date, place, or person. On the whole it represents a gradual step-by-step advance over many years. It was not until recently that the vast accumulation of experience and knowledge began to take tangible form. Thus, from the discovery of the speed of light, of selenium, of photography, the Geissler and Crooks tubes, the scanning disc, photoelectric cells, Deforest three-element tube, sound movies, the work of Farnsworth, Jenkins, Baird, Preece, and the iconoscope of Zworykin . . . from these many sources sprang Television. This uninterrupted sequence of Television developments today brings us to the threshold of unlimited opportunities in this epoch making field.

And so . . . though much has been accomplished in the past, still greater and more abundant opportunities await those who are willing to prepare themselves for a position in this vital new industry.

## MARINE RADIO

Just the other day, it seems, Radio was still in the experimental stage; the dream of inventive minds and thinkers in the laboratories of the world. Suddenly it became a reality, and then the march of progress began. Thrust first upon the world as a life-saving device for the mariner, and as a means of communication at sea, it quickly became an instrument of necessity. The nations of the world soon




**A Telecast of one of the Brooklyn-Cincinnati baseball games by the NBC. Many outdoor activities are now being televised.**

*... Page 5*

made it a requirement on vessels sailing the seven seas. Radio . . . or Wireless, as it was then known . . . had come to stay. The world accepted it as a fact, and promptly decided that the end of development in Radio had been reached.

## RADIO BROADCASTING

Then . . . another startling announcement! Radio Telephony was an established fact . . . stations were transmitting the human voice and entertainment through space! And more astounding — a new industry was born over-night! Hundreds of broadcasting stations soon went into operation and the demand for radio receiving sets was greater than anything the world had yet seen. Thousands of people gained immediate employment but the lack of trained men greatly impeded the progress of the industry. Demand was far greater than supply.

## RADIO MANUFACTURING

Manuacturing plants all over the country worked day and night turning out broadcast receivers, vacuum tubes and parts to meet the insistent demands of the public. Developments came thick and fast. New circuits, new tubes and new designs followed one another in rapid succession until the industry had reached, in ten short years, a state of perfection that is usually accomplished in not less than two generations.

**The main Television Control Room of the National Broadcasting Company, Radio City, New York. The studio programs are monitored from here.**

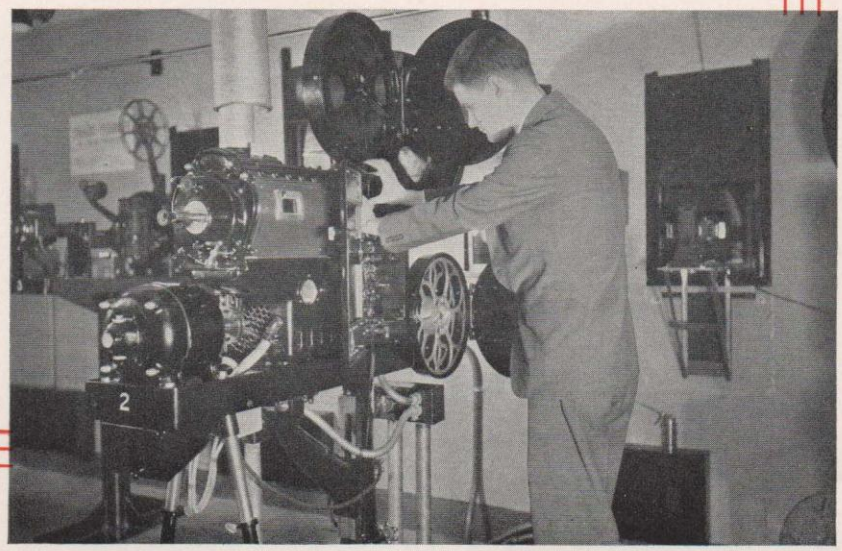
## TALKING MOVIES

Again the public settled back content . . . nothing new was possible . . . Radio had advanced as far as it could go. But once again the public was startled out of its calm. Radio had given its silent competitor, the Movies, a voice. Talking pictures, possible only through the addition of radio equipment, were created! An entirely new field for trained men had been developed. Once more was heard the cry "Radio Men Needed". The Radio Industry was consuming its raw material faster than it could be procured. Rarely was there a comfortable margin of safety between the supply of trained men and the demands for them.

## AVIATION RADIO

Communication necessarily follows transportation, and with each new development in modes of travel, a system of communication has followed. Like the use of Radio for communication with and between ships at sea, where there is no possibility of direct contact, the use of Radio on aircraft is practically a necessity. In fact, its importance is even greater, for under some conditions it is of more assistance to air travel than it is to water travel.

Aviation Radio is the younger but rapidly growing brother of Marine radio . . . and Television has been successfully operated on aircraft! Without the aid of Radio, the safety factor of aviation would be greatly reduced. Colonel and Mrs. Lindberg appreciated the value of radio on their recent flight around the world. After

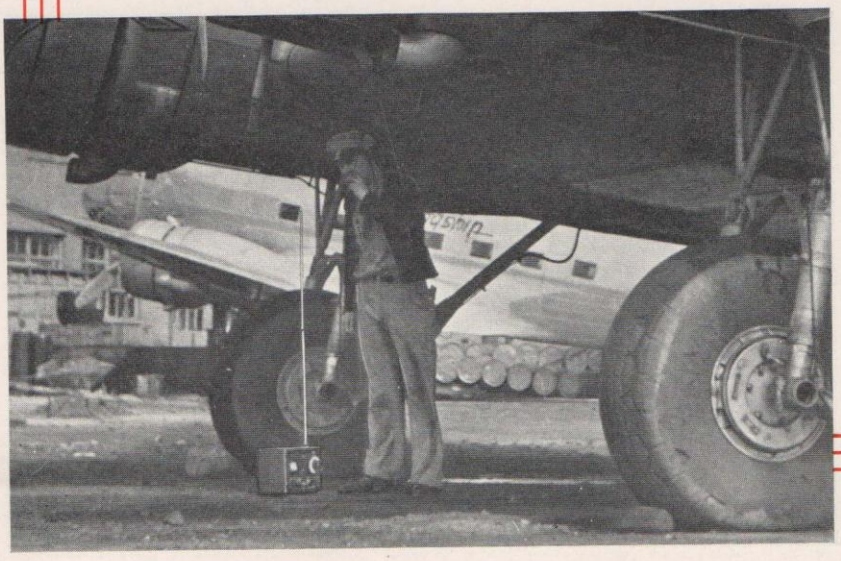


**In one of the Television scanning rooms of the National Broadcasting Company showing the projection of motion picture film for Television broadcasting.**

this flight, Colonel Lindberg said, "I advise any young man looking to aviation as a career to take the Radio side of it. That is the coming thing." Various governments require passenger planes to be radio equipped. It is not a far step to the day when all aircraft will be required to install and maintain radio equipment as an aid to navigation, for the receipt of weather reports, and for the transmission and reception of messages of distress. There is no doubt that the field of Aircraft Radio offers great opportunity.

## RADIO and TELEVISION in INDUSTRY

And still the development, the advance, the progress goes on! Radio equipment is playing a part in practically every field of endeavor. Countless industries are using radio circuits, photo-electric cells, vacuum tubes and X-ray equipment. Automatic control of traffic by radio is past the experimental stage. Fire and burglar alarm systems are now successfully operated by radio apparatus. Ventilation problems have been solved by the use of radio circuits. Improvements in lighting and heating have been made by this same modern science. Radio apparatus is today used in hospitals for surgery and heat therapy, and in the prospecting industry for locating mineral and oil deposits. It is used to sort materials according to size, weight, thickness and color. It sends photos by wire, increases the rate of plant growth, kills parasitic growths. There seems to be no limit to the number and variety of uses to which radio apparatus can be put in industry, horticulture and the other sciences.



**An aviation radio mechanic testing the radio equipment installed in one of the airplanes of American Airlines.**

... *Page 8*

## RADIO and TELEVISION . . . the FIELDS OF UNLIMITED OPPORTUNITY

Today the Radio and Television business which has been created by broadcasting alone gives employment to hundreds of thousands of trained men, and the money turn-over is figured in hundreds of millions. Most people think of Radio and Television in terms of the receiving sets seen everywhere. However, the manufacture and sale of sets is only one of the phases that offers opportunity to trained men. Broadcast operation, talking pictures, servicing, repairing, testing and maintenance, ship and shore station operation, public address systems, the field of facsimile reproduction, aviation, selling and merchandising . . . all these fields require the services of trained men.

One of the monthly technical publications states, "There is not a radio set manufacturer today who has not his technical staff either investigating Television or is not pioneering into this field himself. This is not an over-statement of the conditions. New developments are coming along almost every day; and the only comparison is with that boom which the Radio Industry experienced in its broadcasting infancy during 1920-21. There has been a furious activity in new Television company incorporations lately."

**Showing the actual Televising of a play in one of the Television studios of the National Broadcasting Company.**

*. . . Page 9*

## FACTS ABOUT THE INSTITUTE

The laboratories and workshops of the United Radio-Television Institute contain a complete outlay of Radio, Television and Electronic equipment for practical training of its students. Transmitters, receivers, instruments, oscilloscopes and various testing and analyzing devices are in abundance. A plentiful supply of equipment and tools enables each student to obtain actual *practical training* . . . the keynote of our instruction.

The calibre of a training institution is measured, not by the number of students enrolled, but by the success of its graduates. United Radio-Television Institute aims to train a limited and carefully selected enrollment in its laboratories, workshops and classrooms. Individual students profit by the competitive spirit of group training, but the size of each group is restricted so that individual problems may receive the proper attention.

LOCATION: The Institute is located at 106 Halsey St., Newark, New Jersey. It is readily accessible to numerous bus lines, to the Pennsylvania Railroad and to the Hudson and Manhattan Tubes.

EQUIPMENT and INSTRUCTORS: Laboratories, workshops and classrooms are well-lighted and well-ventilated. Every modern development in the radio and television industry is provided for training purposes. All instructors are not only qualified engineers; they are men who have had years of actual practical experience in the field. Students are therefore assured of sound and thorough training.

**An aviation radio mechanic testing the radio apparatus on one of the skyliners of American Airlines.**

LIVING ACCOMODATIONS: Although the Institute does not maintain student dormitories, we have on file a list of residences and will be glad to assist out-of-town students in obtaining suitable quarters. There are many excellent homes located within walking or convenient riding distance of the Institute, and the student may choose from a wide range of accomodations. The Newark Y. M. C. A. is just across the street from the Institute. For the average student, the sum of $12.00 per week will cover all living expense.

CLASS HOURS: Day and evening classes are conducted throughout the entire year. Day classes are in session five days each week, three hours daily. Evening classes meet on alternate evenings, namely Monday, Wednesday and Friday of one week, and Tuesday and Thursday of the following week, alternating each week. There are two day classes. The morning class is in session from 9:15 to 12:15 o'clock; the afternoon class meets from 1:15 to 4:15 o'clock. The length of the day course is approximately eight and one-half months. Evening class hours are from 7:00 to 9:45 o'clock, the length of the course being approximately 55 weeks.

TUITION: The tuition fee for the Day or Evening course is $275.00, payable $8.00 per week for the Day course and $5.00 per week for the Evening course. If, for any reasons, the student requires more than the average time to satisfactorily complete the training, he will not be required to pay more than the stipulated tuition of $275.00.


**Use of the oscillator in testing and lining-up radio equipment in police patrol cars. Practically all municipalities use radio apparatus in police and fire departments.**

. . . Page 11

## COMPLETE RADIO-TELEVISION TRAINING

This complete Radio-Television training program, as outlined, prepares you for many branches of Radio and Television. More specifically, this instruction *trains* you in a practical way for the various opportunities in Television and Radio . . . Broadcast Station Operation, Public Address Systems, Servicing, Repairing and Maintenance, Aviation Radio Mechanics, Selling and Merchandising, Establishing your own Business, Facsimile Systems and Frequency Modulation principles.

It is especially and decidedly advantageous NOT to learn only one or two of the foregoing subjects, such as just servicing and repairing, or television and public address systems only, but all of them. You want to *know* Television and Radio without your knowledge being narrowed down to only one or two branches of the industry. You want to be prepared to take advantage of the innumerable opportunities that are yours with thorough training . . . that is our object of training you for these opportunities. Your scope is then widened . . . your knowledge more embracing. Remember that little knowledge is more often worse than none at all.

PRACTICAL TRAINING is the key-note of the Institute. The student not only learns "why" but also "how" in the laboratory workshop method of preparing serious minded individuals for the industry.

**One of the earlier semi-portable Television control units of the National Broadcasting Company. This was used to monitor the Televising of the second inauguration of President Roosevelt.**

*. . . Page 12*

## OUTLINE OF TRAINING

FOREWORD AND INTRODUCTION: This is supplementary instruction on "Radio and Television — what it is — its past, present and future". It is the student's stepping stone into the industry, relating to the earlier experiments and developments in the art and of that which is in store for the future of the industry.

REVIEW OF MATHEMATICS: A general review and application of mathematics required in the field of practical applied radio and television.

DEFINITIONS AND SYMBOLS: Familiarization with the technical terms used in Television and Radio, together with standarized symbols.

SLIDE RULE: Instruction on the practical use of the slide rule. Problems with the slide rule.

RADIO AND TELEVISION PHYSICS: Substance and matter. Molecular and atomic theories. Fundamentals of the electron theory. General review of physics as pertains to radio and television phenomena.

MAGNETISM: The nature of magnetism. Natural and artificial magnets. Magnetic and non-magnetic substances. The effect of magnetism on metals. Law of magnetism. Magnetic field — induction — strength. Magnetic poles. The magnetic circuit.


**The mobile Television unit of the National Broadcasting Company which is used for Televising open-air views. An inside view of this unit is shown on the following page.**

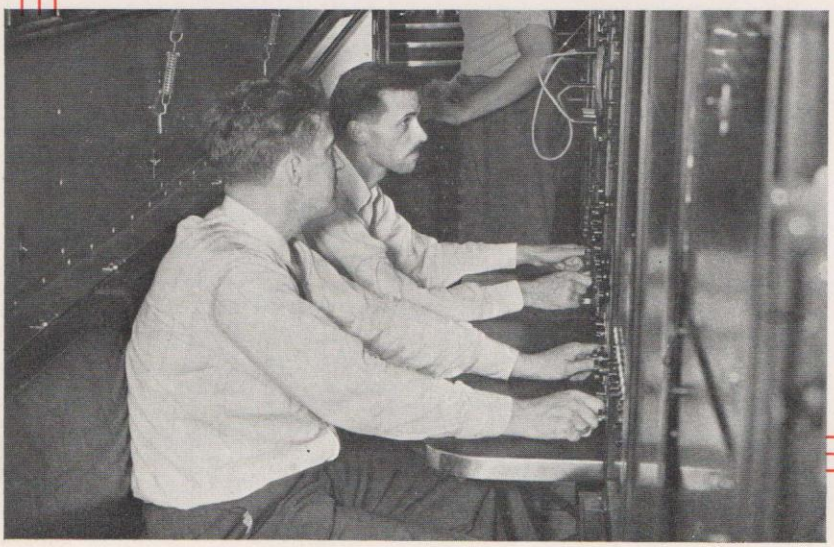
...Page 13

ELECTROMAGNETISM: The electromagnet. Production of magnetic fields by electric current. The laws of electromagnetism. Determination of polarity. Reluctance, magnetomotive force. Relation between direction of current flow and magnetic lines.

ELECTROMAGNETIC INDUCTION: Proof of the laws of electromagnetic induction. The electromagnet. Right-hand rule to find direction of induced e.m.f. in a conductor. Lenz's Law. Inductance and self-induction. Mutual induction. Counter-electromotive force.

PRINCIPLES OF ELECTRICITY: Application to Radio and Television. Electrical terms. Methods of producing electromotive force. Series, parallel and series-parallel circuits.

RESISTANCE AND CONDUCTION: Pressure. Rate of flow. Opposition or Resistance. Standard Ohm. Resistance in d-c and a-c circuits. Inductive reactance. Capacitive reactances. Electrical conductance. Resistor — rheostat — potentiometer. Resistance materials — alloys. Friction — heat and the electron. Conductors — insulators. Measurement and calculation of resistance. Wire gauges. Microhm — megohm. Temperature coefficient of resistance. Specific resistance. Circular mil — square mil. Finding the resistance of a wire. Length of wire — circular mil area. Finding area of square or rectangular conductors.



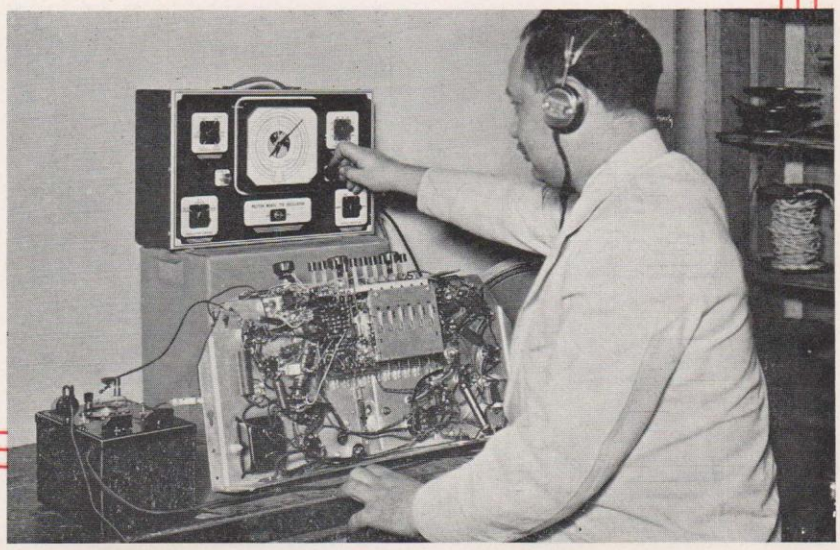
**Showing the video and audio controls in the mobile Television unit of the National Broadcasting Company.**

... *Page 14*

CIRCUITS AND OHM'S LAW: Polarity. Direction of current flow. Electromotive force. Resistance and current relations. Volt - Ohm - Ampere. Practical problems in Ohm's Law. Potential drop — fall of potential drop — fall of potential. Series of circuits — parallel or multiple circuits — series and parallel grouping of conductors. Applying Ohm's Law when both internal and external resistances are considered. Method of measuring resistances based on application of Ohm's Law — Voltmeter - Ammeter method - Wheatstone Bridge Method. Application of Kirchoff's Law.

PRIMARY CELLS: Sources of electric power. Classification of batteries and cells. Primary cells — secondary cells. Polarization. Local action. Constructional details and operation of standard dry cells. Methods of connecting cells; series combination — parallel and parallel-series and series-parallel combinations. Results obtained from various cell combinations

SECONDARY OR STORAGE BATTERIES: Effects of overcharging and overdischarging. Methods of charging. Floating or trickle charge principles. Electrolyte. Solution renewal. Specific gravity. Use of the hydrometer. Reaction of charge and discharge. Various ways of determining state of charge and discharge. Charging circuits. Renewal of electrolyte and how indicated. Buckling of plates. Local action. General care and maintenance of storage batteries.



**The skilled use of precious and testing apparatus used in conjunction with Radio and Television requires thorough knowledge of "how" and "why".**

... Page 15

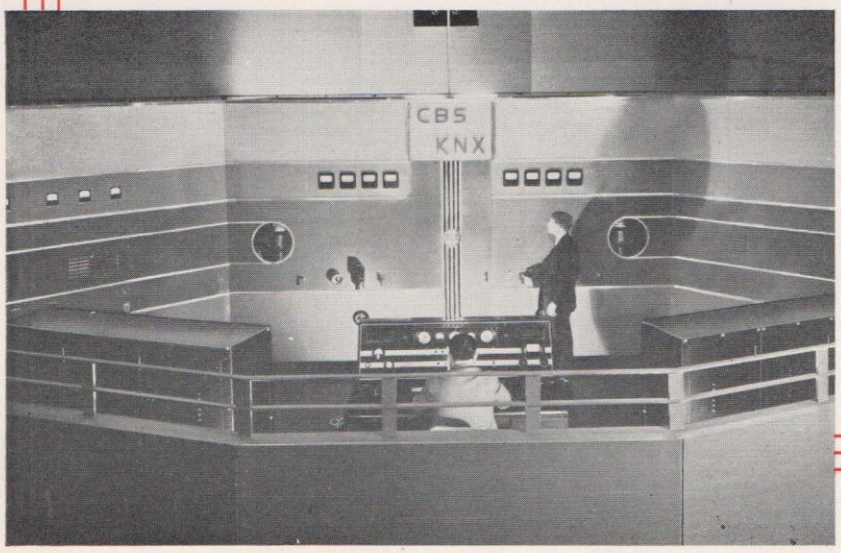
INDUCTANCES: Transfer of energy by induction. Effect of inductance. Practical inductance problems. Self-inductance in detail. Choke coils and various forms of inductance. Use of iron core in inductance. Effect of inductance in d-c and a-c circuits. Inductive reactance. Uses of radio-frequency and audio-frequency choke coils. Phase angle. Phase displacement.

CAPACITANCE AND CONDENSERS: The condenser. Condenser dielectrics. Practical capacitance problems. The function of condensers in a-c circuits. Types and uses of condensers. Condensers in series and in parallel. Capacitive reactance. Impedance. Phase relations in capacitive circuits.

D-C MOTORS AND GENERATORS: The d-c motor. The d-c generator. Function and use of generator field rheostats. Shunt, series and compound wound d-c generators. Eddy currents. Function of the commutator. Counter electromotive force. Field poles. Armature reaction. Motor starting boxes. Troubles and remedies.

ALTERNATING CURRENT: Alternating current principles and laws. Phase — lag and lead — Cycle — Frequency — time period — Resonance. Ohm's Law for Alternating Current. Practical demonstrations on alternating current problems in radio and television uses.

A-C GENERATORS — MOTOR GENERATORS: Alternations — frequency — cycles — phase — phase relation — current — voltage. Effective current and voltage. Power factor. The essentials of the motor-generator. The rotary converter. Starters.




**KNX, the Hollywood, California, home of Columbia Broadcasting System. This shows the master control room.**

... *Page 16*

TRANSFORMERS: The simple transformer. Radio-frequency — audio frequency and power types of transformers. Ratio of transformation. Induced e.m.f. and its effects. The auto-transformer. Transformer losses.

GRAPHS AND CURVES: Use and importance of graphs and curves — what they are and how to read them. Principles of curve diagrams. Blue print and diagram studies.

METERS AND MEASURING INSTRUMENTS: Voltmeters — ammeters — wattmeters — frequency meters — ohmmeters — ampere-hour meters of a-c and d-c types and their uses in television and radio. Oscilloscopes and standard analyzers in practical use.

SOUND AND WAVE STUDY: Theory of sound. Sound effects. Changing sound to other forms of energy. Reflection and reverberation. Electro-magnetic radiations. Wavelength — velocity — frequency. Pitch — harmonics — beats.

LIGHT: Wave mechanic theory of light. Lenses and reflectors. Optical instruments. Reflection, refraction, bending and absorption of light rays. Photometric units.

OSCILLATORY CIRCUITS: Oscillatory discharge of condensers through inductance. Action of inductance and capacity in determining frequency or wavelength. Types of waves produced by radio and television transmitters. Wave motion. Closed and open oscillatory circuits. Oscillation transformers. Inductive, direct and capacitive coupling. Resonance and tuning.

**Calibration and precision work, such as shown above, requires knowledge and skill.**

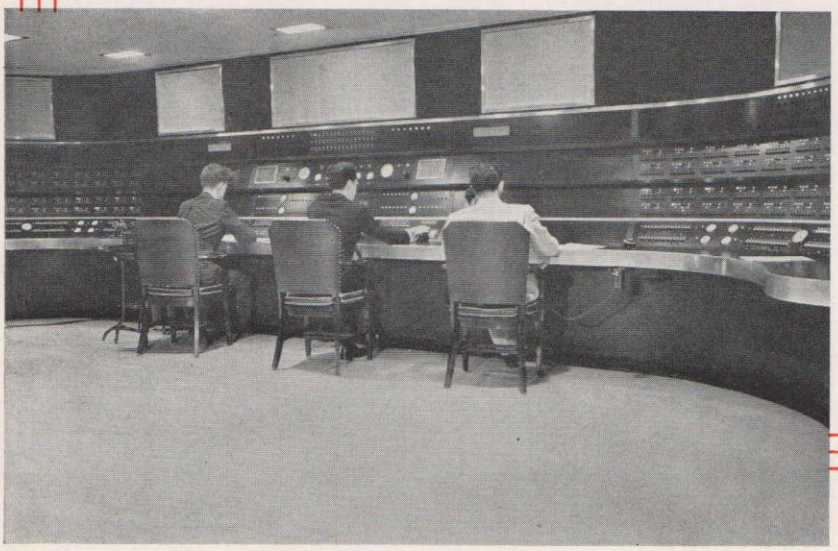
... *Page 17*

ANTENNA AND AERIAL SYSTEMS: Wave propagation. Nature and radiation characteristics of electromagnetic fields. Various types of antennas and aerials used in the transmission and reception of audio and video signals. Aerials for multiple reception. Methods of reducing noise. Autombile antenna systems.

VACUUM TUBES: Development of the various types of tubes. Characteristics of vacuum tubes. Test equipment and uses. Amplification factor measurements. Characteristic curves. Action of vacuum tubes when used in various circuits and for the multiplicity of various purposes. Photoelectric tubes.

RECEIVING CIRCUITS: Reception of signals. Study and interpretation of schematic and wiring diagrams. Practical assembly of various circuits using radio and audio-frequency amplification and power amplification. Tuned and untuned radio-frequency. Superheterodyne. Neutralizing and balancing. Shielding. Receiver alignment. Set conversions. Circuit testing with standard analyzers. Use of oscilloscopes. Automatic controls. Midgets and auto installations.

TROUBLE SHOOTING: Trouble shooting on various types of a-c and d-c standard equipment. Practical use of various testing apparatus and meters. Training in the acquisition of practical knowledge of various systems.



**The master control room of the National Broadcasting Company at Radio City, New York. All studios are controlled from this room.**

... Page 18

LOUD SPEAKERS: Magnetic, dynamic, condenser and crystal loud speakers. Bi-polar magnetic driving units. Analysis of vibrating system. Exponential horns. Baffles — acoustic clarifiers — sound diffusers. Loudspeaker troubles and remedies.

PUBLIC ADDRESS SYSTEM: Layout of apparatus. Hum elimination. Grounding and shielding. Echoes and dead spots. Multi-receiver hookups. Location of microphones and pickups. Protection of equipment.

TELEVISION: Breaking up the scene into elemental impressions for transmission and reception. Image detail requirements — frequency range — flicker — interlaced scanning — brightness — contrast controls. Video and sound carrier relationships.

TELEVISION CIRCUITS: Tracing sound and picture signals through television circuit. R-F amplification, oscillator and mixer-first detector, video I F. amplification, video detector, video amplifier, d-c restorer, sweep circuiit, impulse separating circuit, automatic gain control.

TELEVISION — CATHODE RAY TUBES: Design and operation of Cathode Ray tubes. Electron guns — electronic lenses — magnetic focusing — beam deflection — electrostatic and electromagnetic deflection — image size — fluorescent screens. High voltage power packs for cathode ray tubes.

**The recording division of WOR. Many important talks and addresses are recorded for later use in broadcasting, as are also the more popular entertainment features.**

TELEVISION COMPONENTS: Horizontal and vertical sweeping of the electron beam. Clipper circuits — Synchronizing impulse separators. D-C restoration. Frequency separator — horizontal and vertical saw-tooth sweep oscillators — wave shape correctors — distribution controls. Signal phasing — intensity — focus. Distortion elimination. Special television tubes.

TELEVISION SERVICING: Use of testing equipment in servicing television circuits, with special emphasis placed on the practical use of the oscilloscope. Elimination of signal interference. Alignment of sight and sound channels. General circuit analysis. Trouble shooting.

AVIATION RADIO: Radio along the airways. The duties of aviation radio men. Communication systems. Principles of meteorology for aviation radio men. Aids to aerial navigation. Transmitters and receivers. Radio aids to blind flying.

TRANSMISSION: Transmitting circuit principles. Ultra high frequency circuits. Modulation systems. Broadcast transmission. C. W. transmission. Television transmission. Vacuum tubes used in transmitting — class A, B and C amplifiers. Point to point communication. Radio and television transmitter equipment analyses. The Meissner, Hartley and Colpitts circuits.

SHORT WAVE COMMUNICATION: Principles of short wave transmission. Amplifying harmonics of the crystal. Use of piezo-electric crystal in transmission. Skip distance effect in reception. Fading. Kennelly-Heaviside layer. Principles of short-wave reception.

**The WOR master control. This is really the "heart" of the station and it is also the eastern terminus of the Mutual Broadcasting Network.**

*... Page 20*

# United Radio-Television Institute, Inc.

Be it known that

HENRY R. SANFORD

has honorably completed the prescribed course of

United Radio-Television Institute, Inc.

and is therefore awarded this

Certificate

On this 12th day of August 1940

T. L. Duncan
President

W. R. Snyder
Secretary

LeRoy H. Gardner
Chief Instructor

The main control panel of the 50-kw WOR broadcast transmitter at Carteret, New Jersey. Charles Singer is the transmitting station supervisor.

... Page 21

## ANTICIPATING YOUR QUESTIONS

Q. *Is a previous knowledge of Radio or Television or Electricity required to take your training?*

A. No. We assume that the beginner has absolutely no knowledge whatever of the subjects and he is therefore trained accordingly.

Q. *Do those who have a thorough knowledge of certain subjects before entering have to take training in those subjects?*

A. No. Sufficient flexibility is provided in our training program as to enable students with certain knowledge to enroll for more advanced training, as determined by an entrance examination.

Q. *Is an entrance examination required?*

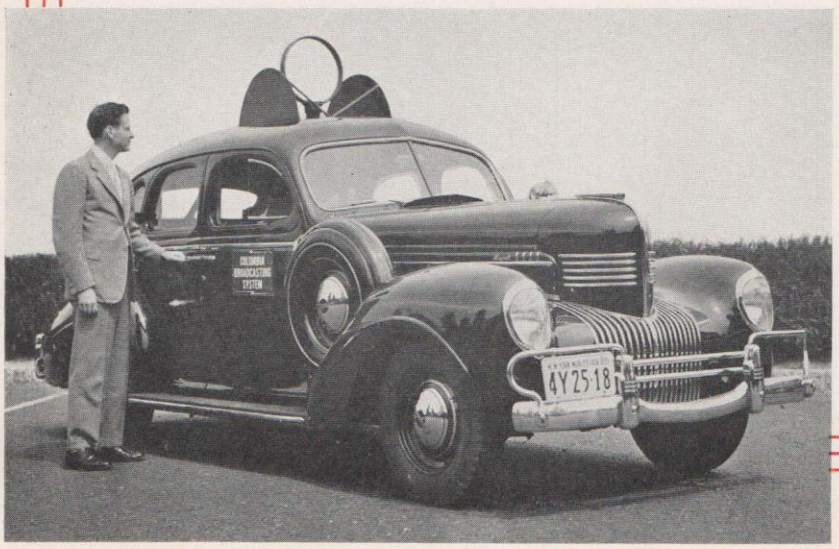
A. An entrance examination is required only in cases where the prospective student wishes to take advanced training.

Q. *Does your training include Television?*

A. Yes — thorough training in television is included. A complete outline of the training is included in this booklet.

Q. *Will your training qualify me to pass successfully the U. S. Government examination?*

A. Yes — this training will enable you to obtain the U. S. Government First Class Radiotelephone (Broadcast) license.




**The field intensity measuring unit of the Columbia Broadcasting System. These cars, which travel more than 100,000 miles a year, serve the purpose of measuring broadcast signal intensities.**

... Page 22

Q. *Do you issue a Diploma to graduates?*

A. Yes — see page 21.

Q. *Do you issue any means of identification to your students?*

A. Yes — an identification card is issued upon enrolling.

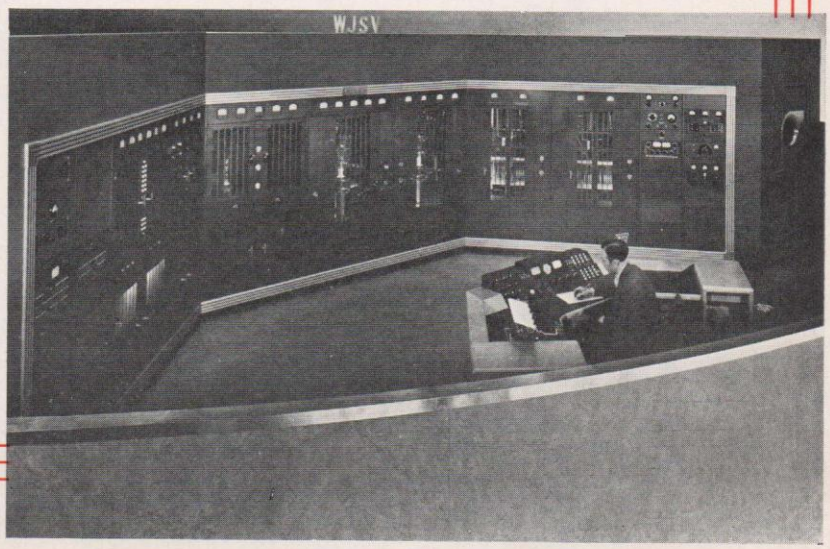
Q. *Can your training be mastered by students of more or less advanced age?*

A. Hundreds of students past 40 and 50 years of age have been trained under my supervision. An article by one of America's large vocational schools titled "Never too Old to Learn" states:

> "Never too old to learn is more fact than fiction. A series of experiments on different subjects with persons of varying ages disclose that men almost fifty years old learn new things more rapidly than children, and almost as rapidly as youths from twenty to twenty-four years of age. Even persons over fifty years old are under no handicap in acquiring knowledge if they will make the effort".

Q. *Do you give employment help to your graduates at no extra cost?*

A. Yes — we assist our students and graduates in every manner possible.




**The control room in the 50-kilowatt broadcast station WJSV of the Columbia Broadcasting System at Washington, D. C.**

... Page 23

Q. *Should I specialize on only certain phases of your training, or should I master the entire course?*

A. By all means take the entire training. You cannot have too much knowledge of the subjects, and surely you want to be prepared to take advantage of any opportunity in Radio and Television that presents itself. Specialization can come later after you have entered the industry. I have had many years experience in training men and this experience has taught me that it is unsound to restrict the student's training too closely.

Q. *How much previous schooling or education is required to profitably take your training?*

A. If you can read and write the English language, add and subtract, you can master this training. Your own interest in the subject is the best entrance qualification you can possess. Think of the many hundreds of successful men in industrial and business enterprizes who were denied the advantages of complete grade and high school education!

The following is quoted from a letter written by George A. Kress: *"As a graduate and student under your supervision I have only the highest praise and satisfaction to offer. Any man of ordinary intelligence wanting to learn Radio could not help but master it by your methods of teaching".*

Q. *Do you maintain a Home Study Training Department?*

A. Yes. Complete particulars concerning Home Study Training will be supplied gladly upon request. The following is quoted from one of the innumerable letters that have passed over my desk during the years that I have spent in training men:

> "The proof of the pudding is in the eating. If ever a man can invest the cost of tuition fee in a Home Study course to better advantage and get more for his money than I have, I wish he would let me in on it".

... Page 24