

The ARRL-IGY Propagation Research Project

V.h.f. Contact Data to Be Collected on a Worldwide Scale

BY MASON P. SOUTHWORTH,* W1VLH

• Since the accompanying article introduces a new ARRL program, perhaps a few words of introduction for its author are also in order. Although W1VLH is officially a newcomer to the Headquarters staff, many of you already know him for his *QST* articles on "things v.h.f." during recent years. These have been turned out while spending his college vacations working in the ARRL laboratories.

Mason graduated from Trinity College, Hartford, in 1955 and from Rensselaer Polytechnic Institute in 1956. He is a member of Phi Beta Kappa, Sigma XI, Tau Beta Pi, Eta Kappa Nu, and Sigma Pi Sigma honorary societies as well as the IRE and their Professional Group on Antennas and Propagation. With this background plus several years of v.h.f. hamming experience it was only natural that W1VLH should go to work on the project announced in this article. He will be in charge of a special ARRL office which will collect and analyze the reports to be sent in by v.h.f. amateurs.

THE WORTH of amateur observations is recognized in many scientific fields, and amateur workers of many kinds will participate in the coming International Geophysical Year. Therefore it was only natural that a place be made for hams in the course of planning the radio-propagation aspects of IGY.

The IGY itself and the reasons for its being were discussed by Dr. Berkner in the July issue of *QST*, and anyone who has not read this background article by now should certainly do so. The possibilities for amateur participation in connection with tracking the satellite of Project Vanguard, and setting up communications networks to furnish moral support to the Antarctic groups and help give notice of special events were mentioned in the same issue. Another amateur project, whose purpose is to gather radio propagation data is, perhaps, to be the most important and worthwhile of all. This involves the reporting of v.h.f. DX contacts made by several means of propagation which, although

fairly common to a good many hams in practical communication, are still incompletely explained theoretically.

When there is a job to be done, one tries to pick the best means for doing it. Just so in this case. When it comes to gathering data about propagation phenomena, it's hard to beat a large number of reporting stations operating at all hours of the day and night. If a series of observing stations had to be set up especially for the IGY, the cost of this phase of the program would be enormous, and results would still not be as complete as could be furnished by existing amateur stations with their wide distribution. Therefore, when information on propagation was desired for IGY, hams were a natural for the job.

ARRL and IGY officials got together as early as the fall of 1955 to see what could be done about setting up a program of amateur observations to supplement the more exact—but of necessity limited—information obtained from scatter soundings and the like. The program which evolved from these talks has now taken on a definite form. The work will be done by ARRL under an Air Force contract. Dr. Wolfgang Pfister of the Air Force Cambridge Research Center will be the consulting scientist on the program. The writer will be in charge of collecting and analyzing the data for ARRL.

The program will be concerned with v.h.f. propagation in three main categories: transequatorial scatter on 50 Mc., auroral communication on any amateur frequency above 50 Mc., and sporadic-E skip. In order that no interesting phenomena may be missed, details of any amateur v.h.f. work over unusual distances will be solicited. It will then be up to the special ARRL IGY Staff to sort them out, if the reporting amateur is unable to do so himself.¹

The first work in the three fields mentioned above was done by amateurs using the v.h.f. bands. Transequatorial scatter was turned up when amateurs in Mexico began working South American stations on 50 Mc., at times when communication should not have been possible, according to any means of propagation then known. Later 50-Mc. operators in many parts of this country and Canada made similar contacts at "wrong" times, and the medium by which these came about is still far from completely understood. It was for the purpose of gathering more data on this phenomenon that scientists working out the scope of the IGY program first conceived the idea of enlisting the aid of radio amateurs.

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* ARRL-IGY Project Coordinator

¹—Basic details of v.h.f. propagation may be found in any recent edition of the ARRL *Handbook*. 50-Mc. DX was described in May, 1955, *QST*, Page 22. V.h.f. dx phenomena were discussed in detail in *QST* for February, 1951, p. 46.

ARRL — IGY

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Long-distance propagation of v.h.f. waves by means of reflection from the auroral curtain, and from sporadically-ionized patches of the E-region of the ionosphere was discovered by amateurs two decades ago, and their observations have been used effectively in studying these phenomena on many occasions. Notable examples are the Cornell University Auroral Project organized with ARRL assistance, and the RASO program conducted by O. P. Ferrell under Air Force contract. Because use of amateur v.h.f. bands is currently at an all-time high, and because the IGY is a worldwide and concentrated scientific effort on many fronts, timed to coincide with the expected peak of a solar activity cycle, the ARRL-IGY program is an unparalleled opportunity for amateurs to contribute to man's knowledge of radio wave propagation.

To make the most of this project, reports from amateurs in all parts of the country will be needed. If you live in one of the less populous sections and make relatively few contacts, don't feel that you can't contribute much. Your reports will be, if anything, more valuable than those from fellows whose areas are well represented. In fact, it isn't necessary to have a v.h.f. transmitter or even an amateur license to help out. Accurate heard reports will be useful supplements to lists of two-way contacts. It goes without saying that this program is made-to-order for the Technician licensee. Many of these fellows have already found out what fun 50-Mc. operation can be, but for those who haven't here's a chance to really make that "ticket" count for something. Not to be overlooked in this project are our brother amateurs from south of the equator. Their cooperation will be essential, of course, in the equatorial-scatter phase of this program. Their help will be solicited through member societies of the International Amateur Radio Union, as well as the pages of *QST*.

The reporting involved in the program will go something like this: All contacts and heard reports which are suspected to have resulted from one of the propagation types outlined above will be listed on the special forms to be available. These forms will be made up so that the desired information can be taken from the regular station log, insofar as possible. Regular operation will, of course, be encouraged. At bimonthly intervals these report forms will be returned to the ARRL office handling the program.

Then the project staff takes over. First the data will be sorted as to propagation type and time of occurrence. Contacts will be selected which are representative of conditions at any given time. From the information furnished about these contacts, calculations of such things as distances and mid-point locations will be made. The resulting data will then be arranged in a form suitable for analysis. At this point the really important job of study and correlation begins. This will go on during the IGY period,

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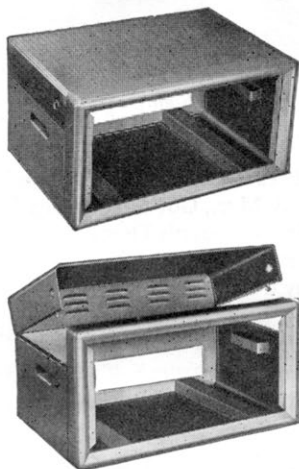
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and probably afterwards when the data from other projects is available. If all this sounds rather involved, remember that all the reporting stations have to do is to operate faithfully and send in suitable data on their contacts.

The International Geophysical Year itself will run from July 1, 1957 until December 31, 1958. In almost any new project, certain "bugs" develop. To circumvent this, it has been decided to start collecting data on January 1, 1957, six months early. Thus, we should be in full swing by the actual beginning of the IGY. Do not think that the data collected during this trial period will be wasted — far from it. We can use all the information that we can get. In fact, there has been some talk of the possibility of continuing an investigation of this sort even after the IGY is over. This will depend on the cooperation received from you, the radio amateur.

If you are equipped to operate or listen on any band from 50 Mc. up, and want to take part in what may become one of the major accomplishments of amateur radio, write in and let us know. Send your letter to the writer, in care of ARRL Headquarters. Bear in mind that the program is in a formative state. Aims and procedures may be modified as the need arises or as new ideas come along. In fact, we hope that the program will remain flexible all during its existence, since it can contribute the most only by being adaptable to new concepts. If you have any suggestions as how this work can be made more worthwhile, let us know that too. Further and more detailed information will be coming up shortly through the pages of *QST*. In addition, there will probably be a monthly bulletin which will be sent to contributing stations. It will contain program news, reports sent in which are of special interest, and reports of the project results as information comes in.

Output Indicator

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capacitance is needed at C_1 to light the dial lamp on 80 and 40 meters than on 15.

The unit shown in the photograph was built in a 3 x 4 x 5-inch box, but the overall cost could have been reduced by using a coffee can for a chassis. However, the writer recently described a harmonic filter² that used a coffee-can chassis, and it was felt that some readers might think we were being subsidized by the caffeine cartel.

² McCoy, "Eliminating 80-Meter Novice Harmonics," *QST*, July, 1956.

ARE YOU LICENSED?

- When joining the League or renewing your membership. It is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.