Number 4 Volume 1  

June 1965

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NEWSLETTER FUNCTION

This NEWSLETTER is published Quarterly for the Administrative Committee of the IEEE Communication Technology Group, and serves as a vehicle for the dissemination of news items of current importance and interest to members of the COMTECH Group.

Technical Committees and other operating elements of the Group are invited to use this publication as its NEWSLETTER.

Items covering Committee, Chapter, Call for Papers, Meetings, Personal and Professional, and other appropriate news are solicited and should be submitted to the Editors as follows:

General News, Committee Activities, etc.
Gunther Karger, Editor
IEEE COMTECH Group Newsletter
RADIATION INCORPORATED
725 Rosada Street
Satellite Beach, Florida 32937
Office Phone: 305-723-1511, Home: 305-262-5894

All Chapter Activities
Ray Bogdan, Associate Editor
IEEE COMTECH Group Newsletter
TELETYPE CORPORATION
5555 Touhy Avenue
Skokie, Illinois 60076
Phone: 313-676-1000

THE DEADLINE FOR THE SEPTEMBER 1965 ISSUE WILL BE: August 1st. All items must be submitted prior to this date.

EDITOR'S MESSAGE

This issue is published early due to the Communications and GLOBECOM VII convention to be held in Boulder, Colorado, June 7 thru 9. The program and pertinent details concerning this meeting are included in this NEWSLETTER for the benefit of all members. This is THE important meeting of all communicators for 1965. On behalf of the Administrative Committee, we urge you to attend and provide your support.

This is the last issue of the NEWSLETTER for the 1964-65 IEEE season. We have endeavored to bring all members news and pertinent information concerning activities of the Group. Special emphasis has been placed upon the program of Group Events on the national, regional and local scenes. We have distributed copies to subscribers of Communications and Electronics in order to inform those members of Group activities during the merger period. We hope they will join our Group and actively participate in its activities.

The IEEE International Convention held in New York the latter part of March was given extensive support by the ComTech Group. A substantial number of technical sessions were sponsored. Volumes 1 and 2 of the Convention Record contain many of the papers presented. Copies of these publications can be ordered directly from IEEE Headquarters. The meeting was highlighted by a panel moderated by Lieut. Gen. (Ret.) James D. O'Connell, Director of Telecommunications Management, Office of Emergency Planning and Special Assistant to President Johnson for Telecommunications. The topic, The World of Communications included discussions by leaders of Airline, Electrical Utility and Transportation Industries concerning their future communication requirements. Those who attended can clearly foresee a bright future for the communications industry.

The COMTECH Administrative Committee and several of the Technical Committees met during the Convention. The September issue of the NEWSLETTER will report details of these meetings.

Chairman R. K. Hellman and Vice Chairman W. Jones were re-elected as AdCom members and Chairman and Vice Chairman respectively. The complete AdCom and Standing Committee roster will be published in the next NEWSLETTER.

INCREASE IN DUES

In accordance with action taken by the Administrative Committee, the membership dues of the Communication Technology Group will increase to $5.00 effective July 1, 1965 (present dues are $4.00 per year). This action was necessary in order to continue the high quality services the Group provides. Technical items are published in the TRANSACTIONS while general Group and chapter news are announced in this NEWSLETTER. Both publications are issued quarterly. The Group sponsors an annual Communication Convention which provides a meeting place for communications oriented engineers. Additionally, other important meetings, symposia and activities are supported. $5.00 is indeed a nominal amount for the privilege of belonging to, supporting, and receiving benefits from an organization representing one of the most important technological areas of our times.
**COMMITTEE REPORTS**

**WIRE COMMUNICATION COMMITTEE**

Chairman: W. C. Burrough, Southern Bell Tel. & Tel. Co., Atlanta, Ga.

Three sessions of the Wire Communication Committee at the International Convention in New York in March dealt a total attendance of 675 persons. Figures from the last session of the first session was the one on impulse noise; it attracted 309 engineers.

Party committee members and visitors attended the business meeting of the Committee. Membership chairman Bill Robinson reported that over half of the committee members are now members of ComTech, while half have not applied for membership in the last year.

Reports were made by the task forces of the Wire Committee.

1. **Instrument Technology**
   - Fred Andrews shortly will seek formal approval of the new standard from all members of the committee.

2. **Carrier Frequency Coordination**
   - Jim Sippe will prepare a final report, which will be a paper for the NEC in October.

3. **Longitudinal Balance Methods**
   - Joe Petrie has organized a task force of about 12; another panel discussion will be held at the NEC.

4. **Education and Training**
   - Ben Jeremiah has accepted the assignment of organizing a task force, which will hold its first meeting at Boulder in June. The committee will meet in Boulder on June 7, 1965. The Wire Communication Technical Program at Boulder will be distributed.

**POTENTIAL CHAPERS**


The Space Communication Committee has been very active this year in sponsoring sessions at the IEEE technical conventions. At the International Convention held in Chicago in March, Mr. Jallie and his committee sponsored seven sessions. For the first IEEE Annual Communications Conference, it is sponsoring five sessions in Chicago at the hotel and an additional session at the National Electronics Conference in Chicago in October 1965. The committee now is sponsoring two sessions at Multiple Access as Related to Communication via Satellite Report.

L. J. Jallie, having served as Chairman for the last year and one-half, as the re-election of C. Mawson who will be Chairman effective July 1, 1965.

**IEEE COMMUNICATIONS CONFERENCE**

Plans are now being formulated for the 1966 IEEE Communications Conference to be held in Philadelphia, Pa., June 15-17, 1966. The meeting will be the second annual conference to be held by the Communications Technology Group. This conference will have the joint sponsorship by the Philadelphia Section and the University of Pennsylvania, and several other IEEE groups will present sessions.

The Conference is under the General Chairman of Mr. W. H. Forster.

The theme of the Conference is comprehensive coverage of all phases of communications - from theory and research, through development, manufacture, and utilization of new equipment. It is the objective of the technical program to provide continuity of sessions for engineers and scientists with specialized or general interests in communications technology.

The Technical Program Committee is interested in hearing from potential authors. Please address suggestions for topics and authors to the Technical Program Chairman, A. E. Jost, Jr., Bell Telephone Labs., Room D-301, Holmdel, N. J., or to the chairman of the Technical Program Committee.

This will be the only IEEE Conference for 1966 devoted exclusively to communication. High quality papers on all phases of communications are being solicited by the ComTech Group Technical Committee and the participating Institute groups.

**CHAPTER REPORTS**

**COMTECH CHAPTERS**

Baltimore (Inactive)
Bosan
Conner
Cleveland
Cincinnati
Dallas
Denver-Boulder
Florida West Coast
Long Island
Los Angeles (Metropolitan)
Miami Valley
Monmouth
Nebraska
POTENTIAL CHAPTERS

McGraw-Chairman. Chairman: J. W. McGraw, chairman of the Communications Technology Group of the Los Angeles Section, received the IEEE degree in 1952 from the University of West Virginia, and the LSU degree in 1955 and 1956, and degree in 1957. He is now employed at the Bell Laboratories in Murray Hill.

**NEW YORK COUNTY**

Mr. Robert W. Rile has been appointed Secretary Treasurer of the group.

**CHICAGO**

Mr. D. H. Grover has been appointed Secretary Treasurer of the group.

**FLORIDA WEST COAST**

Mr. Robert W. Tilton has been appointed Secretary Treasurer of the group.
FIRST IEEE ANNUAL COMMUNICATIONS CONVENTION TO BE HELD JUNE 7-9, 1965, IN BOULDER, COLORADO

The First IEEE Annual Communications Convention, covering all aspects of communications technology, will be held June 7-9 in Boulder, Colorado. This convention, initiated by the IEEE Communications Technology Organization, is expected to provide a major annual interchange of information on theory, methods, and measurements among the several communication disciplines. In addition to the Communications Technology Group, other active organizations and participants include the IEEE Groups on Information Theory, Audio, and Space Electronics/Telemetry. The convention, which is being hosted by the University of Colorado and the Boulder Laboratories of the National Bureau of Standards, is really three conferences in one, in addition to the main June 7-9 national Symposium on Global Communications (GLORECOM VII) and an informal symposium, "Characterization and Adaptive Communication Systems," the following:

- General Session: Sponsored by the various Technical Committees of the Communication Technology Group and by the Audio and Space Electronics/Telemetry Groups. The sessions will cover the complete breadth of communications technology. Fields of interest include Communication Systems, Radio Communications, Space Communications, Switching, Wire Communications, Data Communications and Telegraph Systems, Telemetry, Audio, and Space Electronics/Telemetry.

- GLORECOM VII: The informal symposium, with the theme this year of "Characterization and Adaptive Communication Systems," will deal extensively with methods of state characterization and with interpreting the characteristics of communications channels, and with techniques for adapting to these characteristics. Special sessions on underwater and seismic channels will be offered, including discussions on the symposium theme.

- INFORMATION THEORY SYMPOSIUM: Theme for this symposium is "Time-Varying Channels," which closely parallels and complements the GLORECOM VII theme. The emphasis here, however, will be directed more to the informational theory aspects of such channels, rather than to descriptions of the channels themselves. In addition to the more familiar radio and wire channels, special sessions on underwater and seismic channels will be presented. A panel discussion on Communications Systems and Adaptive Techniques will be held Monday evening.

- PROCEEDINGS AND PREPRINTS: Each registrant will receive a copy of the Convention Record, incorporating either computer printouts or carbonless copies of the proceedings. Additional preprints may be purchased at a nominal price from the IEEE Headquarters in the style of the University of Colorado Memorial Center. In addition, information concerning conduct tours of the campus, trips, or other activities will be available at the registration desk.

- SOCIAL EVENTS: An active social program has been planned for both attendees and exhibitors. In addition to the Convention Banquet and Social Hour, an informal Chuckwagon dinner on Flagstaff Mountain, a number of tours to points of interest in the "Colorful Colorado" countryside have been arranged.

- EXHIBITS: A large exhibit, held in the Pacific Telephone Co. Auditorium, 140 New Montgomery Street, San Francisco, California.

- GENERAL INFORMATION

Travel Arrangements

Boulder is located 27 miles northwest of Denver, to which it is linked by Haughwout Tracks which are served by several major airlines, railroads, and bus lines. In addition to regular bus service from Denver International Airport is available at selected times.

Registration

Registration fees for the convention have been established as follows:

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<td>IEEE Members</td>
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<tr>
<td>Non-Members</td>
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<td>Students</td>
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Advance registration may be accomplished by sending the required fee to the following office, postmarked not later than May 28.

Bureau of Continuation Education University of Colorado Boulder, Colorado

Regular registration, as well as check-in for advance registrants, will be held in the lounge of Ristrom Commons, University of Colorado, from 4 to 9 PM on Sunday, June 6 and at the University Memorial Center on Monday, June 7 beginning at 7:30 AM.

Accommodations

University Residence Halls

Rooms and meals will be available in the University of Colorado Residence Halls on a first come-first served basis. Registration for these rooms should be made early to assure accommodations.

Rates for a room on Sunday, Monday, and Tuesday evenings and Monday morning will be $6.50 per night, with the exception of Tuesday evening, but excluding dinner on Tuesday evening are as follows: Single room (limited) $25.00 per person; double room $30.00 per person. Corresponding rates for children under 12 and under are $22.00 and $17.00, respectively. Persons desiring to remain through Wednesday night may make such arrangements (at additional cost) during final registration.

Motel & Hotels

Several of the motels and hotels in Boulder have set aside blocks of rooms for persons who plan to attend the convention. You should make your own reservations. Scheduling the first night's room charges will be made only after the reservation requests have been received. Please identify yourself with the IEEE Convention to secure accommodations.

Make Your Reservations Early!
**CALENDAR OF EVENTS**

**Convention Schedule**

**Sunday, June 6**
2:00 PM - 8:00 PM Registration & Information, Kittredge Commons, University of Colorado

**Monday, June 7**
1:30 AM - 6:00 AM Registration & Information, University Memorial Center
9:00 AM - 12:00 Noon Group I: Technical Sessions
2:00 PM - 5:00 PM Group II Technical Sessions
4:00 PM - 8:00 PM Milli-Hi Social Hour
8:00 PM - 10:30 PM Information Theory Panel Discussion

**Tuesday, June 8**
9:00 AM - 12:00 Noon Group III Technical Sessions, GLOBECOM VII Tutorial Sessions
2:00 PM - 5:00 PM Group IV Technical Sessions, GLOBECOM VII Tutorial Sessions
6:30 PM - 9:00 PM IEEE Banquet (University Memorial Center)

**Wednesday, June 9**
9:00 AM - 12:00 Noon Group V Technical Sessions
2:00 PM - 5:00 PM Group VI Technical Sessions

**Social Schedule**

**Monday, June 7**
10:00 AM - 12:00 Noon Ladies’ Welcome Coffee, West Ballroom and the Alumni Hall, University Memorial Center.
1:00 PM - 5:30 PM Tour to Martin-Marietta. Fifteen minute briefing followed by tour of production facilities, showing assembly of Titan III launch vehicles.
1:00 PM - 5:00 PM Tour of NBS: Conducted tour of National Bureau of Standards Boulder Laboratories.
6:00 PM - 8:00 PM Milli-Hi Social Hour: Partially industry sponsored, at the new Boulder Country Club on Gu Barrel Green.
8:00 PM - 9:30 PM Flute Quartet Recital: Auditorium in the Music Building, CU Campus.

**Tuesday, June 8**
7:00 AM (9:00 AM Eastern Time) - 7:30 PM Air Force Academy Tour. Full dress graduation parade, followed by 20 minute air show, if weather permits. Inspection of grounds after show. Cost of lunch at AFA cafeteria is not included in tour price.
9:00 AM - 3:00 PM Tour to Estes Park. Family outing to the Rocky Mountain National Park village. Price includes lunch at the Carter House.
1:00 PM - 5:00 PM Tour of NBS: Conducted tour of National Bureau of Standards, Boulder Laboratories.
G-2A
Propulsion Relating to Space Communication
Space Communications

Session Chairman: J. G. Barry
Micro Corporation
P. O. Box 358
Bedford, Massachusetts

"Control of Plasma Collision Frequency for Allievation of Signal Degradation" J. Hoffmann, Micro Corp.

"Transmission Characteristics of the Ionosphere" D. D. Swanev, Philco

"Predicting the Incidence and Level of Radio Frequency Interference in Coordination of Microwave and Space Communication Systems" D. M. Hinten, Bell Telephone Labs of Canada

"RIF Broadcasting from Satellites" R. P. Haviland, General Electric


G-2B
Signal Detection
Communication Systems

Session Chairman: Delmar Potts
Jantsy & Bailey
Washington, D. C.

"Theory of Signal Detectability" R. A. Roberts, University of Michigan (Cooley Lab)

"Optimum Detection of a Stochastic Signal in a Gaussian Noise of Unknown Power Level" F. H. Tuten, Yale University


"Reception of Non-Orthogonal Signals" F. F. Fulton, Lockheed

"Error Rates in FSK Using the Phase Locked Loop Demodulator" D. L. Schilling, J. Billing & D. Kermisch, PB

G-2C
Microwave Systems
Radio Communications

Session Chairman: C. R. Kraus
The Bell Telephone Co. of Pa.
One Parkway - 16th Floor
Philadelphia, Pennsylvania

"FM 120/5000, a Mobile Radio Link System" I. A. Eagen, Microwave Laboratory Systems


"Microwave Propagation in Ionospherically Plasmas" F. H. Minshull, Jr., University of Alabama Research Institute

"A Versatile High-Speed Radio Path Protection System" F. C. Bale, Lenhart Electric Co., Inc.

G-3D
"Tropospheric-Scatter Propagation Tests Using a Bake Receiver" S. B. Barrow, L. G. Abraham, Jr., S. Stein, & D. Bitsker, Sylvanian Electronic Systems

"Comparison of Digital Modulation and Detection Techniques for a Low-Power Transportable Troposcatter System" Nile S. Hering, SHAPE Technical Centre

"Design Concepts for Transportable Innocent Spread Oceanographic Experiments" P. J. Bartholomeu & I. Vogt, SHAPE Technical Centre

"A New Mote-Burst System Incorporating ARQ and Diversity Receptions" P. J. Bartholomeu & I. Vogt, SHAPE Technical Centre

G-2B
Time-Varying Channels II
Information Theory

Session Chairman: George Cooper
Purdue University
Lafayette, Indiana

"Maximum A Posteriori Decimation of Analog-Vector Signal through Random Coding Media" M. Schwartz, Polytechnic Institute of Brooklyn

"Continuous Estimation of Signals in a Depressed Channel" R. Pichhoit, Polytechnic Institute of Brooklyn

"Optimum Adaptive Receivers for Random Channel Communication" S. Frolic, Sylvanian Reconnaissance Systems Lab

"The Principle of Maximum Entropy" J. Spragin, Arizona State University

G-2B
Information Theory I
Information Theory

Session Chairman: Jack Wolf
New York University
New York, New York


"Growth-Correlation Analysis of Logarithmically Processed Variables" N. Hering and A. N. Joiner, SHAPE Technical Center

"Optimum Homomorphic Filters" A. Oppenheim, MIT

"An Analytic Comparison of Block and Recurrent Codes for the Correction of Independent Errors" C. G. Ewing and J. Robinson, IBM

"VHF Communications (Globecon VII)

Session Chairman: N. H. Kudiston
SHAPE Technical Centre
The Hague, Netherlands


Tuesday, June 8
9:00 AM - 12:00 Noon

G-1A
Signal Processing Analysis
Communication Systems

Session Chairman: A. P. Kandian
Communication Systems, Inc.
Paramus, New Jersey

"The Transmission of Frequency Modulated Signals through Linear Systems" D. D. Weiser, Syracuse University & B. J. Leon, Purdue University

"Analyses of M-ary Modulated Subcarrier Systems" P. D. Staaf, Philco

"Bandpass Waveform Synthesis" Giorgianni et al., Massachusetts Institute of Technology

"Time Compression in Recording of Errors" I. M. Small, IBM

"A New Approach in Time-Domain Equalization with Simplified Procedures" S. E. Gogol, IBM, France

G-1B
Low Noise Amplifiers I
Radio Communications

Session Chairman: P. T. Spradlin
Bell Telephone Laboratories
Whippings, New Jersey 07881


"System Characteristics of Tunned Diode Amplifier" Norman Chassell, International Microwave Corporation


G-1C
Antenna Systems for Space Communication
Space Communications

Session Chairman: M. Hoffman
ITT Federal Labs
642 River Road
Notley 10, New Jersey

"An Ultra Wideband Cadar-Frequency for Satellite Communications" P. Polites & S. Kominos, RCA, Canada

"Design of a Broadband 60 to 94 MC Stripline Upconverter" A. J. Grayeff & R. S. Berg, MIT

"Radiation Characteristics of Antennas Surrounded by Inhomogeneous Diffusing Plasmas Sheaths" A. R. M. Rashid, Detroit University

"Signal-to-Noise Ratio Improvement in an Adaptively Phased Array" J. W. Eberle & L. D. Zobey, Ohio State University

"Balanced-Feeding Type Antennas for Rocket Telemetry" Fujio Yamashita, Nippon Electric Co., Limited
"System Design Parameters of Oversea AUTOVON Switching Systems"  
E. J. Gleiser, W. C. Miller, and N. J. Murphy, Automatic Electric Co.

"Application of Common Control to Oversea AUTOVON Switching System"  

"Marker and Matrix Configurations for Oversea AUTOVON Switching System"  

"Physical Aspects of Oversea AUTOVON Switching System"  

"Line and Truck Design for Oversea AUTOVON Switching System"  
W. A. Linderholm, R. C. Clark, and L. L. Smith, Automatic Electric Co.

G-3A  Globecon Tutorial Session  
(Globecon VII)

Session Chairman: E. J. Baghdady  
ADCOM, Inc.
Cambridge, Massachusetts

"The Theory and Definition of Measures of Channel Performance"  
M. Schwartz, Polytechnic Institute of Brooklyn

"Methods of Measuring and Monitoring Channel Performance"  
R. G. Elschnig, Lincoln Laboratories

"Methods of Adapting Circuits to Environments"  
F. E. Fredrich, Bell Telephone Lab

"Communications Systems 300 kc to 30 Mc - MF/MF"  
B. Goldberg, USAERDL, Ft. Monmouth

Spordic II  
(Globecon VII)

Session Chairman: Ernest R. Smith, Jr.
National Bureau of Standards
Boulder, Colorado

"The Role of Spordic-E Propagation in Inhomogeneous Telecommunication Systems"  
George W. Hayden and Robert M. Davis, Jr., NASA

"Characteristics of Inhomogeneous E Propagation and Calculation of E Signal Strength"  
K. Miya and T. Sasaki, Kokusho Denki Denso Co., Ltd.

"Spordic-E Signal Observations on a 1000 km Path"  
Robert Fosheim, Standard Electronic Laboratories

"Evidence for Talles in the Spordic-E Layer from Backscatter Measurements"  
Clayton Clark, R. D. Harris, D. B. Jensen, and G. P. Francis, Utah State University

Tuesday, June 5

2:00 PM - 5:00 PM

G-4A  Error Control III  
(System Communication)

Session Chairman: Miles Bedachtai  
Rome Air Development Center
Rome, New York

"A Model for Digital Error Distributions"  
S. Berkes, E. L. Cohen, and N. E. Zierler, MIT

"An Error Correction in Multi-Channel Circuits Employing Cyclic Codes"  
Mu-Tue Hsiao & Kwok Y. Shih, IBM

"A Randomized Decision Feedback System Using Group Codes"  
N. Zain, RCA, & A. E. Joshi, University of Pennsylvania

"Some Upper Bounds and Lower Bounds on the Minimum Redundancy of an Error Correcting Group Code"  
D. R. Ray-Chaudhuri, IBM (Watson Research)

"On Truncation Error Bounds for Sampling Representations of Band-Limited Signals"  
D. A. N. Thomas, Princeton University

G-4B  Low Noise Amplifiers II  
(Radio Communications)

Session Chairman: P. T. Spraul  
Bell Telephone Laboratories, Inc.
Whippany, New Jersey 07981

"Maseres for Satellite Communications"  
J. J. Dagan, Bell Telephone Labs

"Low Noise 'L' Band Transistor Amplifier Design"  
L. W. Read and G. D. Johnson, Texas Instruments

"A Survey of Low Noise Parametric Amplifiers"  
J. G. Jossenas, Bell Telephone Labs

"Closed-Cycle Refrigeration System for Low-Noise Microwave Amplifiers"  
John T. Harwell and Walter M. Beard, A. D. Little, Inc.

G-4C  Space Communication Equipment Design Techniques  
(Space Communications)

Session Chairman: H. Clute  
Westinghouse Electric Corp.
Aerospace Div.
Friendship International Airport
San Diego, California

"An Extra Wide Band Communications Satellite Receiver"  
G. D. Hensberg, IIT Federal Labs

"A Variable Frequency Multiplier for an All-Solid-State Satellite Communication System"  
E. E. Bills & C. D'Elia, RCA

"A Hard Limiting Gain Regulator with Weak Signal Enhancement"  
R. M. Lerner & R. S. Berg, MIT

"Global Communication Systems - Synchronous, Medium Attitude, or Manual?"  
F. Alam and R. Happe, System Sciences Corp.

Switching System Maintenance and Testing  
(System Communication)

Session Chairman: S. B. Walter  
Strumberg-Carson
100 Carlson Road
Rochester, New York

"Maintenance Planning for an 1,000 ESD"  
L. S. Tsongonokas, Bell Telephone Labs

"Testing of a Circuit Switching System by Simulating Many Connections on a Single Switch"  
Leon Staudler, RCA

"An Automatic Call-Through Test Set for Step-by-Step System"  
A. L. Fleming, Bell Telephone Labs

"New Extended Range Local Test Device"  
G. A. Barbary, Bell Telephone Labs

"Maintainability Aspects of the Oversea Autovon Switching System"  

10
GENERAL NEWS

University of Colorado and National Bureau of Standards will conduct a course on:

ELECTROMAGNETIC PROPAGATION
June 28 - July 16

The objectives of this course are to provide a concentrated study of the fundamental physics and mathematics of propagation in free space, with emphasis on transmission media. The course will be aimed at those scientists and engineers who are interested in communication theory and applications of theory to the design and development of systems of communication. The course will include:

1. Ray Theory and Ray Tracing Techniques
2. Introduction to Mode Theory and Full Wave Methods
3. Characteristic of the Medium
4. Propagation in the Frequency Range 10-200 kHz
5. Propagation in the Frequency Range 200-2000 kc/s
6. Propagation in the Frequency Range 2.5-30 Mc/s
7. Optical Propagation
8. Space Propagation
9. Cosmic Dust Mie Scattering
10. Notes, Receiving Systems

The course will be conducted at the Central Radio Propagation Lab. of the National Bureau of Standards in Boulder, Colo. There will be approximately 30 on-the-job observers, who will be primarily from the National Bureau of Standards, but there will be some from other research laboratories.

A tentative list of dates for the three-week course in Electromagnetic Propagation is as follows:

Dr. G. J. Little
Dr. J. R. Winterton
Dr. W. F. Beale
Dr. T. R. Gayler
D. B. Crow specialists in the field...
Barry, S. M.
Barnes, C. B.
Barnes, E. R.
Barrett, J.
Bassler, M. A.
Bassler, J. H.
Bateman, D. J.
Benery, F. W.
Bentley, G. D.
Bennett, G. B.
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Wright, H. L.

Windmuller, S. M.

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Massachusetts
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