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BULLETIN

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VOL. 35, NO. 9

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R.S.G.B. BULLETIN

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EDITOR:
John Clarricoats, O.B.E., G6CL

DEPUTY EDITOR:
John A. Rouse, G2AHL

EDITORIAL OFFICE:
R.S.G.B. Headquarters, New Ruskin House, Little Russell Street, London, W.C.1
Telephone: HOLborn 7373

ADVERTISEMENT MANAGER:
Horace Freeman, The National Publicity Co. Ltd., 20-21 Red Lion Court, Fleet Street, London, E.C.4
Telephone: FLEet Street 0473-6

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Current Comment

discusses topics of the day

National Convention

BEFORE the last war Convention was *the* event of the R.S.G.B. year. Planned well in advance it attracted upwards of 200 members. Compared with present-day standards, when 1,000 members and their families support a single mobile rally, prewar Conventions may appear to have been very puny affairs, but in the memories of those who attended them they will never be forgotten. The pleasure of reunion, perhaps, more than anything else accounted for their popularity: shades of Pinoli's and of the Florence, of Conversaziones, and of visits to 2LO, when it was at Marconi House; memories too of Bevan Swift, Dawson Ostermeyer, Simmonds, Gregory, and Stollery, to mention but five stalwarts of those bygone days. Memories of Murray and Mann who launched the Royal Naval Wireless Auxiliary Reserve at Convention in 1932, and of Nutting, Stewart and St. John who laid the foundations of the Royal Air Force Civilian Wireless Reserve at Convention in 1938.

Since the end of the last war three National Conventions have been held: one in Manchester, one in London, and one in Bristol. All were well supported and all were splendidly organized.

After a lapse of six years another National Convention is to be held—this time in Cambridge—and already there is a feeling abroad that this will be an event to remember. Let it be said, without fear of contradiction, that Cambridge, besides being a University city, possesses some of the most beautiful architecture in the world, whilst the famous Backs of the Colleges bring a delight to the eye.

The impact of fundamental research on the development of radio communication and the fact that Cambridge itself is the home of much of that research will be stressed in the advance publicity which the organizing committee is to distribute. In support of that claim Mr. J. A. Ratcliffe, C.B.E., of the Cavendish Laboratories and Martin Ryle, Professor of Radio Astronomy, will be among the many prominent speakers during Convention.

In preparing to give pleasure to hundreds of members and their ladies the organizing committee are undertaking a tremendous task but that task will be lessened as soon as they obtain a clear picture of the likely attendance.

As for details the Convention will be opened at midday on Thursday, September 15, and for the next two and a half days a packed programme of events will be offered. Accommodation has already been reserved at several hotels in the centre of the city and a limited amount of accommodation will be available at Ridley Hall and Clare Hall Hostel. High-spot of the Convention will be a Reception at the Guildhall on Friday evening, September 16 and a Convention Dinner on Saturday evening, September 17.

Although Convention is at present six months distant it is not too early to make plans for attending. As a guide, it is expected that the overall cost of tickets for those who intend to support the event fully, will be about £2 a head which fact alone should ensure widespread support.

Members who expect to attend Convention are urged to send a postcard without delay to the Convention Secretary, Mr. Howard Waton (G3GGJ), "Arkengarthdale," New Road, Barton, Cambridge, stating how long they expect to stay, whether they will be accompanied by relatives or friends, and what hotel or hostel accommodation is likely to be required.

—J.C.

Four Metres

MEMBERS will have seen in the February issue a statement containing the good news that the 70·2-70·4 Mc/s band has now been allocated until further notice to all U.K. amateurs including those who live within a 50-mile radius of the Jodrell Bank Observatory. Hitherto the band has only been available on a year-to-year basis and not at all to those in the 50-mile zone.

Results achieved by those who have worked on 4m in the past have been most encouraging but many potential users have failed to try the band because of the temporary nature of the allocation and the fear that equipment might soon become redundant. The latest announcement from the Post Office should remove those fears and lead to considerably greater activity in a most interesting part of the frequency spectrum, lying as it does between the highest frequency DX band (28 Mc/s) and the real v.h.f. range of 144 Mc/s.

Propagation around 70·4 Mc/s shows similarities to propagation on both adjacent amateur bands. Though for much of the time it will behave like 144 Mc/s, it is likely, during summer months particularly, to provide sporadic *E* openings. Members will remember the contacts which were made by G5KW and G5MR with North Africa just after the band became available.

The U.K. allocation is on a purely national basis and no provision is made for it internationally but it is to be hoped that other European Amateur Radio societies will be able to persuade their authorities to allocate 200 kc/s in this region. With Continental amateurs on the band, a vast new field of experiment will be opened up.

—J.A.R.

Some Radio Aspects of the International Geophysical Year*

By R. L. SMITH-ROSE, C.B.E., D.Sc., Ph.D., F.C.G.I., M.I.E.E.†

MEMBERS of the Society will be well aware that during the period from July 1, 1957 to December 31, 1958, scientists throughout the world carried out an intensive programme of observations of various related geophysical phenomena occurring on the Sun, in our atmosphere and on the Earth itself. Radio played a very important part in this programme. In the first place, it was used as a means of rapid communication to co-ordinate various parts of the programme which were selected at short notice when it was expected that some unusual occurrence was likely to take place on the Sun. Secondly, radio echo technique was used as the normal means of examining the characteristics of the ionosphere and also of the existence of the ionized trails of meteors; the effect of aurora on radio wave propagation conditions particularly at very high frequencies was also studied. Thirdly, radio techniques were used to investigate thunderstorms and atmospheric noise as well as for the observation of general meterological conditions, including winds, in the lower atmosphere. Some suggestions as to the manner in which radio amateurs could participate in this whole programme were given by the writer in the Society's BULLETIN for March 1957. This was followed in April and August 1957 by more detailed programmes described by G. M. C. Stone (G3FZL), who acted throughout as the R.S.G.B. I.G.Y. Co-ordinator and has published reports on progress in July and November 1958. Another relevant article entitled " Propagation and the International Geophysical Year " by G. W. Slack (G5KG) was published in the BULLETIN for July 1957.

Probably the most spectacular event of the I.G.Y. was the launching of artificial earth satellites in the U.S.S.R. and in the U.S.A.; and some news items on *Sputniks 1 and 2* were given by Stone in November and December 1957. These events demonstrated two features of the importance of radio in the exploration of the upper atmosphere and the space beyond. Radio position finding is a necessary aid to visual observation in determining the orbits of satellites; and it is also the means whereby the scientific observations made in a satellite are communicated to earth either directly or after a suitable recording technique is used.

In addition to a calendar of observation days drawn up in advance, provision was made during the progress of the I.G.Y. for the declaration of Special World Intervals when the state of the Sun indicated the likelihood of a geophysical disturbance which might affect, for example, the ionosphere, and the earth's magnetic field. For this purpose an international network of radio and line communications was used to alert all participating observers and warn them that such a S.W.I. might, subject to confirmation, begin sixteen hours later. During the I.G.Y. 44 such alerts took place; of these 22 culminated in a special world interval, during 17 of which major solar and terrestrial disturbances occurred.

Provision was also made in advance for the setting up of a number of World Data Centres. The two main centres in U.S.A. and U.S.S.R. collect data relating to all disciplines in the geophysical programme; while in the radio field two additional centres in England and Japan were set up. The former is at the D.S.I.R. Radio Research Station at Slough, where, up to date, well over a million sheets of ionospheric records (ionograms) and results, together with atmospheric noise and auroral data, have been received. It is likely that the mass of material brought together in this way will provide the basis of research in geophysics for many years to come; and in this brief review it is possible to refer to only one or two examples of the results which have already been achieved.

Study of the Ionosphere

The exploration of the ionosphere by vertical soundings using pulse techniques was established on a regular basis in this country and in the United States of America over 25 years ago. From the two or three pioneer stations in this field, the number steadily increased to about 80 which were in regular operation before the I.G.Y. began; and about twice this number were established during the I.G.Y. The study and assimilation of the vast amount of observational data obtained at these stations will take many years; but to illustrate how some of the results have already been used, two examples may be referred to here. One of these deals with small quantities of data which have been examined in great detail and very accurately: the other is concerned with the approximate statistical treatment of a large amount of data referring to specific ionospheric characteristics.

Distribution of Ionization and M.U.F.s

The calculation of the maximum usable frequencies (M.U.F.) for radio communication circuits is based on the assumption that the density of ionization in the highest (*F2*) layer of the ionosphere increases with height according to a parabolic law. The refractive properties of a non-parabolic layer might be expected to lead to maximum usable frequencies above or below those at present in use. Recent research in this and other countries has resulted in new methods of calculating the variation of electron density (or ionization) with height through the regions which reflect radio waves of various frequencies. These variations can be expressed in graphical form in what are termed N(h) profiles, and these are often found in practice to be far from parabolic in form. By tracing the paths of the waves through ionized layers conforming with the measured profiles, it has been shown that, although the actual maximum usable frequencies do not differ by an appreciable amount from those calculated assuming a single parabolic *F2* layer, the angle of arrival of the waves for a given distance between the transmitter and receiver tends to be greater than that for a parabolic layer of the type usually assumed. Thus the practical conclusions reached are that while the maximum usable frequencies now in use are not seriously affected by

* This paper was read to Society members present at a meeting held at the Institution of Electrical Engineers, London, on Friday, January 22, 1960.

† *Immediate Past President, Radio Society of Great Britain.*

the shape of the layer, it may be desirable to use aerial systems which project the radiation at a greater angle of elevation than has hitherto been considered the most appropriate.

Solar-Cycle Changes in foF2

In the above example, the whole of the observational data for about ten ionograms have been studied in very great detail. The next example deals with the critical frequency of the *F2* region, using data obtained from many thousands of ionograms from all parts of the world.

During the I.G.Y., solar activity was considerably higher than it has been since regular visual observations of the number and magnitude of sunspots were begun about 200 years ago. As a consequence, the ionization and hence the critical frequencies of the ionospheric layers have reached unprecedented high levels. This new information on ionospheric behaviour at very high solar activity is unique and is unlikely to be repeated for many years to come. This is important because it adds a great deal to earlier knowledge on the relations between solar activity and critical frequencies, an understanding of which is essential to the accurate forecasting of M.U.F.s for communications.

Ionospheric Investigations in the Antarctic

The I.G.Y. provided the impetus for a scientific survey of Antarctic and Arctic ionospheric conditions on a scale which had not previously been attempted. In the Antarctic, British ionospheric stations were manned by the Royal Society at Halley Bay in the Weddell Sea, and by the Falkland Islands Dependencies Survey at Port Lockroy in Grahamland. Other stations were operated by France, U.S.S.R., and other countries, including one at the South Pole where the U.S.A. had a large base.

Ionspheric observations at these high latitudes in the Antarctic are of special importance owing to the fact that the summer and winter conditions there are very different from those in lower and more temperate latitudes. The complicated behaviour of the upper (*F*) region of the ionosphere may be better understood by attempting to separate the phenomena due to electrons produced directly by the Sun's radiation from those which are due to horizontal or vertical drifts of clouds of electrons in the ionized layers. Such movements or drifts are the result of interaction with the earth's magnetic field, and the velocity of the movement depends on the direction of this field and, in particular, on the angle of magnetic dip. Now in the Weddell Sea area, this dip was found to be anomalous due to the asymmetry of the magnetic field in relation to the centre of the earth. This anomaly is so great that the dip angle at the Royal Society Base at Halley Bay, 75° S, is the same as that at Canberra, 35° S, or at similar latitudes in Florida in the northern hemisphere. As a result, the ionospheric phenomena are more dependent on movements in the layers than on the direct effect of the Sun's radiation. For example, it was found that in midwinter when the Sun does not rise above the horizon for about three months, the critical frequency—and thus the density of ionization—of the *F* region was greater than that found in midsummer when the Sun never sets. Furthermore, in spite of the absence of solar radiation in the winter, a large diurnal variation in the density of ionization was found at Halley Bay, the noon value being about ten times that at midnight. Detailed studies of the records of observations confirm that these changes are mainly due to horizontal movements of ionization. On some occasions there may be simultaneous reflections of radio waves from two layers; one being the regular or normal layer which is gradually replaced by a much more dense one moving into position overhead. The differences between summer and winter diurnal changes illustrate a phenomenon taking place on a world-wide scale; and continued study will lead to a better understanding of the ionosphere generally, and the manner in which radio waves are reflected round the earth in long distance communication.

The Use of Rockets and Satellites During the I.G.Y.

During the past decade rockets have been used for research purposes to investigate the phenomena and characteristics of the upper atmosphere by direct measurement in a manner which ground-based experiments are unable to provide. Following this work, it was recommended that during the I.G.Y. observations with rockets should be supplemented by means of artificial earth satellites carrying instruments for the measurement of solar radiation—ultraviolet, X and cosmic rays—and its effect on the ionosphere. This recommendation culminated in the successful launching on October 4 and November 3, 1957, respectively by the U.S.S.R. of the instrumented earth satellites known scientifically as 1957 —α and—β, or more popularly as *Sputniks 1* and *2*. This was followed on January 31, 1958, by the U.S.A. satellite 1958—α — *Explorer 1*; and others have followed at intervals during the past two years. At the present time, there are about a dozen satellites in orbit

Indexing some of the thousands of microfilm tables of ionospheric data received at the I.G.Y. World Data Centre at Slough from all parts of the world. (Crown Copyright reserved)

round the earth, while two others are pursuing courses round the Sun and Moon.

These space vehicles contain instruments for the measurements of the properties of the atmosphere, the electron density of the ionosphere and the intensity of cosmic and solar radiation in outer space. The output of these instruments is in electrical form and is either transmitted directly by radio to the ground observing stations, or is recorded on magnetic tape and sent later on receipt of a command signal from a radio station on the earth. Some of the telemetry systems are relatively simple providing information in only a few channels; others are more complex and use up to 48 channels. For example, the system used on the 20 Mc/s transmissions from *Sputnik 3* (1958 α) contains three channels, one to indicate whether solar or chemical batteries are in use, and two to record cosmic-ray data. A pulse width system of modulation is used, the information being given by the time interval between successive changes of the pulse width from one discreet value to the next. The American satellites have transmitted the information on a frequency of 108 Mc/s supplemented more recently with higher frequencies. In one of the systems used, the modulation consists of 16 bursts of tone, the information being carried by the tone frequency (5 to 12 kc/s), the duration of the bursts and the interval between them, giving 48 channels in all. The power of transmitters in continuous operation varies from 10 to 100 mW, while for intermittent operation on command, a few watts have been used.

Apart from the need to extract the observational information from the satellite, radio transmission is used to track it and to supplement the positional information which may be obtained visually under favourable clear sky conditions. Radio interferometers and tracking equipment have been installed in a number of countries to give round-the-world coverage by international co-operation. Additional information provided by the radio signals includes a determination of successive orbit periods, from a knowledge of which information is obtained as to the shape of the earth, variations of gravity at different altitudes and the drag of the rare atmosphere at the orbit levels. Moreover, measurements of the total electron density between the earth and the satellite have been made by comparing the speed of the received waves at a frequency just above the critical frequency of the ionosphere, and at a much higher frequency. The difference in speed at these two frequencies depends upon the total number of free electrons along the path; so the distribution of this number with height can be determined from a continuous record of the difference between the two received frequencies. Both the U.S.A. and U.S.S.R. results have shown no clearly defined minimum in the electron density between the *E* and *F* layers; and in the U.S.S.R. results there has been a negligible decrease from the maximum of the *F* layer up to a height of about 470 km. British experiments with Skylark rockets used a different technique, the change in conductivity and dielectric constant of the ionized air being used to change the frequency of an oscillator. This system has a very rapid response and is capable of showing the fine structure of the ionosphere. In view of the fact that radio methods of sounding the ionosphere from the earth's surface are limited to the lower portion up to the maximum of the *F* layer, and that it is estimated that there is at least as much more ionization above this layer, the satellite clearly provides a very powerful tool for future ionospheric research.

Conclusion

In concluding this very brief review of the manner in which the I.G.Y. was associated with radio, two points must be emphasized. First, that the successful exploration of our atmosphere and the outer space beyond depends to an increasing extent on the technique of electronics and radio communications. Secondly, it is clear that the international exercise which was designated the I.G.Y. did not end on December 31, 1958. As G. M. C. Stone has pointed out in the BULLETIN for January 1959, the following year has been termed International Geophysical Co-operation—1959; and it was also recommended that as far as practicable the various observatories should continue to work in their respective disciplines to extend our knowledge of the earth and its surroundings. It has further been recommended that the World Data Centres established for the I.G.Y. and extended for the results obtained with rockets and satellites, should be continued indefinitely as international repositories of the observational information which is to be freely available for research workers in the future.

A Simple Test Prod

By A. D. MacDonald (GM3NPM)

A BALL-POINT pen consists of a plastic insulating tube with a shaped metal contact at one end. To convert a used pen into a test prod, it is only necessary to pass a wire down the barrel and connect it to the metal of the ball-point. First, the ball-point is filed, or ground, until the ball falls out. As there is usually a little ink left, it should be blown or washed out. Washing also removes ink stains on the ink holder. A length of insulation is removed from the multi-strand wire to be used to join the prod to the test instrument. The bare wire should be rather more than the length of the metal ball holder. This wire is then passed down the centre of the plastic tube normally holding the ink, until the end of it protrudes through the hole in the metal part of the ball-point pen and is then soldered, preferably with a very hot soldering iron as lengthy application may result in the plastic melting. After the joint has been filed to a smooth finish, the test prod is ready for use.

Such a test prod has been in use for some time in the writer's shack with very good results. In appearance and ease of handling, it surpasses many professional prods sold as accessories to high-priced equipment, yet costs nothing and will only take ten minutes to make.

Revision Notes Available

COMPREHENSIVE revision notes for the use of members who are preparing for the City and Guilds of London Institute examination on Friday, May 6, 1960, are available from Headquarters, price 1s. per set, post paid.

THE ROYAL BIRTH

The following telegram was addressed to the Society's Patron shortly after the announcement was made from Buckingham Palace that Her Majesty The Queen had given birth to an infant Prince.

"To H.R.H. The Duke of Edinburgh, Buckingham Palace, London.
The President, Council Members and 10,000 other Members wish to extend their congratulations and loyal greetings on this grand event. Metcalfe, President. Radio Society of Great Britain."

The following is the text of the reply received:

"Thank you very much for the kind message on the birth of our son—Philip, Patron."

Amateur Radio Participation in the I.G.Y.*

By G. M. C. STONE, Grad.I.E.E. (G3FZL)†

DR. SMITH-ROSE has described the international organization that was set up to co-ordinate radio wave propagation observation during the International Geophysical Year. He has also described some of the results that were achieved, especially those of the Royal Society Antarctic Expeditions and of his own establishment, the Radio Research Station, Slough, and its outposts scattered throughout the world. It is proposed in this paper briefly to outline the U.K. radio amateur I.G.Y. programme. One or two particular aspects will then be dealt with in a little greater detail. Finally the continuation of similar studies by radio amateurs will be considered.

As Dr. Smith-Rose has stated, the R.S.G.B. I.G.Y. programme was initiated following his suggestions published in the March 1957 issue of the R.S.G.B. BULLETIN. The original planning was carried out by D. W. Furby (G3EOH), C. E. Newton (G2FKZ) and the writer, and our ideas were published in the BULLETIN at various times during 1957. A comprehensive instruction manual was prepared which covered all the initial projects and was later amended to cover additional projects such as satellite signal reception. Some 10,000 special signal report forms were printed. Certain of the projects proved to be non-starters for various reasons and only those that have produced satisfactory results in terms of the quantity and quality of observations will be mentioned here.

Since the I.G.Y. was chosen to occur during a sunspot maximum, a fruitful field of study proved to be that concerned with the ionospheric propagation of both h.f. and v.h.f. radio waves. Data were collected concerning the reception of the U.S. Bureau of Standards Station WWV on 15, 20 and 25 Mc/s over the North Atlantic path. In addition, a study was made of the propagation of 144 Mc/s radio waves by auroral reflection. It is intended, firstly, to analyze these auroral reports in some detail and then to relate them to the reception reports of WWV.

A certain amount of work was done in the U.K. on the ionospheric propagation of radio waves in the 50 Mc/s region but the majority of work in this field was carried out in the United States where the A.R.R.L. organized and ran very successfully, under the leadership of Mason Southworth (W1VLH), a programme primarily designed to investigate all modes of propagation in the 50 Mc/s band although 144 and 432 Mc/s observations were made also. Of particular interest were the results obtained across the Equator and a new mode of propagation—trans-Equatorial scatter—was extensively explored. Similar work was carried out by amateurs in Cyprus and Central Africa and some of their findings were published in *QST* for December 1959. The work of this group has been assisted by several amateurs in the U.K., notably L. G. Spencer (G4LX) of Newcastle upon Tyne. The R.S.G.B. does not propose to analyze any 50 Mc/s results but to hand over the limited number of reports to the A.R.R.L. who are working under the aegis of a contract placed by the U.S. Air Force.

A further U.K. item concerned v.h.f./u.h.f. tropospheric propagation. This programme was largely due to C. E. Newton (G2FKZ) who first carried out such observations during 1950-53 (see R.S.G.B. BULLETIN, November 1954). It was decided to extend his work of that period on a much larger scale. Two types of measurements were required, those concerning the weather in terms of barometric pressure and water vapour pressure and those concerning the reception of v.h.f./u.h.f. radio signals over path lengths greater than 50 miles. The largest amount of data collected by the R.S.G.B. during the I.G.Y. was in connection with this project. Hundreds of met. readings all over the country were taken by amateurs who purchased the necessary instruments at their own expense. In addition, many regular reports were made concerning the signal strength of broadcasting and television stations, the results of regular scheduled operation in the 144 Mc/s band and various types of general operating in the 70, 144, 435 and 1296 Mc/s bands. Reports were also submitted of the reception of the v.h.f. beacon station, GB3IGY, operated on behalf of the R.S.G.B. by K. E. S. Ellis (G5KW). From a study of all such reports it is hoped to produce information to guide the individual amateur in making forecasts of above-average conditions and to provide some information of value to the professionals.

Worthy of special mention here is the regular schedule operated by J. N. C. Bradshaw (G2NY) with the Dutch

Members of Wirral Amateur Radio Society recording telemetry signals from **Sputnik 3.** *Standing, G2HOF; seated (left to right) G2FNI, G3CSG, G3EGX.*

* This paper was read to Society members present at a meeting held at the Institution of Electrical Engineers, London, on Friday, January 22, 1960.

† *R.S.G.B. I.G.Y./I.G.C., 1959, Co-ordinator.*

Government Station PE1PL over a path of more than 300 miles. Using high power (1 kW in the case of G2NY and more in the case of PE1PL) it has been found possible to maintain communication with surprising regularity. The mode of propagation is undoubtedly tropospheric scatter since G2NY has the Pennine ridge, about 40 miles away, between him and PE1PL. Many other similar schedules have been run and consistent results have been obtained over similar long paths, e.g. London area to Dunfermline, Scotland, especially by the use of high power.

G2FKZ is now engaged on the marathon task of commencing the analysis of the v.h.f. tropospheric signal reports and it is too early yet to report any result. G2FKZ is being helped by a number of I.G.Y. observers in this work and he hopes to be able to publish some initial results later this year although a complete analysis of these data will take a number of years to complete. In particular, it is hoped to relate various types of v.h.f. propagation conditions to known types of weather conditions, e.g., anti-cyclones, depressions, etc.

Earth Satellites

A field of study, not originally planned, concerned the reception of radio signals from earth satellites. Immediately upon the release of the first Russian earth satellite, 1957α, *Sputnik 1*, arrangements were made to organize some observations in view of the radio frequencies being used. First efforts were made, in conjunction with the British Astronomical Association, to set-up a network of stations whose aim was to measure and plot, relative to time, the Doppler shifts on the satellite radio transmissions on 20 Mc/s. From this it was possible to calculate the time and range of nearest approach. Given this information from a number of widely spaced observers it was possible to calculate the orbit of the satellite and then to make predictions concerning future orbits. At that time no organization in this country was charged with this responsibility although it has now been taken over by the Radio Research Station from which a regular prediction service is operated. Such a network of observers was set up in time for the release of 1957β, *Sputnik 2*, and orbit forecasts were made for about one week from the joint B.A.A./R.S.G.B. centre at Norwood Technical College; in fact, on the day of the release orbit predictions were supplied for broadcast by the B.B.C. after the 11 p.m. news. Typical Doppler curves are shown in Figs. 1 and 2. Fig. 1 shows curves taken out at a one-man station, that of L. V. Dent (G3GDR) of Watford. Fig. 2 shows a similar curve made by G. N. Roberts (G3ENY). A paper describing this work was read at a special Royal Society meeting by J. Heywood. (This was published in the *Proceedings of the Royal Society*, Vol. 248, No. 1252.)

The next satellite to be released for which an amateur observational network was set up was 1958β, *Sputnik 3*. In this case the requirement was for amateurs to record the telementry signals on tape. Two centres were set up, one

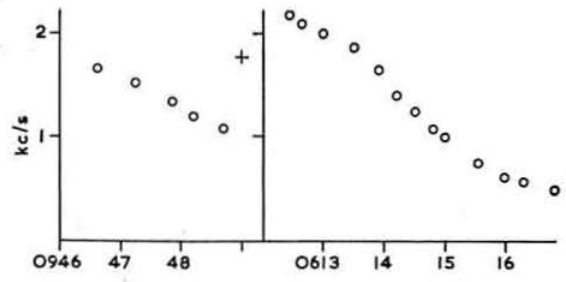


Fig. 1. Curves showing Doppler shift prepared by L. V. Dent (G3GDR) of Watford on November 4, 1957. Satellite 1957β (Sputnik 2).

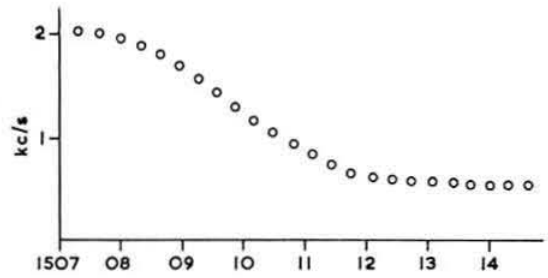


Fig. 2. Similar curve to that of Fig. 1 prepared by G. N. Roberts (G3ENY) of Bridgnorth on November 4, 1957. Satellite 1957β (Sputnik 2).

manned by members of the Wirral Amateur Radio Society under V. Collins (G2HOF) and the other in London manned by N. A. Bennett (G3HSC) and J. Wall (G3GQK). Observations were continued for two weeks and many thousands of feet of tape were used. Recently selected tapes have been sent to Dr. Pressey of the Radio Research Station, who has transcribed these tapes on to film suitable for analyzing the telemetry signals. The equipment for doing this was displayed at the 1960 Physical Society Exhibition. The information contained in this telemetry concerns cosmic ray intensity which is of particular interest since the discovery of the Van Allen radiation belt which surrounds the earth (see also *Radio* (Moscow), No. 11, 1959).

Auroral Studies

Before 1957 there was very little documentary evidence of auroral propagation in the 144 Mc/s band. The aim of this part of the R.S.G.B. I.G.Y. programme was to determine the frequency of occurrence and daily variations of such propagation.

Aurorae are caused directly by solar activity of some sort and 144 Mc/s auroral propagation was sometimes observed when Special World Intervals had been declared but also at times when no unusual solar activity had been reported. This phenomenon is known to geophysists and such aurorae are said to be caused by imaginary areas of the Sun known as *M* regions. Little appears to be known of what is unusual about such regions but the resulting aurorae are very real. Another feature of aurorae is that they become more common as the latitude becomes higher, peaking in a region known as the auroral zone. It has been possible to compare the occurrence in a high latitude compared with the U.K. because the R.S.G.B. has one observer in Sweden. He is Olof Karlsson (SM6PU) whose reports have been of exceptional merit. From his results and those obtained from U.K. amateurs, histograms (Figs. 3 and 4) have been plotted, showing the occurrence of 144 Mc/s auroral propagation during 1957, 1958 and during the year of International Geophysical Co-operation, 1959. A number of interesting results can be seen from these histograms. For example, there was a surprising reduction in the number of aurorae at the time of the actual sunspot maximum, around November/December 1957. A recurring peak month for occurrence was September, whilst the greater number of aurorae in a three-monthly period was after the sunspot maximum and I.G.Y., i.e., during the first quarter of 1959. The increased occurrence rate at a higher latitude can be seen during 1958 when 20 days were observed in Sweden with only 15 in the U.K. As a general rule there are two peaks of auroral occurrence during the day, one in the late afternoon and the other just after midnight.

Signals reflected from the auroral ionization are easily recognizable. What starts out as a pure c.w. wave is reflected

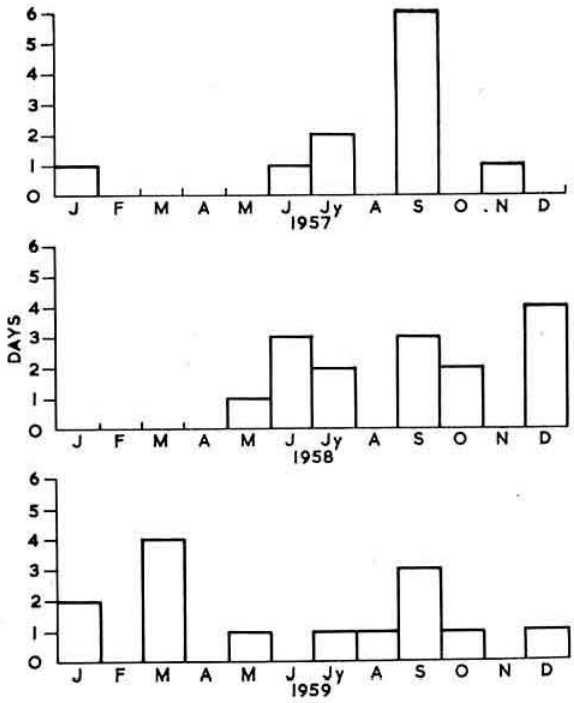


Fig. 3. Occurrence of auroral propagation on 144 Mc/s observed by U.K. amateurs during 1957, 1958 and 1959. Where propagation continued after midnight, the occurrence has been recorded as two days (based on results from 15 observers).

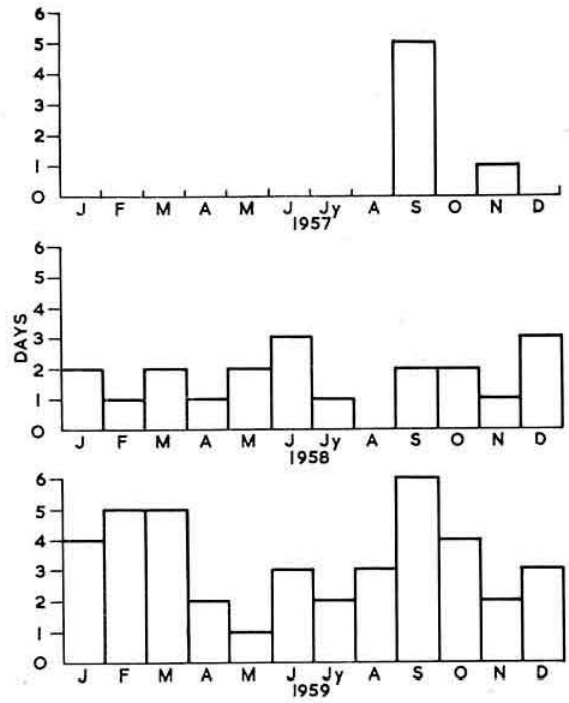


Fig. 4. Occurrence of auroral propagation on 144 Mc/s observed by Olof Karlsson (SM6PU). Note the comparison with Fig. 3. In this case reporting did not commence until September 1957.

from a very great number of small discrete ionized areas which are moving. The resulting returned signals each have a Doppler shift depending upon the velocity of the ionized region. The resultant signal, which is a combination of these individual signals, takes on the characteristic of a noise modulated transmission; the higher the carrier frequency, the greater the Doppler shift on each reflected component. Thus a 144 Mc/s reflected signal sounds more like a hiss than a c.w. transmission. (Some typical auroral signals recorded by L. Hardie (GM2FHH) were then played.)

Amateurs in Denmark have attempted to relate auroral occurrence to changes in the Earth's magnetic field and some correlation is apparent. U.K. amateurs also wish to investigate this point and hope to obtain through the I.G.Y. organization, U.K. magnetograms for periods of particular interest.

Conclusion

During this brief review it has not been possible to give more than a mere glimpse of what was done by radio amateurs during the I.G.Y. For the sake of the record, the writer would like to say that more than 150 U.K. amateurs took part in the Society's I.G.Y. programme and there are many more examples of outstanding individual effort. Special certificates were awarded to every observer who completed more than three months' continuous observation; in all, 75 were issued.

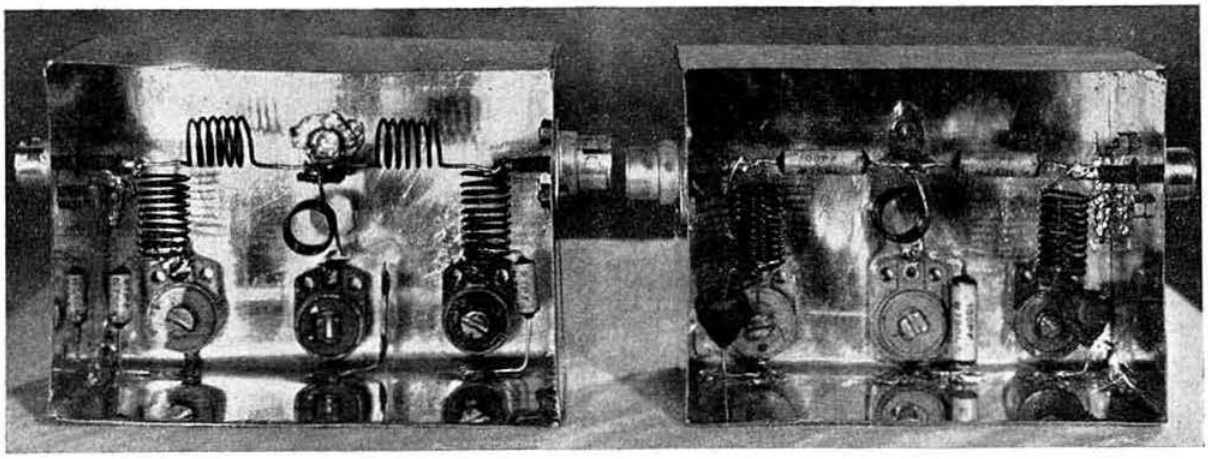
At a later date it is hoped to document adequately the results of this work as a lasting tribute to members' efforts and enthusiasm. The work of analyzing the results is only just beginning but will certainly be completed although it may take several years to do. Similar contributions have been made by amateurs in the United States, Canada, Germany, Denmark, Sweden, Cyprus, Central Africa, Japan and many others. It is to the credit of the Amateur Radio movement that it can apply itself to such tasks with such good purpose.

It is also hoped to continue specialized studies of radio wave propagation on a more limited scale in the future. In fact, plans are being made to contribute to the U.K. programme which is now being organized under the leadership of Dr. Saxton of the Radio Research Station, Slough, to prepare for the Tenth Plenary Assembly of the C.C.I.R. which is scheduled to be held in New Delhi in 1963. It is also hoped to be able to contribute in further satellite observations and to continue auroral observations throughout the whole sunspot cycle. A new field is the study of tropospheric propagation in the 10,000 Mc/s band and plans are being made at present in concert with the London U.H.F. Group for this purpose.

To conclude, the writer would like to thank Dr. Smith-Rose for the great encouragement that he has given to radio amateurs participating in radio wave propagation studies. His advice and help have always been forthcoming and, in fact, without his guidance it is doubtful whether we should have been able to establish the Society's I.G.Y. programme in the way we did.

Holiday in Sweden

CARL E. ELG (SM4KZ), Vindelgatan 20, Ludvika, Sweden, and his wife would like to hear from a British family interested in arranging an exchange holiday. Mr. and Mrs. Elg have two children and own a lakeside cottage about 6 km. from Ludvika. A car is available for sightseeing and visiting radio amateurs in the area.



Low and High Pass Filters for All

Simplified Designs for Home Construction

By DAVID DEACON (G3BCM)*

LOW and high pass filters may be readily made at home and once constructed are most useful in connection with measurements on transmitters and television receivers even if not actually required in cases of interference. For some time past the TVI/BCI Committee has been studying the practical aspects of assembling and aligning simple but effective filters of these types and it is the purpose of this article to describe some examples providing high attenuation across the standard U.K. television receiver intermediate frequency band 33·4 to 38·4 Mc/s. Work has been concentrated on this range because it is now in nation-wide use in all currently produced receivers irrespective of local channel frequencies.

It is apparent that even in areas of comparatively high level television signals interference does occur, due in almost every case to i.f. break-through or swamp although no properly designed superhet receiver should suffer from this type of trouble. The problem can generally be overcome by inserting a bandpass filter or an i.f. transformer in series with the grid lead to the mixer valve preceding the i.f. chain concerned. If the rejector device is simply placed in the aerial lead, it must not be overlooked that through stray capacity coupling and ineffective screening an interfering signal may still reach the mixer stage through the r.f. stage(s) and pre-mixer circuitry.

The protection of national broadcasting and television i.f. bands places a heavy responsibility on all concerned in the field of radio engineering and not least of all on the radio amateur. However, it is not the intention to indulge in polemics regarding the proper design of television and broadcast receivers in this instance.

In a properly constructed amateur transmitter the harmonic component should be at least 40db down on the fundamental. (This figure relates to the effective radiated power at the transmitter output terminals.) On no account should the power of the harmonics radiated from the chassis or connecting leads exceed that measured at the aerial terminals. Sub-harmonics from early stages of the transmitter are included in this test.

Filters to be described in this article should provide some 40db or more of attenuation so a practical total for the attenuation of harmonics in a well-designed installation should be of the order of 80db. In round figures and assuming a transmitter operating at 150 watts input and 66 per cent efficiency, the e.r.p. of which is 100 watts, 40db design attenuation reduces harmonic radiation to 10 milliwatts; a 40db filter further reduces this figure to 1 microwatt, a not impossible achievement with present-day h.f. transmitters for amateur use.

Filter Design

To encourage the widest construction and adoption of these filters particularly in transmitter outputs, a standard but relatively simple circuit has been adopted. Only very elementary hand tools are required to build them and, except for the tin box, most of the materials should be on hand or readily and cheaply obtainable. No special skill is required and, provided reasonable care and attention is paid to the winding details for the inductors and to the location of the components, the results attained should be equal to if not better than those achieved with the prototype filters made by the Committee.

The photograph at the top of the page shows examples of the low pass (left) and high pass (right) types.

The filters employ "m" derived end sections in conjunction with "m" derived "T" centre sections. Individual component values have been determined to allow the mean band of high attenuation between 32 and 38 Mc/s to be adjusted by approximately ± 10 per cent.

The input and output characteristic impedance is centred on 75 ohms. This facilitates the use of co-axial cable and

* *Chairman, TVI/BCI Committee, 17 Lonsdale Road, South Norwood, London, S.E.25.*

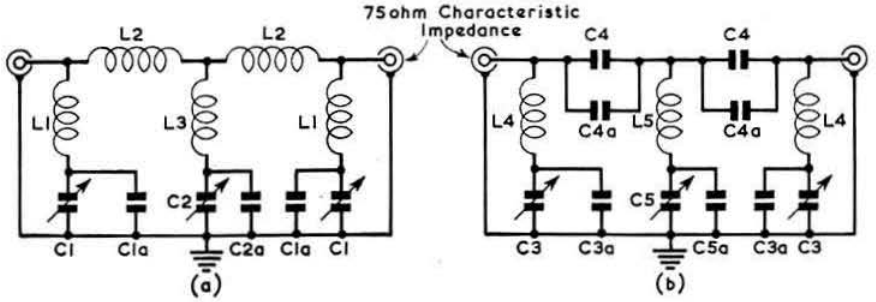


Fig. 1. (a) Low pass filter. (b) High pass filter. The fixed capacitors marked " a " indicate that the capacitor is in fact made up of fixed and variable capacitors as indicated in the Table.

connectors which, in conjunction with a good earth system, should ensure effective screening of the " filtered " lead-through and thereby optimum performance.

The low pass filter is for transmitter r.f. output circuits using co-axial 75 ohm cable. The high attenuation mean band is 32 Mc/s to 38 Mc/s adjustable ± 10 per cent. The cut-off frequency is 32 Mc/s ± 10 per cent. It employs five inductors, three capacitor combinations, two co-axial connectors and a tag strip mounted in a tinned-iron box.

The high pass filter is for television co-axial aerial feeder circuits of 75 ohm characteristic impedance. The high attenuation mean band is 32 to 38 Mc/s adjustable ± 10 per cent. The cut-off frequency is 38 Mc/s ± 10 per cent. It employs five capacitor combinations, three inductors, two co-axial connectors and a tag strip mounted in a tinned-iron box.

In order to simplify the construction as much as possible, neither filter has internal screening between its various branches. Even so, their effectiveness is quite impressive in a correctly matched system, and they should give a good account of themselves in operation.

Fig. 1 shows the circuits of both types. As long as there are no abnormal standing-waves or excessive transmitter harmonics on any part of the feeder system, the components specified for the low pass filter are adequate for h.f. transmitters with d.c. inputs up to 150 watts.

The theory, operation and characteristics of filters will not be dealt with here but may be studied in detail in textbooks and amateur handbooks. Several useful articles have been published in the R.S.G.B. BULLETIN. [1, 2, 3, 4].

Box Construction and General Details

In view of the need to obtain positive contact particularly in the screen and earthed side of the filter network as well as to ensure that in use there can be no possibility of contact rectification occurring, tin-plate (tinned iron) is far superior to aluminium for the box. Tin-plate of 20/22 gauge lends itself to bending and soldering as well as affording screening of the magnetic component of the r.f. current flowing in the filtered lead.

To allow adequate separation between the inductors in each branch of the filter and the minimum of interaction in the absence of internal screening, the box should be made at least 4 in. long, 3 in. wide and 2 in. deep. Suitable tinned-iron boxes may well be obtained from retail shops. Fig. 2 shows the general arrangements for making them up. Proportional adjustments in the marking out should be made for boxes with different dimensions to those shown for reference in Fig. 2.

After marking out and either drilling or punching all the holes in the flat pieces of metal, the box can be bent into shape. To facilitate this, a block of wood, preferably a hard variety cut to the internal dimensions of the box, will be found most useful. *If the box is constructed in this way it is advisable to cut the wood block to size first and then to mark out the tin-plate sheet allowing for the thickness of the metal.* To make the lid a good fit it should be formed in position on the box with the block of wood inside. In this way the lips of the lid may be hammered into their final close fitting form using another piece of hardwood between them and the hammer head. Self-tapping P.K. screws can be used to fix the lid to the box, or alternatively it may be fixed with a number of spot solder joints, but not until the unit has been checked and aligned.

The seams of the box should be soldered with a hot iron. Care in carrying out this operation should result in a smooth and mechanically sound joint which will make the box extremely rigid. Where material for the box is not

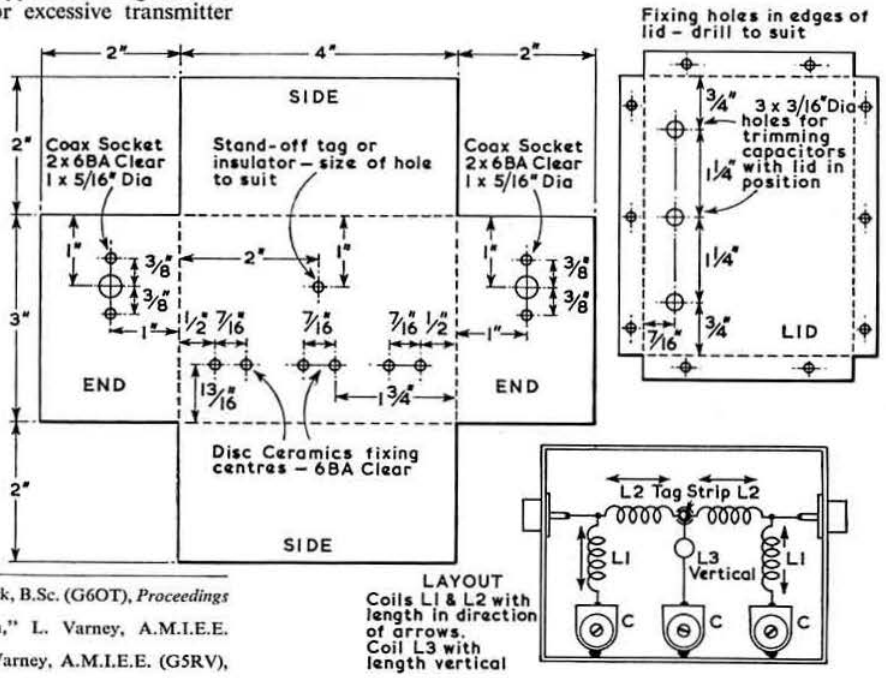


Fig. 2. Drilling details for the filter box. The layout of the low pass filter is shown in the small diagram at the lower right.

[1] " Impedance Matching," H. A. M. Clark, B.Sc. (G6OT), *Proceedings of the R.S.G.B.*, No. 6, Summer 1949.

[2] " Television Interference Suppression," L. Varney, A.M.I.E.E. (G5RV), March 1950.

[3] " An Improved Low Pass Filter," L. Varney, A.M.I.E.E. (G5RV), June 1952.

[4] " Low Pass Filters for Television Interference Reduction," L. Knight. Grad. I.E.E. (G2DXK), May 1953.

available in the correct size, it is practicable to solder together the individual sides, ends and bottom using the wood block as a jig. The 20/22 gauge tinned-iron sheet for the box is generally available from ironmongers in sheets measuring 20 in. by 28 in. for about 5s. This quantity is sufficient to make about five or six boxes to the pattern of Fig. 2.

Other materials required in constructing each filter are two co-axial sockets, 6 B.A. nuts and bolts, a small stand-off insulator or tag strip, self-tapping screws, insulated sleeving, tinned copper wire, a reel of 18 s.w.g. enamelled wire and strips of rubber, Perspex or wood for the underside of the box.

Assembling and Connecting Up

Before construction commences, the inductors, capacitors, co-axial sockets and the tag strip should all be tinned. When this has been done the following assembly procedure will be found a useful guide:

(i) Fix the ceramic variable capacitors in position as indicated in Fig. 2, using 6 B.A. nuts and bolts. (The heads of the bolts should be on the underside of the box.)
(ii) Fit the co-axial sockets and tag strip.
(iii) Add the fixed capacitors in parallel with the variables, at the same time securely soldering the earthy ends to the tin box using the shortest possible leads.
(iv) The three series inductors (L1, L3 or L4, L5) should then be connected between the free ends of the capacitors and the co-axial connectors or tag strip points. Note that the centre inductors should be fixed at right angles to the two end inductors.
(v) Finally, depending on whether the filter is low or high pass, the in-line inductors (L2) or capacitors (C4) may be soldered into position.

This completes the construction but in order to ensure that the screw heads on the underside of the box do not damage any surface on which the unit may be placed it is as well to affix small pieces of rubber, Perspex or wood strips to the bottom.

Checking and Adjusting

Before attempting to make any tuning adjustments on the filters it is as well to test for continuity, open-circuits or short circuits using Figs. 1 (a) and (b) for reference.

With a grid-dip oscillator which covers 30 Mc/s to 40 Mc/s (preferably calibrated at least at each Megacycle) adjustment of the filter may be carried out using the simple test circuit shown in Fig. 3.

The alignment procedure for each type of filter is as follows.

Low Pass Filter With the test oscillator set at 30 Mc/s adjust the link coupling to give about 300 microamps deflection on the meter with the filter out of circuit. Set the oscillator to 32 Mc/s and connect up the filter as shown in Fig. 3. Tune each C1 until the meter reading just begins to fall. By doing this a number of times and by swinging the oscillator from 30 Mc/s to 40 Mc/s in the process the function of the filter will become apparent. When this has been done,

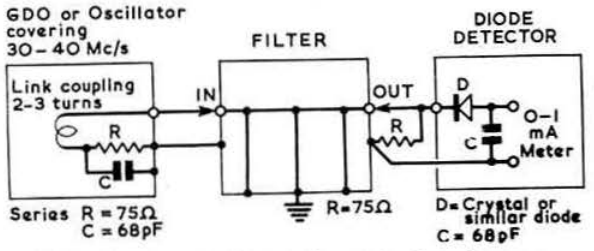


Fig. 3. Arrangement of test equipment for filter alignment.

Coil Table

In both low and high pass filters all inductors are wound with 18 s.w.g. enamelled copper wire on a ¾ in. mandrel (former).

Low Pass Filter

L1 (two required). Total length of wire including leads 13½ in. 9 turns close wound, opened to 1⅛ in. winding length (Inductance 0·4 μH).
L2 (two required). Total length of wire including leads 9¾ in. 6 turns close wound, opened to ⅝ in. winding length (Inductance 0·225 μH).
L3 (one required). Total length of wire including leads 8½ in. 5 turns close wound, opened to ⅞ in. winding length (Inductance 0·2 μH).

High Pass Filter

L4 (two required). Total length of wire including leads 14¾ in. 10 turns close wound, opened to 1⅛ in. winding length (Inductance 0·49 μH).
L5 (one required). Total length of wire including leads 9¾ in. 6 turns close wound, opened to ½ in. winding length (Inductance 0·24 μH).

Capacitor Table

Low Pass Filter

C1 (two required). Total capacitance 52pF maximum made up of a 5–35pF ceramic variable in parallel with 17pF fixed.
C2 (one required). Total capacitance 85pF maximum made up of 5–35pF ceramic variable in parallel with a 50pF fixed.

Although ceramic variable capacitors are suggested above on the grounds of economy, air spaced variables are to be preferred for use in filters for transmitters in the high power class. Other combinations of variable and fixed capacity may be used provided the total meets the specification. At least 20pF variable capacity should be allowed.

High Pass Filter

C3 (two required). Total capacitance 65pF maximum made up of a 5–35pF ceramic variable in parallel with 30pF fixed.
C4 (two required). Total capacitance 83pF comprising close tolerance capacitors of 33pF and 50pF in parallel.
C5 (one required). Total capacitance 103pF maximum made up of a 5–35pF ceramic variable in parallel with 68pF fixed.

the meter should read about 300 microamps below 32 Mc/s, but above this frequency the reading will fall rapidly. Between 36 and 38 Mc/s there may be a small peak but this can be eliminated by adjusting C2.

Repeating the test is good practice and helps to achieve optimum results as well as demonstrating in a practical way the filter characteristics.

If each C1 is tuned at 35 Mc/s instead of 32 Mc/s the filter will provide fairly high attenuation extending over the television Channel 1.

High Pass Filter In this case the test oscillator should be set at 40 Mc/s and the coupling adjusted to give about 300 microamps deflection on the meter with the filter out of circuit. Set the oscillator to 38 Mc/s and connect the filter according to Fig. 3. Now tune each C3 until the meter reading just begins to fall. Continue to do this a number of times and swing the oscillator from 30 Mc/s to 40 Mc/s in the process. The action of the filter should show that above 38 Mc/s the meter reads about 300 microamps while below 38 Mc/s its value falls rapidly. There may be a small peak at approximately 32 Mc/s but by tuning C5 it can be completely eliminated. The same remarks on repeating the test apply.

If each C3 is adjusted at 36 Mc/s instead of 38 Mc/s the filter will show fairly high attenuation extending down to 28 Mc/s, which is useful in the case of 10m operation.

More detailed notes on alignment together with the description of a test oscillator and a calibrated output meter for measuring attenuation levels will be included in a later article.

Matching the Filter to the Feeder

It is not generally appreciated that link couplings and pi-output networks must always be proved a correct match into the 75 ohm co-axial feeder if the filters are to achieve their

(Continued on page 404)

A Three Valve Receiver for Two Metres

By JOHN GAZELEY (B.R.S.20533) *

From a wealth of experience gained in designing and building v.h.f. receivers of many types, the author of this article has evolved a straightforward superhet which should do much to increase still further the popularity of the 2m band. Using readily available components and inexpensive valves, the design should be of interest to both the seasoned v.h.f. worker and the newcomer.

MANY would-be v.h.f. operators are put off by the apparent complexity and expense of the usual receiving equipment for the 2m band. Typical installations use three or four valve converters feeding into a costly receiver such as the AR88 as an i.f. strip. This does of course give the best results at the present stage of the art, but perfectly satisfactory results can be obtained with much simpler arrangements. Such a receiver is described in the present article and is capable of excellent reception of all but the weakest of 2m signals.

The Circuit

One half of a Brimar ECC85 (V1a) serves as a grounded grid r.f. amplifier in a similar circuit arrangement to that of the R.S.G.B. Two Metre Converter described by W. H. Allen, M.B.E. (G2UJ), in the R.S.G.B. BULLETIN for February, 1954. The other half (V1b) of the same valve is used as a grounded cathode autodyne (or self-oscillating) mixer. The principle is frequently seen in commercial equipment but is somewhat unusual especially with regard to the feedback compensating network. Examination of the circuit diagram (Fig. 1) will show that there are two components in the oscillator feedback loop: regenerative feedback at the oscillator frequency and degenerative feedback at the intermediate frequency, which causes loss of gain and broadens the tuning of the i.f. coil. This may be cancelled out by the application of regeneration at the intermediate frequency and is accomplished by connecting the earthy end of the signal frequency grid coil (L3) to earth via the anode i.f. bypass capacitor (C4). The circuit configuration is similar to the " neutrode " principle. The result is a high gain low noise 2m converter with an i.f. of approximately 25 Mc/s.

The i.f. amplifier (V2a) is the pentode section of a Brimar ECF82, gain control being provided by a variable cathode bias resistor (R7). There is a tendency towards regeneration but it is fully under the control of R7 and improves stage gain and selectivity. The triode section of the same valve (V2b) serves as a detector, re-generation being controlled by varying the h.t. supplied via the potentiometer R13. Controls R7 and R13 tend to be interdependent and some detuning is noticeable when an attempt is made to resolve c.w. A separate b.f.o. would be an improvement in this respect.

A second Brimar ECF82/6U8 is used in the audio stages. The triode section (V3a), the first a.f. amplifier, is resistance capacity coupled to the detector stage. Cathode biasing is not used but the high value of the grid leak R15 (2·2 Megohms) makes the stage self-biasing by grid current flow through this resistor. R14 is a grid stopper to prevent r.f. voltage getting into the audio section. The pentode section

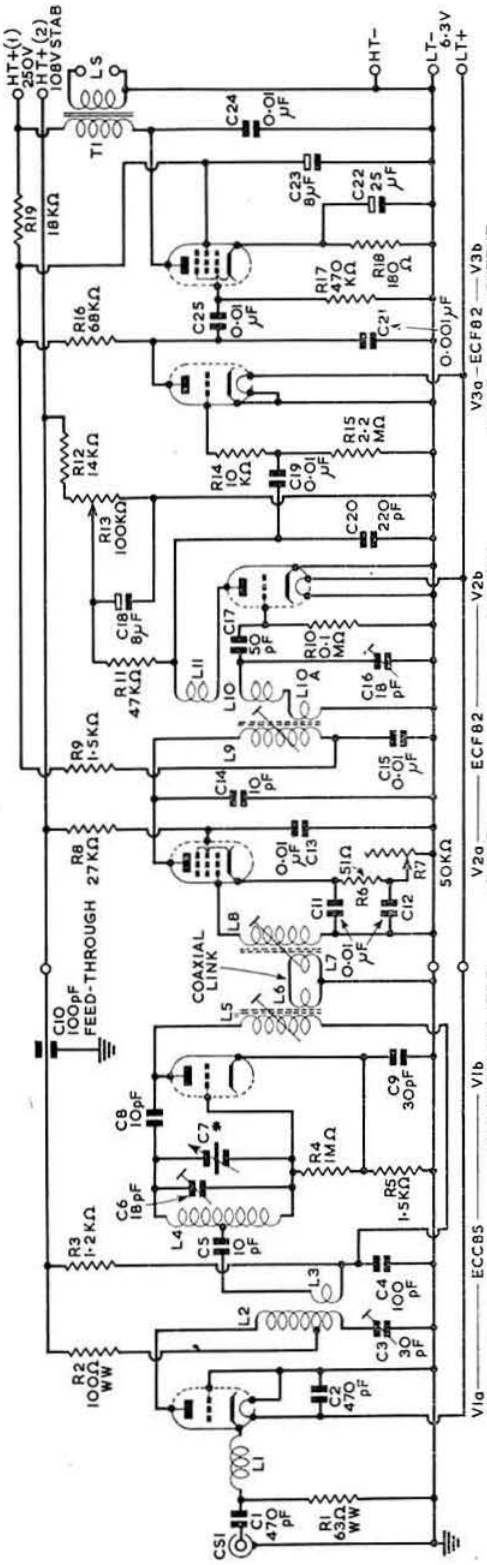


Fig. 1. Circuit diagram of the complete three valve receiver for two metres. All resistors are Radiospares miniature ½ watt type except where otherwise specified. T1 is a Radiospares miniature output transformer intended for use in personal receivers (approximate ratio 40 : 1). The valveholders should be p.t.f.e. or nylon loaded Bakelite type. The details given in the Coil Table are for an i.f. of 25 Mc/s.

* *192 Haselbury Road, Edmonton, London, N.9.*

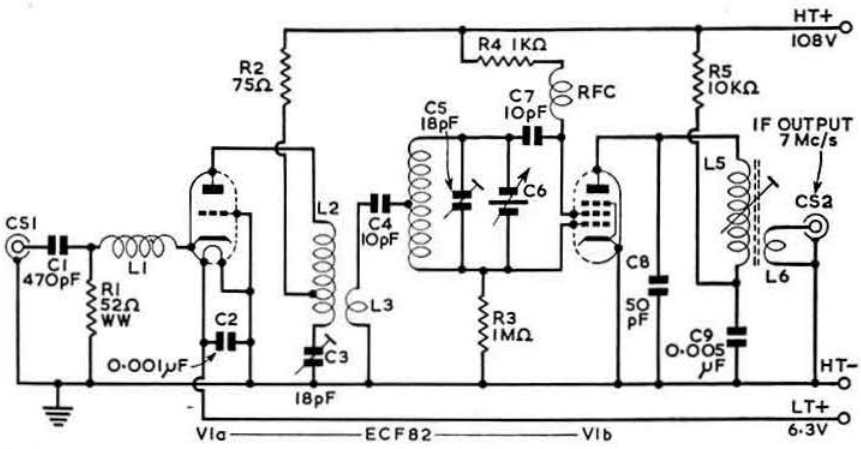


Fig. 2. An alternative "front-end" (grounded grid r.f. stage and mixer-oscillator) using a triode-pentode for low intermediate frequencies of the order of 7-15 Mc/s.

(V3b) is used as the output valve and will drive a small loudspeaker. Resistance capacity coupling is used between the audio stages.

Alternative Mixer

Should a lower intermediate frequency be desired with its advantages of better adjacent channel selectivity, the circuit shown in Fig. 2 may be employed in place of the r.f. and mixer-oscillator stages of Fig. 1, though it must be appreciated that with an autodyne mixer it is extremely difficult to align the r.f. circuits due to oscillator pulling, the lower limit for the i.f. being about 7 Mc/s.

The alternative front-end uses the pentode section of a Brimar ECF82/6U8 as the mixer. In this application, as grid 2 is employed as the oscillator anode, there is very little degenerative feedback at the intermediate frequency and the compensating network C4, R3 is no longer a necessity, though improved mixer gain will result from its use.

Layout

Bending and drilling instructions for the converter sub-chassis are given in Fig. 3 together with similar details of the main chassis. The arrangement of the i.f. and audio stages is not critical but the converter section should be built on a sub-chassis and follow the layout shown in Fig. 4.

Fig. 5 shows the underchassis layout of the principal components in the i.f. and audio stages.

A good slow motion drive is recommended for use with C7: many types are suitable but the prototype employs an ex-Government Muirhead type 10A/7719.

Alignment

When the receiver is completed, the wiring should be checked. Power may then be applied: 6·3 volts for the heaters, 108 volts stabilized (H.T.2) and 250 volts (H.T.1).

The co-axial link between the converter and the i.f./a.f. section should be temporarily disconnected and a 25 Mc/s (or whatever intermediate frequency has been decided upon) modulated signal from a signal generator or test oscillator injected into the i.f. section. The slugs of L8 and L9 and trimmer C16 should then be adjusted for maximum audio output with the regeneration control R13 at a low value. The input from the signal generator should be reduced to a level that is barely audible or detectable on an output meter. As

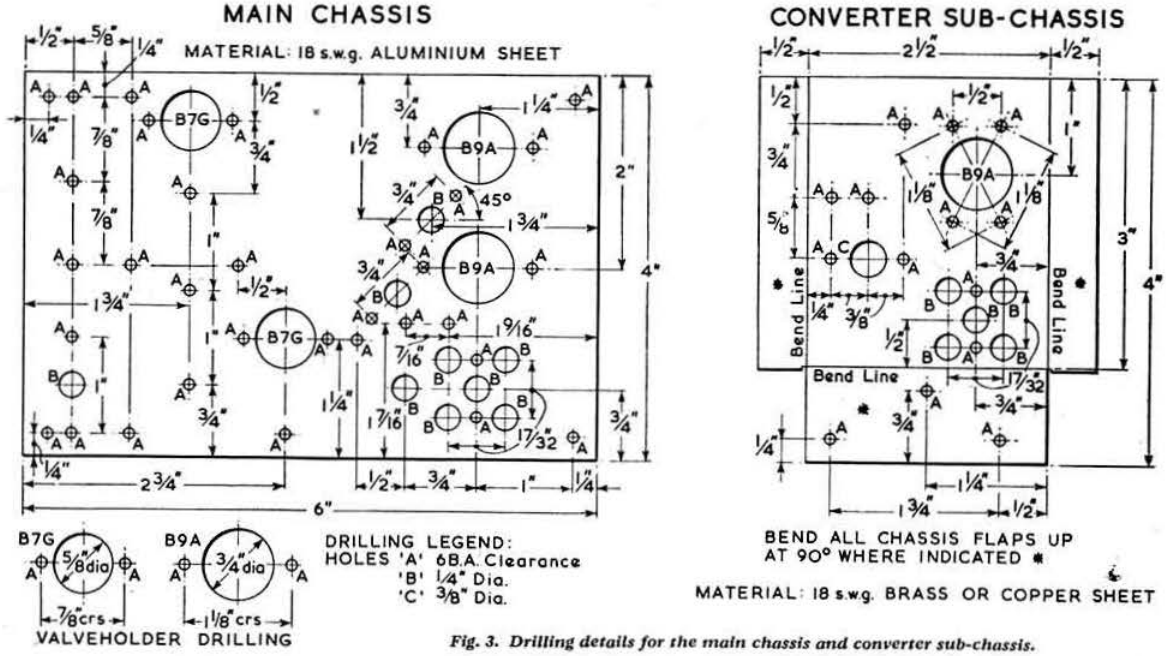
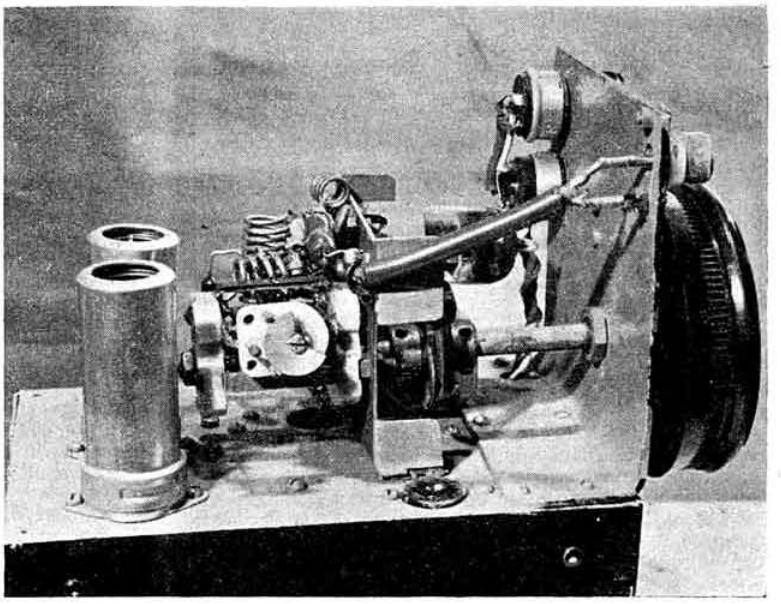


Fig. 3. Drilling details for the main chassis and converter sub-chassis.

R13 is advanced, the audio output should increase until a point is reached where the detector (V2b) goes into self-oscillation. This should occur with R13 almost at maximum setting. Moving the coupling loop L10A along the former of L9 and or altering the coupling between L10 and L11 should enable this condition to be obtained. When it has, the input from the signal generator should again be reduced until the modulation is just detectable when the regeneration control R13 is set so that V2b is on the verge of oscillation. The slugs of L7 and L9 may then be peaked for maximum output. While this is being done, adjustment of R13 may be necessary to keep the detector just on the verge of oscillation.



A sideview of the three valve receiver. Note the arrangement of the converter sub-chassis and the screening cans on V2 and V3. The B7G socket in the foreground is for h.t. and l.t. supplies.

Converter Section Alignment

If a receiver tuning the intermediate frequency is available, the converter section can be aligned rather more easily by using the " S " meter. A g.d.o. (grid dip oscillator) is another useful item for converter alignment. However, the writer prefers direct injection of a crystal-controlled signal and the alignment of the r.f. circuits for maximum mixer grid current. This can be detected with a micro-ammeter in series with the grid leak or by means of a d.c. amplifier (either valve or transistor). Suitable circuits are shown in Fig. 6.

The r.f. source can be the low power driver stages of a 2m transmitter, a signal generator or a g.d.o. coupled into a loop on the end of a piece of co-axial cable connected to CS1. Adjustment is carried out in the following manner. Disconnect the mixer h.t. feed resistor R3 and insert the measuring device between the earthy end of the mixer grid leak R4 and chassis. Then tune C3 and vary the inductance of L3 by squeezing or opening out the turns of the coil until maximum mixer grid current is indicated. No adjustment of L1 is necessary provided it is constructed in accordance with the details given in the coil table. The input signal should then be tuned across the whole 2 Mc/s range (144-146 Mc/s) although it is of course impossible to achieve a perfectly flat response with only two tuned circuits. There should, however, be no peak in the response which would indicate

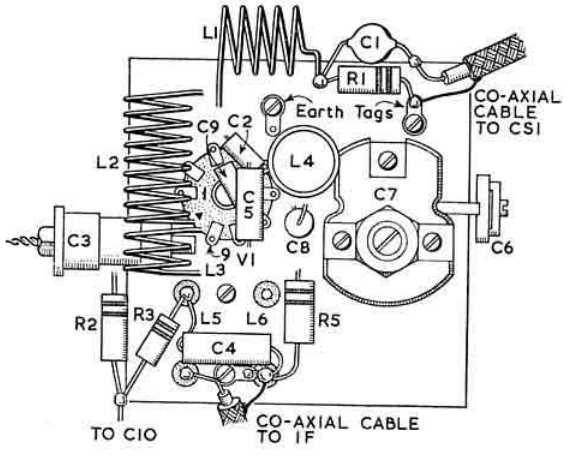


Fig. 4. Layout of the converter section of the receiver (r.f. and mixer-oscillator). The main tuning capacitor C7 is connected to the Muirhead drive with an Eddystone flexible coupler.

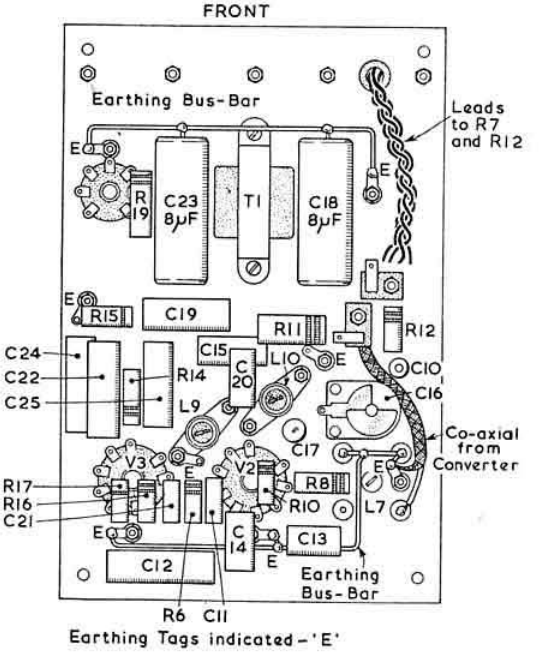


Fig. 5. Under-chassis layout of the i.f. and audio stages. C18 and C23 are Dubilier " Drilitic " type BR002 electrolytics. C22 is a T.C.C. " Micropack " electrolytic type CE320.

COIL DATA

L1, 5 turns 18 s.w.g. tinned copper, ¼ in. diameter, ¾ in. long.
L2, 8 turns 18 s.w.g. tinned copper, ¼ in. diameter, ¾ in. long, tapped approximately 6 turns from anode end (see text).
L3, 3½ turns 18 s.w.g. tinned copper, ¾ in. diameter, ⅜ in. long.
L4, 3 turns 16 s.w.g. tinned copper, ¾ in. diameter, ⅜ in. long, centre tapped.
L5, 20 turns 30 s.w.g. enamelled on ¼ in. diameter Aladdin former with dust-iron core in screening can.
L6, 2 turns 30 s.w.g. enamelled wound over "cold" end of L5.
L7, 2 turns 30 s.w.g. enamelled wound over the "cold" end of L8.
L8, 24 turns 30 s.w.g. enamelled on ¼ in. Aladdin former with dust-iron core in screening can.
L9, 19 turns 30 s.w.g. enamelled on ¼ in. former with dust-iron core.
L10, 18 turns 30 s.w.g. enamelled on ¼ in. former with dust-iron core (last 4 turns wound on "cold" end of L9 and shown as L10A in Fig. 1).
L11, 5 turns 30 s.w.g. enamelled wound on L10 former; spaced ⅛ in. approx. from "cold" end of L10.

regeneration. Should this trouble occur, altering the h.t. tapping point on L2 may be effective but should only be resorted to if all else fails. The layout of the r.f. stage components (Fig. 4) should be examined first if regeneration is evident. The grid lead to V1a should be as short as possible. Bending the valve base tag down towards the chassis will help considerably in this respect especially if a solder tag is arranged to come into direct contact with the valveholder tag. Grounded grid amplifiers have a tendency towards instability if there is a serious mismatch in their input circuits. The test for such instability is to substitute an 80 ohm resistor for the co-axial line to the signal source. If the instability ceases, correctly matching the aerial to the feeder should overcome the trouble when the signal source is again connected. Another method is to lengthen the co-axial cable. Tightening the coupling between L2 and L3 is also helpful.

The tapping point on L2 may be checked with the point of a pencil: there should be little or no change in mixer grid current when the tapping point is touched with a pencil. The point of connection should be altered until this condition is obtained. It must be remembered that any of these alterations will necessitate retuning C3.

In order to check the oscillator and tune it to the correct frequency it will be necessary to disconnect the signal input and reconnect R3. If the oscillator is functioning there should be an increase in mixer grid current when h.t. is applied.

An absorption wavemeter (or g.d.o. with no h.t. applied) should be set to 120 Mc/s and C7 (the main tuning control) set to mid-scale. C6 should then be adjusted until a dip is noted in the mixer grid current when the absorption wavemeter is held about an inch away from L4. Next reconnect R4 and the co-axial link between the converter and the i.f./a.f. section, plug a suitable aerial into CS1 and tune C7 for a strong local signal. The slug in L6 can then be peaked with an insulated screwdriver. Final adjustments are best carried out on weak signals.

All the controls tend to be interdependent and a certain amount of patience is needed to get the best performance out of this receiver.

Three of these receivers have been built using different intermediate frequencies and there is little to choose between them as regards performance, although more oscillator pulling is experienced with the lower i.f. model. The 25 Mc/s version could suffer from second channel interference from stations in the 80/90 Mc/s v.h.f. broadcast band but in practice all three are capable of excellent results.

Acknowledgments

The writer is indebted to G3GOZ for testing the receiver at his station and to G2UJ, G3FD, G3LCK and G6LL who also carried out tests on the receiver.

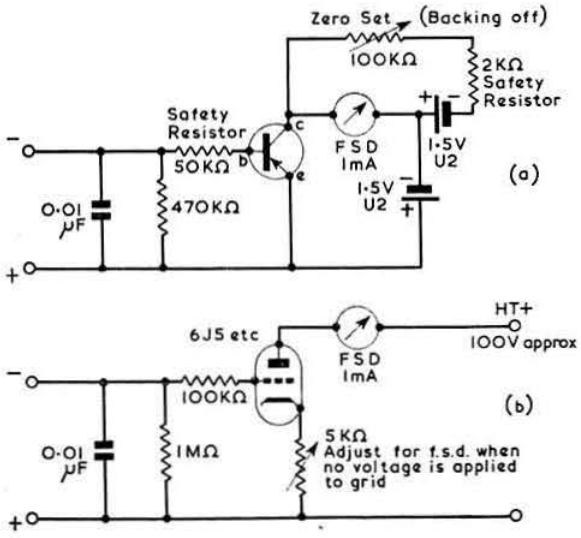


Fig. 6 (a). Transistor d.c. amplifier for measuring mixer grid current (adjust for **maximum** *reading). (b) Valve voltmeter for measuring mixer grid current (adjust for* **minimum** *reading).*

Low and High Pass Filters for All (Continued from p. 400)

design performance; in fact no filter will work correctly unless its input and output impedances are properly matched to suit the overall feeder impedance.

Using a short length of 75 ohm cable, one end connected to the transmitter and the other terminated in a non-inductive 75 ohm resistor with a r.f. thermal ammeter in one side, the link or pi-output network should be adjusted to produce maximum reading on the ammeter. Inserting the filter in the co-axial feeder between the transmitter and the load should produce no change in the meter reading; transmitter loading and input being kept at a constant value. More details on this aspect will also be given in a later article.

General Considerations

A good earth should be used with all radio equipment, both amateur and domestic. Mains earths are inherently unreliable and should be avoided. Failing a ground earth, the *iron* pipe of a cold water main supply is usually satisfactory. The filter case and co-axial braid should be securely bonded to earth otherwise they may be at r.f. potential and the filter action non-existent.

Extreme caution should be exercised with a.c./d.c. equipment where one side of the chassis is at mains potential. Most modern TV receivers fall into this category. It is essential to check that the neutral is always connected to the chassis. In such cases the earth lead should be connected to the chassis through a 0·01 μF capacitor of at least 1,000 volt d.c. test. It is important to make quite sure that the coax socket is in no way directly connected to the receiver chassis otherwise the joining of an earth to the filter box may well have disastrous consequences.

Twin 80 ohm cable will not satisfy the stringent requirements for matching and screening demanded in all applications of the filters. Where it is in use the short though somewhat unethical remedy is to deliberately introduce a quarter-wavelength of 75 ohm co-axial cable (measured to suit the TV channel concerned), making sure that the braiding is attached to the earthy side of the twin feeder socket at the receiver. If no earth is present a 0·01 μF capacitor should be introduced as for a.c./d.c. receivers.

Break-in Operation with the Geloso Signal Shifter

Adding Grid-block Time Sequence Keying

By GERALD A. S. LANDER (DJ0BF)*

THE main purpose of this article is to describe a method of grid-block time sequence keying for the well-known Geloso 4/102 unit without chirp effects. Other modifications that have been carried out to the Geloso unit used by DJ0BF will, however, also be briefly described.

Basic Modifications

It is usual practice with all Geloso units sold in Germany to modify the driver stage. In its original form the unit radiates a considerable amount of interference on 10·7 Mc/s —the third harmonic of 3·5 Mc/s and the i.f. used in German f.m. receivers. This is one reason that has led to the general replacement of the 6L6 or the 6V6 by an EL86. In addition, the cores are removed from the coils in the anode circuit of the driver stage and a small sub-chassis added to the signal shifter. A small variable condenser of approximately 25 pF is built on to this sub-chassis and connected between the anode of the EL86 and earth. In this way the stage can be peaked for maximum drive on each band.

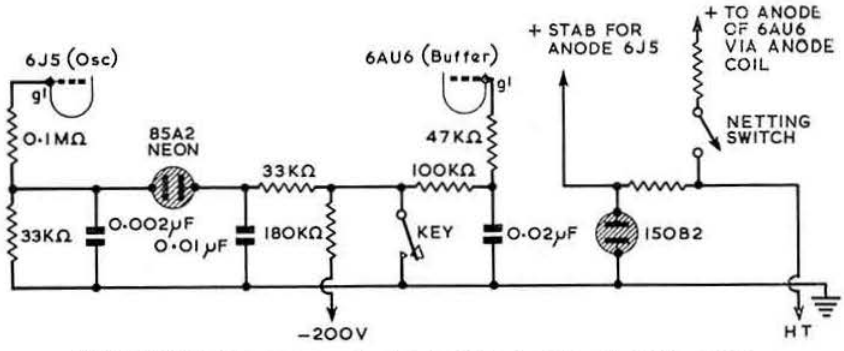


Fig. 1. Grid-block time sequence keying circuit for the Geloso 4/102 Signal Shifter.

As the keying circuit to be described involves keying the oscillator and buffer stages, fixed bias must be applied to the driver and p.a. stages to protect them whilst no drive is present. In the writer's power pack provision was therefore made for a negative supply of approximately 200 volts which is used for both the negative bias of the various valves and for the grid-block keying circuit. The EL86 and the 1625 (in the p.a.) receive their grid bias via suitable voltage dividers. In addition, the buffer (6AU6) and driver stages have been provided with cathode combinations to ensure a weak additional source of bias as a safety measure. The 6AU6 has a 1 K ohm resistor by-passed by a 0·005 μF capacitor and the EL86 a 250 ohm/0·005 μF arrangement.

An attempt was also made to reduce the amount of drift caused by warming-up, etc. In the writer's case the v.f.o. drifted low in frequency, and experiments were made with varying amounts of negative temperature coefficient capacitance. Finally two capacitors each of 30 pF and with a negative temperature coefficient of N. 075 were placed across the voltage divider in the oscillator stage. This necessitated, of course, a realignment of the v.f.o., which was, however, not difficult.

Keying Circuit

The grid-block time sequence keying circuit itself is shown in Fig. 1 and its construction is perfectly straightforward. The arrangement is incidentally one that is becoming very popular and is used, for example, by American Heathkit in the "Apache" transmitter kit. The circuit works in the following manner: When the key is "up," the high negative voltage on the control grids of the 6J5 and the 6AU6 cuts off these valves completely. The blocking voltage can, of course, reach the 6J5 and be effective only after the neon has fired. On closing the key, the two R/C combinations (100 K ohms/0·02 μF and 33 K ohms/0·01 μF) discharge. The smaller time constant of the combination for the oscillator stage (33 K ohms/0·01 μF) causes the neon to extinguish before the 100 K ohms/0·02 μF for the buffer has discharged. In this way the oscillator stops functioning a fraction of a second before the buffer, obviating any possible chirp. On lifting the key again, the buffer stage is blocked more quickly than the oscillator stage, despite its higher time constant, as the neon must charge up to its higher striking voltage. Alterations to suit the individual taste can be made to the circuit as it stands. For example, by increasing the value of the capacitor in the 100 K ohms/0·02 μF combination, the keying can be made "softer." The value of the series resistor (shown in Fig. 1 as 180 K ohms) can be varied to suit the negative voltage available in each individual case. The neon used should not have a built-in series resistor, and should strike at about 70-90 volts.

Netting

As the whole transmitter is brought into operation on depressing the key, a method must be found of operating the oscillator stage alone for netting to the frequency of a station it is desired to call. The simplest method that occurred to the writer was to place a switch as shown in Fig. 1 in the h.t. lead to the buffer and oscillator stages in such a way that the h.t. to the buffer is cut off whilst the oscillator still receives a stabilized voltage of 150 volts. Voltage stabilization should always be used for the oscillator stage of the Geloso unit.

The circuit described has been in operation at DJ0BF for about six or seven months and has proved entirely satisfact-

(*Continued on page 412*)

* *21b) Altena, i/Westf., Feldstrasse 10, German Federal Republic.*

A Personal Story from

The Lone Voice of Tobago —VP4WD

By JACK LAMBERT, G3TA (ex—VP4WD) *

TWENTY-THREE weeks on Tobago in the British West Indies, and five hundred Amateur Radio contacts: this in a nutshell (or more appropriately in a coconut shell) is the story of VP4WD.

It all began when Walt Disney Productions (England) Limited decided upon Tobago as the location for filming *The Swiss Family Robinson*. I was fortunate enough to go along as a member of their film unit. As soon as I was warned for the location and learned that social life and recreation would be pretty limited I decided it would be a good thing to take out some radio gear with me. Thanks to the good offices of G3AAE and G3YF a complete B2 installation was made available. In between times I had sent off an air mail letter to Trinidad asking for facilities and a licence to operate an amateur station on Tobago.

I flew out via the Azores, Barbados and Trinidad and thence to Tobago, arriving on August 13, 1959. No reply had been received from the Post Office people prior to departure. Repeating my request I eventually had a reply from the Trinidad Customs and Excise to say *they* handled all radio licences, and on receipt of fourteen dollars, forty cents (£3) a licence would be issued. This duly arrived on September 3 and much to my surprise granted me the call-sign I had requested, VP4WD (Walt Disney).

The only site available at the hotel for aerials was festooned with 35 ft. pylons carrying the main supply cables to Scarborough (the capital), about 1 mile away. A temporary aerial was made up of about 42 ft. of p.v.c. lighting flex, slung up about 12 ft. high at the home end and 8 ft. high (tied to a rose bush) at the distant end. Although useless on 14 Mc/s, it certainly surprised me on 7 Mc/s. On the second " CQ de VP4WD " I raised W2KQT with 579 both ways. After more W contacts conditions changed. Then I heard HA5KFR calling me, and a contact resulted, RST569 both ways from Budapest. The little B2 had certainly opened my eyes and ears. I continued to use this very poor aerial for about ten days but conditions on 7 Mc/s steadily got worse, so I decided it was about time I obtained some poles to support something better. This was easier said than done, as all company transport was kept fully occupied on transporting labour and material to the various location sites on the island. By means of " bribery and corruption " I induced one of the locals to fell a couple of 20 ft. bamboos and these were transported to the Hotel Robinson Crusoe on the top of one of our transporters—a hazardous journey along the narrow winding roads indeed, causing much consternation to several truck drivers coming in the opposite direction! These poles were erected on a free Sunday afternoon and with a 14 Mc/s dipole slung between them, things certainly improved.

Despite some care being taken to swing the lobes of the dipole away from the States as much as possible I found that my 14 Mc/s signals were covering all parts of the U.S.A. and even up into VE6. I can only surmise that the arrays of power transmission lines were reflecting my signals that way. It seems from the log reports that the first leg of my skip was arriving around Long Island way as the majority of reports from there were in the 589-599 class.

It would appear from various reports I had from W, VE and Europe (particularly DL/DJ) that the little B2 was pumping out a signal comparable to those of the higher powered

The operating position at VP4WD.

competition. This was spotlighted even more when I moved to a house on the other side of the hotel, situated on a small hillock with a large garden. With the co-operation of a truck driver I had two 35 ft. bamboo poles felled and transported to the site, and erected on the Sunday afternoon of December 20. Using prefabricated 14 and 7 Mc/s dipoles between these, reports immediately went up from Europe by one and in some cases two S-points. The direction of fire was across open sea. This aerial enabled me to get into the South of Europe, raising I1 and SV0 and also getting into HZ1. It also raised the best DX of the log, JA1AB and JA1DM, although only 449 from both.

I would like to emphasise that VP4WD was not installed as a " DX-pedition " station, but simply as a means of relaxation and with a view to keeping in touch with some of my friends in the U.K. My apologies to the operators who called me on umpteen occasions but whom I never heard. It was usually very hard work trying to copy European signals when the path to U.S.A. was open.

Two other militating factors were continuous drift on the 4 valve receiver, mainly due to large fluctuation of the 115 volt a.c. supply mains, and the very cramped tuning on 14 Mc/s. To assist me in locating my frequency on the receiver I installed a small check oscillator fed from the receiver power supply. This was a great help; by merely plugging in the transmitter crystal I was able to check just where I came up on the receiver dial. With a good communication receiver I could perhaps have doubled the number of contacts made.

On breaking down the log on my return home the following information emerged:

Just over 520 contacts were made, 350 with all districts in U.S.A. with 43 States (W7 was elusive, only five contacts made), 34 Gs, 30 DL/DJs and about 24 VE1 to 6. In all, 46 countries were worked, consisting of about 30 in Europe, the rest made up of the Americas, plus HZ1 and JA1. One rare bird was a F3CB/CF in Europe but it was a very scratchy contact due to severe American interference.

Real Co-operation

I should like to put on record that I deeply appreciate the co-operation of those who helped to make VP4WD possible, including the proprietor of the hotel and VP4TAQ, not to mention various members of the film unit who cheerfully put

(*Continued on page 412*)

* *327 Parkway, Iver Heath, Bucks.*

The MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By J. DOUGLAS KAY (G3AAE)*

THE first French Atomic Explosion occurred on February 13. An original start to *M.O.T.A.* but with some possible significance for DX workers, for **G4LX** (Newcastle) reports that on that day there was a *midnight* opening on **28 Mc/s.** At that time he heard signals from W4, 5, 7 and 0, VE5, 6 and 7, KL7, KH6, ZE and JA. At the same time 21 and 14 Mc/s were void of signals. G4LX suggests that this amazing opening may have been caused by a cloud of ionized particles from the explosion. Certainly a most interesting phenomenon.

Now let us come down out of the clouds and see what is happening or is going to happen in the world of DX.

News from Overseas

The VQ Area

From **VQ4ERR** and **VQ8AD** comes news of activity in the South Indian Ocean area. **VQ8BBB** left Carajos Island around February 12 and returned to Mauritius where he will remain for at least two months, after which he may return to Carajos or go to a new QTH.

There is at present no regular activity from either Chagos or Rodriguez, but **VQ9HB**—now on 14 Mc/s c.w. regularly with a 20 watt rig—is expected to visit Chagos in the very near future and may put his rig on the air for the few days that he is expected to be on the island.

Aldabra (**VQ7**) activity is not envisaged in the foreseeable future as the island is extremely difficult to reach, the best way being by schooner from Mahe in the Seychelles.

Plenty of expeditions to **Zanzibar** are planned by the VQ4 gang, but exact dates and frequencies are not known at present.

In Mauritius itself both **VQ8AD** and **VQ8AV** are very active on 28 Mc/s a.m. and when conditions are right put through extremely good signals during the early afternoons.

VQ4ERR himself has passed on all the logs for his recent Zanzibar, Tanganyika and Seychelles sideband activity to W4IYC who is distributing the cards on his behalf. Addressed envelope and I.R.C.s are requested where a direct reply is desired.

VQ3HG was recently the unhappy victim of a fire which destroyed his house and all his station records prior to January 8, 1960. He had, however, QSLd all contacts up until December 12, 1959, which leaves only the period December 12 to January 6 uncovered. He will be pleased to confirm contacts during this period upon receipt of cards. We feel sure that all readers will commiserate with him and wish him a speedy return to normal operation.

Aden

Ray Ford **VS9ARF** (ex-G3MJI) writes from Aden where three letter call-signs have recently been issued for the first time. Ray will be in Aden until August and is at present operating on 14 Mc/s c.w. only, although he hopes to get on 7 Mc/s in the near future. Operating times are mainly confined to 21.00 to 03.00 G.M.T. but he occasionally gets on between 14.30 and 18.30 G.M.T. **VS9APS** has recently been licensed and operates mainly 'phone, while **VS9ATY** will also shortly be active on 'phone.

*40 Fryston Avenue, Coulsdon, Surrey.

Gibraltar

Bob Milton **ZB2N** has recently been very active on the h.f. bands and when he wrote—on February 7—had worked 99 countries since January 1. He expects to return home to Scotland on March 21, by which date he hopes to have reached his target of 120 countries, which should be more than adequate to ensure the safe arrival of 100 confirmations for his DXCC.

The Pacific Area

Ed Goodhue **KH6DLF** (ex-KL7PIV) has very kindly agreed to provide a monthly report on what he hears going on in the Pacific area. This will be most welcome as there is no doubt that the Pacific is the most difficult area to work from Europe not only because of the distance but also because of the very small amount of activity on some of the smaller islands.

KJ6BV is with the U.S.A.F. on Johnston Island and will be there for several months longer. His rig runs 500 watts and he has been worked on a.m. on 14,285 kc/s, and on c.w. on 14,080 kc/s at around 07.00 G.M.T. **KG6IJ** is ex-KA0IJ a club station on Iwo Jima, and has been worked on 14,270 kc/s at 08.00 on s.s.b. The following times and frequencies are also mentioned: VR6AC 14,324 a.m. 06.30, VR3W 14,070 07.00, ZK1BS 14,305 s.s.b., ZK2AB 14,300 a.m. 07.45, KM6BQ 14,265 s.s.b. 08.00, KM6BU 14,265 a.m. 07.00, VR1B 14,070 c.w. 09.00 and ZM6AA 14,080 c.w. 06.00. 9N1GW has been worked at the unusual time of 09.00 (14,303), while JT1AW was located at 07.00 on 14,045.

DXotic Showcase

Call-sign	kc/s		G.M.T.	Country
VP5FP	3,509	c.w.	23.40	Turks & Caicos Is.
AP4M	7,007	c.w.	23.30	Pakistan
VP7CC	7,004	c.w.	01.25	Bahamas
VK5NO	7,036	c.w.	20.45	Australia
UM8KAB	7,010	c.w.	00.25	Kirghiz
9N1GW	14,310	s.s.b.	14.10	Nepal
OK7HZ/YI	14,315	s.s.b.	14.30	Iraq
I5GN	14,206	a.m.	19.00	Somalia
VP2DX	14,190	a.m.	21.36	Dominica
HCCC8	14,048	c.w.	02.30	Galapagos Is.
VP3MC	14,096	c.w.	21.40	Brit. Guiana
VQ6GM	14,102	c.w.	19.10	Brit. Somaliland
ZS7M	14,040	c.w.	17.30	Swaziland
VS4BA	14,090	c.w.	15.15	Sarawak
FU8AC	21,240	a.m.	08.10	New Hebrides
FD8AMS	21,230	a.m.	18.00	Togoland
KG4AU	21,250	a.m.	20.30	Guantanamo Bay
FB8CD	21,180	a.m.	16.15	Comoro Is.
FK8AT	21,240	a.m.	08.15	New Caledonia
XW8AL	21,280	a.m.	13.33	Laos
ZS9G	21,180	a.m.	19.15	Bechuanaland
YA1BW	21,075	c.w.	14.18	Afghanistan
VP8EG	21,090	c.w.	20.00	South Orkney Is.
HCCC8	28,657	s.s.b.	18.38	Galapagos Is.
HK0AI	28,180	a.m.	16.40	San Andreas Is.
FD8AMS	28,350	a.m.	10.45	Togoland
VQ8AD	28,300	a.m.	15.45	Mauritius
VQ8AV	28,272	a.m.	15.00	Mauritius
XW8AL	28,225	a.m.	11.00	Laos

HP1GP in the Republic of Panama uses a Hallicrafter transmitter, Collins 75A4 receiver and Telrex four-element beams for 14, 21 and 28 Mc/s. Operation is principally on s.s.b.

Ed himself can get to **KS6** on a plane that visits there every two months, but the trouble is that it leaves again after a couple of hours not giving enough time for any DXpeditionary activity worth the journey. However, Ed is working on this to see if anything can be arranged to give him a longer stop-over on the island. Both he and his KWM-1 are ready to go, so let us hope that he can fix something.

Antarctica

VP8CC has relieved **VP8EP**, who is scheduled to reach Southampton on March 18. Cards for VP8CC should be addressed to G3JAF with either s.a.s.e. or I.R.C. for a direct reply.

Republic of Mauretania

From **GW3AHN** comes news of what may possibly be a new country for DXCC purposes. On February 14 he worked **FF7AB** on 21,280 kc/s a.m. and was told that the location used to be part of FF8 French West Africa but the prefix was changed when Mauretania became a republic. The address is in *QTH Corner*.

French Togoland

ZD2AMS was certainly active from Togoland as **FD8AMS** but his activities were very severely restricted by the limited periods during which the mains supply is available. He was heard on 14, 21 and 28 Mc/s, but his main period of operation appeared to be from around 17.30 G.M.T. on 21 Mc/s 'phone which is, unfortunately, not the best time for working into Europe. He also appeared for a very short period on 28 Mc/s on Sunday mornings.

In a QSO with G3AAE **ZD2AMS** said there was quite a tale to tell about his adventures as FD8AMS, and promises it in time for the next *M.O.T.A.* He made only 600 contacts, but is going back again armed with his own power source and aerial supports.

British Columbia

Syd. Spencer **VE7AMD** writes from Victoria that during the past few years he has come to the conclusion that VE7 is not a desirable prefix and that most DX operators are not interested in working VE7 stations. Surely this cannot be true because, regardless of the desirability of VE7 for E.DX.C, B.E.R.T.A., W.A.VE. and similar awards, we are all only too pleased to work into Pacific Canada when the band conditions permit. Syd QSLs 100 per cent and is always pleased to contact the U.K.

DX Briefs

VK5BP is planning to put the Northern Territories of Australia on the air this coming summer.

VS5BY should by now be active again. W6ZEN will continue to act as QSL Manager, and has the logs for previous VS5BY operation if anyone is still needing a confirmation.

VP2SL will be active from Montserrat between March 9 and 28. He will probably then go on to the British Virgin Islands and operate from there for a similar period.

I5GN will be leaving Somalia in April and as there is no QSL Bureau there advises that all cards should be sent to him airmail. All cards received will be answered the same way.

(All the above DX Briefs via the West Gulf DX Club.)

DX News from Home

The mystery of **IE1SMO**, reported last month, is cleared up by A.1696 and others who say that this station was situated on Vulcano Island 12 miles off the north-east coast of Sicily. It was operated by **IT1SMO**, whose address is given in *QTH Corner*.

G4CP comes in with a couple of very useful crystal frequencies: **VR3W** is on 14,040 kc/s in the mornings while **ZL3VH/3** will continue to wield his 12 watts on 14,076 for another couple of months. He also says that G3GGN licensed as VE2AZI has been on from Vermont as VE2AZI/W1—the second ex-G to operate from the States via the Canadian route.

B.R.S.20,104 says that the *Yasme* **3** will probably be in the vicinity of VP5 or HC8 by the time these notes are read.

QTH Corner

BV1US	via K4MPI.
ETE3CE	Box 385, Addis Ababa, Ethiopia.
FF7AB	Andre Dubois, Nouakchott, Republique Mauretania.
FG7XF	via W2CTN.
FR7ZE	Robert Bedier, 3 Rue St. Bernard, St. Denis, Reunion Island.
FS7WP	via W3KVQ.
HCCC8	W8MXS, 5093 Sumter Street, Cincinnati 38, Ohio.
IE1SMO	Athos Bellomo, via Fiume 495, Messina, Sicily.
KG6IJ	APO 815, c/o Postmaster, San Francisco, Cal.
KH6DLD / **KH6DLF**	Ed. and Sheila Goodhue, 44-135 Bayview Haven Place, Kaneohe, Oahu, Hawaii.
KJ6BV	APO 105, c/o Postmaster, San Francisco, Cal.
KL7DIE/VE8	Jack Gilbert, c/o Federal Electric Corp., P.O. Box 487, Fairbanks, Alaska.
LA3SG/P	Kjell Midtseter, P.O. Box 35, Indre Arno, Norway.
VE8AP	via VE8AY.
VP2AR	via W3KVQ.
VP2DX	W8VDJ, Robert E. Lora, Shady Acre Golf Course, McComb, Ohio.
VP8CC	via G3JAF.
VQ1ERR / **VQ3ERR** / **VQ9ERR**	W4IYC, 1236 Westminster Avenue, Richmond 27, Virginia.
VQ3HG	D. J. Lloyd, Mountainside, Olmolog, P.O. West Kilimanjaro, Tanganyika.
VQ8AM	G. France Dumont, Saint Antoine, Poudre D'Or Mauritius.
VQ8AV	Vacoas, Mauritius.
VS5BY	via W6ZEN.
VS9ARF	Sgt. R. G. Ford, Sgts. Mess, R.A.F. Steamer Point, B.F.P.O. 69.
YA1BW	Via DL8BS
ZB2N	F./Sgt. R. Milton, 24 Sunderland House, R.A.F. North Front, Gibraltar.
ZS6IF/8	Lambert Ledoux, 101 Lyndhurst Road, P.O. Lyndhurst, Johannesburg.
9N1GW	Ace Radio Club, 6038 28th Avenue, S.E. Washington, D.C.

* * *

R.S.G.B. QSL Bureau: G2MI, Bromley, Kent.

ZD9AD and **ZD9AK** are reported to hold Sunday skeds on 14,080 kc/s, and both **9N1CJ** and **9N1GW** are active on c.w. Have any readers heard or worked either of these ZD9s or 9N1s on c.w.?

Writing to B.R.S.20317, **VQ8AM** requests help in obtaining something like a 19 Set so that he can put Mauritius on the l.f. bands.

G3KSH (Kenton) says that **VR3Z** (G3DAF) will QSL all contacts when he returns from Christmas Island in April, and requests that all cards should be sent via the R.S.G.B. Bureau only. VR3Z is looking for "G" contacts on both 14 and 21 Mc/s.

28 Mc/s

By this time next month we shall begin to notice the seasonal decline in the capabilities of this band, but at present there is certainly nothing to complain about.

G3BHW (Margate) worked FD8AMS (10.42, '350), HK0AI (16.40, '180), XE2WC (18.20, '340) and YN1LC (18.35, '410) on a.m. and ZD1AW (12.15, '075) on c.w. **G3GMY** (Potters Bar) talked to EL4L (15.10, '250), VK4HD (10.13, '202) and HZ1AB (11.30, '470). **G3NWT** (Sandiacre) on 'phone worked VP8BN (17.03), VQ8AV (14.14), CR7EO and CR7DK (16.23), LU5XE Patagonia (17.21) and ZD3E (19.46).

G3DO (Sutton Coldfield) was lucky to hear and work HCCC8 on Galapagos Island on s.s.b. (18.38, '657). **GW3AHN** (Cardiff) used c.w. to contact ZD2GUP (11.00, '060), ZD2JKO (14.00, '050) and VQ3HD (10.40, '100) while 'phone netted him HC2MW (16.00, '300), HH2RV (18.00, '310), PJ3AB (17.05, '300) VP9DV (16.45, '200) and ZD2JKO (14.45, '300). **G3AAE** talked to 9M2GA (10.00, '370), VQ8AV (15.00, '272), VQ8AD (15.45, '300), XW8AL (11.00, '225), VU2CQ (10.15, '252), FB8CG (14.45, '400), VS9AZ (15.05, '198) and FD8AMS (10.30, '225).

A welcome to old timer **G8KP** of Wakefield who reports for the first time. His main field of action has been lower in frequency but he keyed with RA9CAI (10.25), UA0SK (10.34), YA1AO (10.44), CR6AI (11.03), VQ3HD (10.35), ZD2GUP (10.38), ZD1AW (11.23), KV4CG (18.50) and OQ5IG (13.40).

G3FPQ (Elstead) worked VU2ANI (11.50, '240) and ZS7L (17.10, '250) on 'phone and VU2ANI (11.00) on c.w. while **G3MVV** made it with OX3DL (14.50, '430), W9NLB/VE8 (19.08, '330) and RN1KDB (14.09, '350) on 'phone.

All on a.m. except where stated otherwise come the listener reports. **A.1902** (Reading) logged VS9AE (14.20, '165), VE6AAE/SU (14.08, '120), VS6CL (10.49, '100), VU2CQ (15.30, '150), GW3ITD/MM (10.42, '350), ZS3E (10.48, '115), VE2AIG/SU (14.02, '120), VP3MC (20.26, '160), HH2Z (20.06, '315), VP4LZ (20.46, '330) and YN1LC (20.05, '315). **A.1736** found CR7AG (17.15), HH2V (15.40), RN1AT (16.20), VU2CQ (16.35), VU2PS (15.05), RO5AGA (08.55) and RI8WBA (12.45). **A.2121** (West Harrow) reports VS9AE (11.15), HC4IE (12.40), VP8BN (16.58), W9NLB/VE8 (11.32) and VP6JK (12.08). **A.1965** (Penzance) came across ZD3E (13.48), VE2AIG/SU (14.30), CE3RC (20.20), HZ1AB (13.45) and CR4AV (16.25). **A.1859** (Barnet) found GW3ITD/MM (19.04), OQ5FO (19.13), VP9DV (15.40), VQ5GF (19.20) and ZE6JU (16.39). **B.R.S.2292** logged HC1AM (20.06), EL8D (18.47), HZ1AB (13.03), VP3MC (15.39), TI2RKL (13.08), W7NTW Nevada (17.57), XE2BO (17.04), XE3CP (20.55), XE3CW (16.57), ZD3E (12.05) and on c.w. FQ8HA (11.57), TI2LA (19.30) and ZD2JKO (11.49).

21 Mc/s

This band is certainly improving now that the days are lengthening, with marked improvement in the direction of Australia and New Zealand in the early mornings, and towards the VP8 gang in the middle evenings.

G3JAF (Lymington) reports again after a short absence, and in a first rate log records the following a.m. stations worked on the band: FU8AC (08.10, '240), FK8AT (08.15, '245), VS6CL (13.15, '120), VS6EJ (13.15, '120), VS9AE (13.20, '130), VS1GC (15.00, '190), VS1KM (15.26, '210), ZS3E (08.10, '240), VP3MC (21.00, '160), VU2BK (14.25, '120), VP8AQ (20.25, '200), VP8CC (20.44, '190), VP8DU (20.14, '120), VP8DW (20.50, '120), ZS9G (19.15, '180), KG4AU (20.30, '250), XW8AL (13.33, '180), MP4QAO (11.07, '190), 9M2GA (14.56, '130), FB8CD (16.15, '180), CP5EL (22.10, '210), 9K2AL (15.30, '200) and PJ2CO (22.45, '210) with VP8EG (20.00, '090) on c.w.

GW3AHN (Cardiff) split his operation about evenly between 'phone and c.w., on the former working EL0J/MM (18.45, '235), KA2NY (10.45, '180), UL7FA (12.30, '200), VP4LG (19.45, '240), VP8DW (20.15, '150), VU2ANI (14.30, '180), VS9AE (15.05, '170) and 4X4IE Jerusalem (15.45, '210). On c.w. he contacted CR7IZ (16.45, '055), HH2CB (16.10, '050), KL7AZZ (10.00, '050), KR6ZT (10.50, '100), OA4PB (19.30, '050), UA0KUV (11.30, '050), VP4LA (19.45, '040), ZD1AW (10.05, '075) and ZD2GUP (12.20, '050).

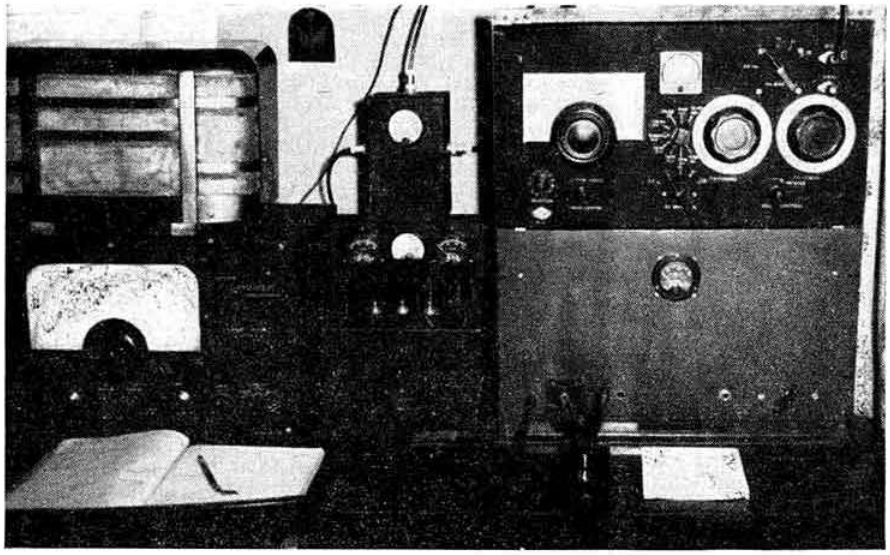
G2DCG (Margate) keyed with YA1AO (14.15, '080), OA4BP (19.55, '005), JA5FP (10.05, '020), MP4TAF (10.46, '095) and heard YA1BW. **G3GMY** also on the key worked ZD1AW (09.20), ZD2GUP (09.27) and VP7NT (14.35). **G3BHW** spoke to HV1CN (13.05, '200) and used Morse for AP4M (15.28, '040), FB8ZZ (14.05, '045), MP4TAF (13.50, '080) and YA1BW (14.18, '075).

G3YF (Chingford) reports 'phone signals from KA2FF (08.20, '190), FB8ZZ (15.45, '145), GW3ITD/MM (14.45, '190), FB8XX (15.15, '140) and FB8CD (15.45, '340). **G6ZO** (Edgware) keyed with FB8ZZ (16.00, '090), VP8ET (20.15, '085), VP7NE (20.45, '000), VP8CC (20.00, '075), HC1JW (19.00, '040), VP5BL (12.15, '060), VP8EH (19.30, '020) and MP4TAF (14.00, '035). **G8KP** also using c.w. worked KG6AAY (08.53), UA0AZ (09.20), 7G1A (18.30), VP7NT (13.33), VU2ANI (10.24), AP4M (16.20), VP9BO (19.33), VK9RO (11.53), VP8CC (19.37), VP8EG (19.42) and ZD2GUP (09.30).

G3FPQ used 'phone to contact FD8AMS (18.00, '225), MP4TAF (17.50, '195) and ZS7L (17.40, '190) and c.w. for VU2ANI and ZS7R (18.50, '060). **G3MVV** talked to UF6KPA (13.45, '110), VS9AE (12.05, '150), KL7BCS (19.15, '250) and 9M2GA (15.10, '120). **G6RH** (Bexley) is welcomed back to the DX fold after a long absence and reports c.w. QSOs with ZD2GUP (08.55, '030), UA0AZ (10.45, '030), HH2CB (21.15, '065) and on 'phone VP2DX (21.10, '210), FB8CD (16.00, '180) and OA4M (21.00, '180).

A.1965 (Penzance) heard 'phone signals from ZD1EO (18.22), OX3DL (18.47), VP9DL (18.50), FQ8AF (18.22), TF5TP (18.55), VS9AE (12.05), LA8LF/MM on an oil

The equipment at VS6BJ comprises an R.C.A. AR88 receiver, BC221 frequency meter and a Labgear LG300 transmitter.



G3AJB of Whitby, Yorkshire, uses an Elizabethan transmitter (upper right) running 120 watts input and a Commander receiver (lower left). The modulator uses 807s in class B zero bias. The control unit with switches and fuses for each individual circuit stands between the transmitter and receiver. The operating desk was made from an old upright piano to which drawers have been fitted for log books, spare valves and other operating requirements. Power packs delivering 750, 500 and 350 volts h.t. and 12 volts d.c. for the relays are fitted at the bottom of desk in the space formerly occupied by the frame for the piano strings. Aerials in use include a 67 ft. dipole, another dipole for 14 Mc/s (both fed with 75 ohm feeder) and a compressed two-element beam for 28 Mc/s in the loft space.

tanker 200 miles south of EA8 (13.40) and GW3ITD/MM on H.M.S. *Puma* at Gibraltar (11.45). This latter station has certainly been putting in an excellent signal on his recent trip to ZS and back, and says that he is the first amateur to be allowed to operate from a naval vessel. **A.1696** using an R107 and a R208 located PZ1AB (12.13), IE1SMO (13.35), FB8CD Comoros (16.55) and FQ8AW (18.10) on a.m. **A.1657** (Yorks) reports EL4L (09.45), MP4BCC (16.08), VU2ANI (16.15), ZD1EO (09.05) and FF8AP (16.00). **A.1736** (Corby) received a.m. signals from EA6AY (16.40), EL2B (08.40), EL6C (17.35), FE8AH (17.00), HI7CJY (21.35), HC8JU (16.00), HV1CN (13.00), MP4TAF (17.50), OY2Z (16.50), TG9TI (18.15), VP2DX (16.55) and YN1WW (18.25). A very nice selection. **A.2121** logged GW3ITD/MM (19.15), ZB2N (16.20), CR4AS (20.00), VS9OM (14.40), CR6DB (18.07) and VE6QX/VE8. Ringing the change **B.R.S.20317** listened on the c.w. end of the band for HC1JW (18.55, '075), TI2CAH (12.20, '020), VU2BK (14.15, '050) and YA1AO (14.20, '075).

14 Mc/s

Once again the bumper bundle of rare DX has been heard and worked on 14 Mc/s with the accent still on c.w. but with the 'phone band being much more productive than for some months past.

G6ZO on c.w. reports UA0KAE (18.30, '035), FG7XE (22.00, '045), FO8AB (08.30, '330), JZ0DA (08.00, '010), DU7SV (09.30, '020), VK0RH (16.15, '065), FB8ZZ (16.15, '035), FB8XX (16.15, '080), FR7ZD (16.30, '015), FB8CE (17.00, '030), KG6AIG (18.00, '090), VU2ANI (18.00, '045), XW8AI/FG7 now FG7XF (19.30, '085), ZL3VH/3 (07.45, '080), VR2DA (08.00, '080), ZD6JC (18.15, '070), VK0IT (19.15, '015), KC4USE (07.45, '090), 3A2CN (18.00, '070), ZS3DP (18.45, '035), ZS3AZ (19.45, '065), VP8EL (20.00, '005), VP3MC (22.00, '015), UA0KYA Tannu Tuva (12.30, '035), VQ8BBB (16.30, '085), HZ1TA (19.00, '020), OR4TX (22.00, '015), OQ0CZ (22.15, '010), VP7NS (20.00, '005), YN4AB (22.00, '025), VP8CC (22.15, '060), UA1KAE/6 (18.45, '050), BV1US (19.00, '045), ETE3CE (16.45, '070), KW6CQ (19.30, '030), UM8KAB (16.15, '080), UM8AD (16.45, '010), VP7NY (20.15, '005), ZS3AH (18.30, '050), ZK1AK (07.45, '015), VP8BK (19.00, '010), VP7BZ (20.00, '010), ZS7R (17.15, '085), OR4TZ (20.15, '055), HC2IU (07.45, '010), VK0BH (18.30, '005), FD8AMS (20.00, '025), LU2ZI (07.30, '045), KG6FAE (08.00, '025), FG7XF (23.00, '085), KS4AZ Swan Island (23.15, '040) and LU1ZI (08.15, '050).

G3YF logged LA3SG/P (10.00, '014), LA8FG/P (12.15, '015), DU7SV (08.30, '045), KG6AAY (11.00, '068), VK0IT (10.30, '062), XZ2TH (15.00, '020), HL9KR (14.50, '028), VU2ANI (16.10, '068), YA1AO (16.00, '088), KG6AIG (18.00, '045), HP8FC/VQ8 (18.45, '060), XW8AI/FG7 (19.45, '095), BV1US (15.00, '050), HCCC8 (01.15, '050), OR4KR (23.30, '062), ZK1AK (11.00, '006), FB8CE (17.10, '090), ZA1NC (17.15, '010), FR7ZD (16.40, '080), ET3E (15.15, '065), JT1AW (16.20, '055), FO8AC (05.30, '035), JZ0DA (07.50, '065), XW8AL (16.30, '070), FQ8HO (15.15, '020) and UM8KAB (16.00, '065).

G8KP, another c.w. devotee, worked 4S7EC (18.15), KR6GF (19.55), 9M2GT (15.55), YN4AB (21.03), PJ2ME (22.40), FB8XX (16.13), VP4WD (20.12), 7G1A (18.45), XZ2TH (15.30), ZS7M (18.05), UA0KAE (18.45), FQ8HO (18.35) and VU2ANI (18.20). Again on c.w. **G3BHW** reports DU1OR (20.00, '055), ETE3CE (23.12, '095), FG7XF (08.55, '080), SU1MS (20.45, '035), VP7NT (23.07), VS9OC (22.50, '040) and YA1AO (17.05, '100).

G3AAE located 7G1A (19.40, '050), VK0IT (19.50, '080), XW8AI/FG7 (20.05, '088), ZS3DP (18.55, '036), UA1KAE (19.10, '080), HCCC8 (02.30, '048), VS9OC (19.15, '044), HH2CB (22.40, '024), OR4KR (19.40, '022), VP7NS (20.48, '004) VP7NY (20.30, '080), VS9ARF (17.45, '007), UA1KAE/6 (19.38, '035), FG7XS (22.50, '080), VP3MC (21.40, '096) and VQ6GM (19.10, '102) on c.w. while 'phone produced I5GN (19.00, '206), VS9APS (19.55, '150), VP2DX (21.36, '190) and VS9OC (20.16, '172).

G3FPQ employed sideband to converse with BV1USC (15.35, '307), FF8AK (19.45, '295), KA2YL (15.25, '305), KH6DLF our Pacific correspondent (18.00, '295), KL7CDF (12.00, '290), LA3SG/P Jan Mayen Island (19.50, '310), OK7HZ/YI (19.05, '310), VE8MB (08.30, '305), ZS3ES (19.30, '305) and 9N1GW (16.15, '310), **G6RH** on c.w. found VP2KN (20.00, '010), VP7NS (20.50, '008), PJ2AL (21.00, '020), KZ5BC (21.45, '005) and HZ1AB (21.30, '020).

MP4BBW (Bahrein), *the* s.s.b. exponent, worked KX6BT (11.39), UI8AK (13.38), UF6BC (16.09), XZ2AD (13.53), VU2ANI (13.50), OK7HZ/YI his first QSO (13.02), FB8BP (17.17), XE1SN (14.44), VP7BI (12.04), XE2FL (13.58)

VQ2AB (15.43), 9M2DB (15.58), HP9FC/MM (16.54), HP9FC/VQ8 Mauritius (13.43), HS1K (15.19), PZ1AX (03.57), HCCC8 (12.54), HP1LO (12.00), YS1MS (12.48), HK7AB (13.11), MP4DAA (14.07), VS1JO (14.39), 9N1GW (16.00) and ZK1BS (04.46).

B.R.S.20104 (Harrow) reports c.w. signals from ZS7M (17.30, '040), MP4TAF (14.50, '030), UM8KAA (14.00, '020), KR6AC (14.15, '010), XZ2TH (16.00, '010) and VS4BA (15.15, '090), while on s.s.b. he found 9N1GW (14.10, '310), OK7HZ/YI (14.30, '315), SV0WB Rhodes (20.50, '320) and MP4DAA (14.00, '300). **B.R.S.20317** reports hearing XE1AX (00.20, '010), VP2DX (23.15, '073) and FG7XF (23.05, '080) on c.w. and FS7RT (00.30, '302) and TG9PS (00.30, '302) on sideband. **B.R.S.22489** sends a report on c.w. signals heard on board an aircraft carrier in the Far East: unfortunately no British stations are listed. **A.1930** logged a.m. signals from CR7AG (17.30), SU1AS (18.15), EA6AR (14.45), HP3FL (23.15), KG4AL (22.00), TI2IT (22.45), KL7CDF (15.20), TI5CV (23.05), HK3EA (00.01), KH6ME (08.05), OY2Z (14.30), VP2DX (20.50), VP6GN (22.15) and HH3DL (23.40).

7 Mc/s and Below

Still somewhat neglected by most but capable of producing extremely good results in the hands of the few exponents who report, these bands have again provided contacts that would delight the most hardened DXer.

For example **G5DQ** (Cambridge) worked the following during the single weekend of the B.E.R.U. contest: ZD2GUP (00.30), ZD2JKO (02.00), VS1FZ (18.18), VQ2CZ (19.10), VS1EA (19.15), VK2GW (19.40), YV6BO (22.40), VP7NT (05.30), VK3KE (08.30), VK5NO (19.30), VQ4AQ (19.50), VQ3CF (21.30), VQ4FK (22.15), VP9BO (22.00), YA1AO (19.30), ZL3GU (07.50), VK2ZR (19.30) and VS9OM (19.15). *Yes, all on 7 Mc/s c.w.* **G3BHW** using the same mode and band worked EA8CU (23.55, '060), UJ8KAA (00.10, '075) and UM8KAB (00.25, '010).

G8KP erected a 7 Mc/s dipole on February 1 and between then and February 17 worked AP4M (23.33), UM8ADF (18.35), EA8CU (23.35), VE6SZ (00.15), UG6KAA (00.12), VP6RG (00.10), VK5JE (20.50), VQ4GQ (21.20), PY6HL (22.20), UA0AG (22.55), ST2AR (21.00), YV5DE (23.40), VK5NQ (20.32), JA8LN (20.10), UM8KAB (22.17), ZA1KC (21.00), 4X4MB (21.48), UL7AA (20.30), PY7AIO (21.13), PY2BIS (22.30), CM2QN (22.30) and rare KS4AZ (23.30). Bill made a 7 Mc/s W.A.C. in 2 hours 7 minutes. On 3·5 Mc/s he got across to ZL4IE (08.10), ZB1FA (23.28), ZC4IP (00.23) and 5A2CV (23.40).

G3FPQ worked the Swan Is DXpedition KS4AZ (22.55, '007), VK5JE (20.40, '012), VP6RG (21.10, '005), VP7BT and VQ4GQ (21.00, '005), while on 3·5 Mc/s he added VP7BT.

B.R.S.2292 logged EA8CU (20.55), EL4A (06.36), CT2AI (21.58), JA1VX (21.48), OX3RH (21.41), PY7LO (21.12), TI2CMF (06.30), UM8ADF (20.54) and ZC4KV (21.25).

Low frequency maestro **B.R.S.20317** reports 7 Mc/s signals from VK2GW (19.14, '005), OD5LX (19.43, '033), UJ8AG (20.11, '015), VK5NO (20.45, '036), ZD2JKO (20.54, '002) OX3RH (21.22, '020), TI2VM (01.20, '040), VP7CC (01.25, '004), KP4YT (01.30, '017), AP4M (23.45, '007), VQ3CF (21.35, '011), UM8KAB (22.14, '002) and UL7AA (22.40, '000). Moving down to 3·5 Mc/s he winkled out UN1AE (19.48, '496), sundry W stations and a really rare one in VP5FP on Grand Turks Island.

Just as this column was about to go to the printers a late report on the l.f. bands was received from **B.R.S.19107** (Beckenham). It is so full of rarities that it has been added as a tailpiece to the band reports. On 7 Mc/s c.w. he logged VP7CC, VP7NT, VP7NY, VP5ME, VP5FP, VP4TR, VP3YG, VP2KD, VP1JH, ZS1A, KS4AZ, YV5GO, VK3AZA (08.30), VK2GW (19.30), YV4AC, UI8AD, UL7FA, UL7HB, UL7IJ, UM8KAB and ZD2JKO while on 'phone he heard KG6NAA at 07.40 on 7.205. On 3·5 Mc/s he reports W5, 6, 9 and 0, VP1JH (06.46), VP3YG (07.50), VP5FP (07.58), VP5ME (08.13), KS4AZ (06.30), VP7NT (07.16), TI2CMF (06.58), ZL3GQ (08.14) and ZL4NX (08.05). The VP1 was his 128th country heard on 80 metres. On Top Band he found VE1HJ, VE1ZZ, W1BB, W1PPN, W2TR, W8ANO, VP1JH (05.29) and VP5FP (05.45), while European stations were heard calling KS4AZ. The above list comprises about five days' listening! Certainly a list to make one get out of bed at the crack of dawn: even when the shack temperature is around the freezing mark.

The Commonwealth Competition

With 22 entrants this competition is definitely proving a success, and it is hoped that in the months to come more and more readers will participate. Already one can see the beginnings of some nice little personal races: G4CP and G8KP at the top of the table, G8KP and G3BHW on 21 Mc/s, B.R.S.20317 and B.R.S.21008 on 14 Mc/s. Incidentally, MP4BBW, who is still well ahead on 14 Mc/s, has made all his contacts on two way s.s.b. Can a station working entirely s.s.b. take the prize on 14 Mc/s which has for ages been regarded as primarily a c.w. band for DX?

Commonwealth Competition

	28 Mc/s	21 Mc/s	14 Mc/s	7 Mc/s	3·5 Mc/s	Total
G8KP	18	32	34	26	15	125
G4CP	15	28	35	18	10	106
G3BHW	29	33	31	2	—	95
G3AAE	33	13	24	14	—	84
G5VU	15	16	25	4	9	69
G8DI	12	10	8	12	18	60
G2BLA...	12	13	9	10	3	47
MP4BBW	—	—	41	—	—	41
GM2DBX	16	17	5	—	—	38
G3KSH	7	9	6	4	3	29
G2DCG	7	18	3	—	—	27
G3MCN	10	12	1	—	—	23
G3GMY	8	12	2	—	—	22
G3MGL	5	2	5	4	—	16

Band Leaders

28 Mc/s—G3AAE
21 Mc/s—G3BHW
14 Mc/s—MP4BBW
7 Mc/s—G8KP
3·5 Mc/s—G8DI

B.R.S.20317	12	18	24	28	15	97
B.R.S.21008	27	35	20	2	—	84
B.R.S.22249	21	15	7	14	3	70
B.R.S.2292	13	19	18	9	—	68
A.1859	25	19	14	2	—	60
A.1902	18	4	11	—	—	33
A.1980	13	12	6	—	—	31
A.2065	10	10	2	2	3	27

Band Leaders

28 Mc/s—B.R.S.21008
21 Mc/s—B.R.S.21008
14 Mc/s—B.R.S.20317
7 Mc/s B.R.S.20317
3·5 Mc/s—B.R.S.20317

B.E.R.U. Contest

Only four people have come forward with claimed scores, and they are **ZB1FA** who knocked up 3,305 points from 475 contacts and must be high on the list, while **G2BLA** (Welwyn) reports 940 points from 52 contacts and **G5VU** (Nottingham) 1,540 points. In the Low Power section **G2DU** (Oxford) accumulated 1,825 points using 25 watts to a 66 ft. centre fed aerial on all bands except 28 Mc/s where a two-element rotary was used. His most notable contact was with VP7NT on 3·5 Mc/s.

B.R.S. and A. members

A number of B.R.S. and A. members will notice that in some cases their listings are either omitted, shortened or changed. This is unfortunately inevitable as some reports contain so many obviously misread call-signs that your scribe has had to scrap the lot; in others such common

stations have been listed that they have had to be omitted due to pressure of space, while in yet others the call-signs have been incorrect but your commentator was able to correct them. One hears complaints about licensed stations not QSLing listener reports, but there is no doubt that the fault in many instances lies with the reporter who has not taken the trouble to ensure that the call-sign logged is in fact the correct one. You cannot expect to receive confirmation of a report on a transmission of G3AAE if you send the card to G3AAB, G3AAC, G3AAD, G3AAV or G3AAT! So please remember to keep on listening until there is no doubt that the call-sign has been heard correctly.

LATE NEWS

TI9SB will be active again from the Cocos Islands around the middle of April, but the exact dates are not yet known.

Political changes in French West Africa (previously FF8) have resulted in the appearance of stations with the prefix **FF4** from the Ivory Coast and **FF7** from Mauritania.

TA3GI, who operates on 14 Mc/s s.s.b. between 18.00 and 21.00 G.M.T., is under cover and cards should be sent to VE7ZM only.

A 500/700 watt a.m./c.w. transmitter has been shipped to Easter Island, and it is hoped that the CE0AC gang will have it on the air by the end of March. Perhaps they will then increase their periods of operating from the present 03.00/05.00 G.M.T. on Tuesdays and Saturdays.

K6CQV/KS6 is due on from American Samoa using a BW.5100 transmitter. He will operate primarily s.s.b. and a.m. but a little c.w. will be included. (All the above late news from West Gulf DX Club.)

* * *

Well, that winds up a really fabulous month on the DX bands. During deadline week G3AAE received more than 50 individual contributions to this column and while time does not make it possible to write and thank everyone, their support is greatly appreciated. Some contributions have not been used *in toto* either because of duplication or lack of space, but they are most useful nevertheless. Good hunting and please remember to post your reports to arrive on or before March 18.

"Rare Counties" Expeditions

BETWEEN 23.00 and 23.59 G.M.T. daily until March 28 and from April 7-10, G3LAS will be active on Top Band from Cambridgeshire. Operation will be mainly on c.w. but phone will be used if requested.

FROM March 29 to April 7, members of Cambridge University Wireless Society will be operating from the Isle of Man on all bands from 3·5 to 28 Mc/s under the call-signs GD3LAS, GD3MDR, GD3MIK and GD6UW. C.w. and/or phone and s.s.b. will be used. All contacts will be confirmed via the R.S.G.B. QSL Bureau.

MEMBERS of the Wirral Amateur Radio Society will be operating from Radnor during the evening of April 22 and from Breconshire on April 23 under the call-sign G3NWR. Both Top Band and 2m will be used. On the lower frequency a balloon-borne aerial will be employed and with it it is hoped to put a good phone signal into most parts of the country.

The Honorary Secretary, A. Seed (G3FOO), 31 Withert Avenue, Bebington, Cheshire, will be pleased to hear of any sources of supply of additional balloons suitable for lifting the Top Band aerial.

The Lone Voice of Tobago—ex-VP4WD

(Continued from page 406)

up with being co-opted for the use of transport when I needed it. The only breakdown I had was on the power pack, all three electrolytics giving up the ghost at various times (not very surprising seeing they were dated 1944!).

My thanks are due, too, to the Manager of the Electric Supply Commission in Tobago, who went to great trouble in tracking down a case of severe electrical interference, which I encountered from December 14 to 28. Before the fault was finally cleared he had at different times switched out of service two ice-making plants, a complete sodium-tubed street lighting circuit, the Government stock farm, and two electrical pumping stations. These all proved to be blameless, and the trouble was tracked down to a faulty supply step-down transformer on one of the pylons in the vicinity, due to sea-air corrosion.

About "TAQ"

I did run to earth one other amateur on the island, VP4TAQ, the chief operator at the Fort Wireless Station at Scarborough. He has been on the island since 1952 but has never been active! I did my best to arouse the "DX bug," and now a new transmitter is on the stocks. With luck he should be active shortly. His location is a "natural," for his house adjoins the Signals cabin (quite a fair sized building) which sits on a 500 ft. hill dominating the town below. He has access to two 100 ft. masts and two 80 ft. masts, and in the cabin there are an AR88LF and AR88D plus an Eddystone 358X receiver.

VP4TAQ holds an A.R.R.L. certificate for c.w. at 35 w.p.m.

Operating Manners

To wind up I should like to say that on the whole I found the majority of the numerous W stations that called me co-operative in their operating manners. Only a few insisted on calling me when I called "CQ Europe" and most of them were careful not to remain on the channel once a contact had been completed.

A final word about QSLs: I have quite a large number outstanding for European contacts. If operators will forward their cards either via R.S.G.B. or direct to my home address, mine will be sent by return.

Heathkit Exhibition

BRITISH Heathkit equipment will be displayed and demonstrated at the Grand Hotel, Southampton Row, London, during the period of the Audio Fair, April 21-24.

A new catalogue which includes details of eight new Heathkits, is available from Daystrom Ltd., Gloucester.

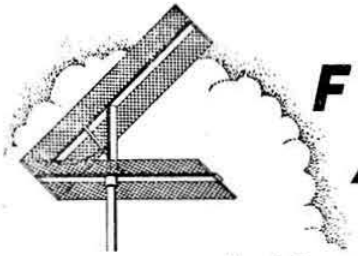
Break-in with the Geloso

(Continued from page 405)

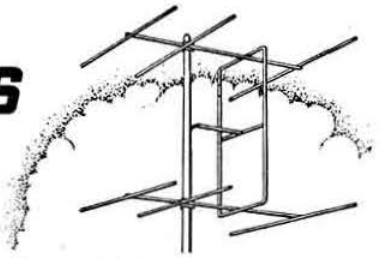
ory for break-in operation, both for normal QSOs and in contests. No frequency drift has been experienced after the usual ten minute warming-up period and no adverse reports have been received. On the contrary, a critical comparison resulted in the conclusion that the note was considerably cleaner than with the method of keying previously in use (grid-block keying of the driver stage with the v.f.o. switched in and out by means of a switch in the h.t. lead). The transmitter runs 45 watts input to a single 1625, operation being mostly c.w. After some months operating break-in, there is no intention of ever going back to any other form of keying.

Reference

DL-QTC, 1959/4.



FOUR METRES AND DOWN



Activity Nights stimulate Operation on 2 and 70

By F. G. LAMBETH (G2AIW)*

ONE of the gratifying features of the Monday activity nights on 144 Mc/s is the way in which they are attracting many of the more recently licensed stations to this band, assured as they are of finding plenty to work during " Monday night on Two." What is also evident is that a much larger number of stations use the band during week day evenings than the handful that could be heard only two or three years ago. It is particularly pleasing to observe that the lamentable mentality of " I've collected you so I won't work you again," once prevalent, seems to have disappeared finally once and for all. Perhaps a good example is being set by some of the aforementioned newer licensees.

In this connection G5UM remarks that a feature of the Monday night activity in the London area is the operation of the Mid-Herts Net on their spot frequency of 145·8 Mc/s, keeping themselves clear of the London congestion in the centre of the band. Anything up to seven stations, all equipped with spot frequency crystals, are to be heard between 8 and 8.30 p.m., lined up in alphabetical-numerical order of call-signs. Other stations who drop in on 145·8 are welcomed by the Mid-Herts Net, but what is noticeable is how few London area stations, in fact, tune as far up as 145·8. The Mid-Herts members customarily move to a mid-band Zone frequency for more distant contacts once their local net operation is concluded.

Saturdays on " 70 "

It should be made plain that the above heading refers to the 70 centimetre band and not to the 70 Mc/s one! Newcomers to 435 Mc/s can be assured of contacts if they listen during the Saturday evening activity nights, which in the London area have recently been attracting anything up to a dozen stations or more. Almost all of them notch five or six contacts per Saturday, nearly all at S8/9, between the hours of 7 and 8.30 p.m., almost entirely within the 2 Mc/s span of 434-436 Mc/s.

Indeed, activity in the Home Counties on " 70 " has been at a level these last few Saturdays such that any one operator cannot easily work all that there is to be heard during the Saturday activity night.

All this is an effective antidote to the minority who complain that " There's never anything doing on 70 cm."

As for " Twenty-three "

Several of the Home Counties u.h.f. operators are now equipped for the 23cm band, and are using 435 Mc/s as a talk back channel. **G8AL** (Chingford) reports some unexpected phenomena on 23cm during his many contacts with G5DT near Croydon. Based on experience of the lower u.h.f.'s the reverse often occurs; for example, a snow covered landscape on one occasion appeared to give remarkably good propagation towards G5DT.

At least half a dozen operators in the London area are now having regular contacts between one another on " 23."

London U.H.F. Group Dinner

A small but select group of enthusiasts gathered at the Bedford Corner Hotel on February 13. The guest of honour was Dr. Smith-Rose and the proceedings were entirely informal. Arrangements were in the capable hands of Phil Thorogood (G4KD) and those who were there had an enjoyable evening. We ought to have had a bigger number, however; there was no fog or other calamity to prevent it on this occasion.

Two Metre News

B.R.S.21476 (Penarth) has completed a new c.c. converter and the 417A—6J4 cascode arrangement has come well up to expectations, sensitivity, stability and low noise being the best yet obtained on this band. It is interesting to note that a British-made 417A is now available from the G.E.C. This is worth knowing to those who may find American 417As difficult to obtain or too costly to import. Another valve of promise for both 2m and 70cm is the readily available EC80 specially designed for grounded grid use at 500 Mc/s and approximately equal to the 6AM4 but with a higher slope and half the price.

G3JGJ (Moretonhampstead) has found very little of interest recently to report. GC2FZC has been heard at odd times weakly, but no QSOs until January 4. The next was on January 31 during the C.W. Contest when the signals were very strong. The only other station heard that day was G5MA, calling GW3ATM (not heard at G3JGJ). The sked with GC2FZC has been kept 100 per cent.

Since February 15 a sked has been running with G3LTF (Danbury) every evening at 18.50/19.00 G.M.T., excepting Fridays. As far as G3JGJ is concerned, this will be a seven day effort weekly, but on Fridays the call will be CQ to the east and east-north-east.

G2XV (Cambridge) says the C.W. Contest on January 31 was very well supported and seemed to be enjoyed by all.

After reading G5UM's letter in the January BULLETIN **A.1491** (Palmers Green) took a survey from last October onwards to ascertain the most active stations in the London area; G3FRF, G3JAM, G3LAR, G3LTF, G3EYV, G6OX and G6TA are outstanding. G3KMP follows not far behind, which is remarkable because he is 60 miles away. On the DX side, the consistency order comes out as: G3MED,

V.H.F. ACTIVITY NIGHTS

MONDAYS FROM 8 TO 10 ON TWO
WEDNESDAYS FROM 8 TO 10 ON FOUR
SATURDAYS FROM 8 TO 10 ON 70 CM

See how many stations you can work, and report the results to G2AIW (V.H.F. Manager).

* *21 Bridge Way, Whitton, Twickenham, Middlesex.*

SIXTH INTERNATIONAL V.H.F./U.H.F. CONVENTION
Kingsley Hotel, London
MAY 21, 1960

G5YV, G3LHA, G3EJO, G3FAN and G3EHY. Conditions have been poor but " never impossible," even sometimes fairly good. Bright spots occurred on December 30, January 4/7, 11, 25/26 and February 7/9. On February 9, G3EHK (Sheffield) was a new one, but no other Midland or Northern stations were heard that evening, surely no fault of conditions which must have been good.

G2CIW (Birmingham) is another recent new one from a distance whilst G3NJT (Felixstowe) has been representing Suffolk on phone and c.w. (144·12 Mc/s). On February 7 no less than four new ones were heard. G3KSW (Cheshunt) is another local with G3JQP, G3JJC, G6NR, G2AOX and G3IUG all recent newcomers in the London area.

G5MR (Hythe, Kent) greatly enjoyed the C.W. Contest, and found activity high throughout. QSOs included three at well over 200 miles (with F3YE, F9AJ and G5YV). G6LI was heard, but could not be raised. Conditions, good at the start, fell off in the afternoon. G5MR had to close down at 18.30, and on resuming at 21.30 found more French stations pouring in, but unfortunately the time was too short. All the same, they were worked until after 22.30. G5MR has worked out his " QRA Locator " as AL76G. This is based on a subdivision of 80 " squares " in each large rectangle, but these subdivisions will have to be standardized before we can be sure, as some countries are using different sized subsquares.

GM3GUI (Friockheim) heard only Scottish stations on January 31 and GM3LAV, GM3HLH/A, GM3FGJ, GM4HR, GM3MDR were worked; G2FXN was heard. On February 2 severe patterns were noted on Channel 4 B.B.C.-TV at 18.10. 144 Mc/s was monitored from 18.30 onwards and GM2FHH was heard later at 59A, followed by GM4HR, 59A (1915) and G2BDQ, 56A (1916). GI5AJ was worked 58A at 19.20. Between 19.35/20.02 G3DMK and G3HBW (the latter calling GM2FXN) were heard, as well as on ON4 and an SM station. G6NB (57A) and G2NY (55A) were worked. GM2FXN was 58A and by direct beam 539.

G8DR who is himself active on 2m, reports that ZC4SC (G8SC) is active on 2m at Limassol (Cyprus). A sked is running over a distance of 15 miles with ZC4WR (Episkopi), signals being 5/8 each way. G8SC's frequencies are 144·00 and 145·350 Mc/s.

The next meeting of the recently formed North Eastern V.H.F. Group will be held at the Cleaver Hotel, Skinnergate, Darlington, on April 9 at 7 p.m. Those active on 2m in the area include G2FO, G2HNL, G3NT, G3CDM, G3FMZ, G3HPJ and G3NOB. The local calling frequency is 145·8 Mc/s.

G3HBW (Bushey Heath) reports that during the C.W. Contest on January 31, 70 stations were worked in 29 counties. However, the absence of several normally reliable DX stations was noticed especially GMs and far northern Gs. GW3LJP put in a good consistent signal from Llandrindod Wells to provide an early Radnor contact. He is active mainly after 11 p.m. around 145·65 Mc/s. February 2 brought a small auroral opening. GM2FXN (Dundee) was first heard at 19.55 G.M.T. and promptly worked (with reports 55A out and 56A in) with a quick fade out. Nothing was heard after 20.03 although a listening watch was maintained until 00.30 on February 3. G3HBW adds his voice to that of G2XV about simultaneous Contests (2m/70cm/23cm). We will have to take this up at Folkestone, and see if anything can be altered. G3HBW thinks the " unidentified TV station " mentioned in the auroral report for December 5 was probably Dresden (145·264 Mc/s) which has been reported before and is a fruitful source of meteoric " pings." It should be possible to hear some of these after 20.00 G.M.T. even in non-shower periods.

GW3MFY (Bridgend) has made a check of his sked with G3LTF (Danbury). The months covered are from November 1959. Of 95 attempts 77 have been R4 or better (c.w.) which means 81 per cent success. The distance is approximately 180 miles.

With reference to scoring in the C.W. Contest, GW3MFY agrees that the " least line of resistance has been taken so that operators away from centres of activity will always be at a disadvantage. Thus, he says, a centrally located station will have much more chance than say, a station in South Wales with the Atlantic in the rear! GW3MFY thinks it seems obvious that the Contests Committee is trying to attract the lazy types who cannot be bothered to work out anything and thus have a bigger entry. On February 8, G3BGL and G3NNG (Harwell) were worked but G3HXS, G8VZ and G2JF were called in vain. On the 9th G6XA (Leamington) and G3FGT (Birmingham) were worked and G3HAZ and G2CIW called.

GM2FHH (Aberdeen) says there was a pretty good opening on February 2 at about 18.30 G.M.T. when SM6BSW, SM7YO, SM7AMN, LA8MC and G5YV were heard, with G2BDQ, G3GWL and G4LX worked. As GM2FHH had to QRT at 19.00 G.M.T. he doesn't know what happened after that. The beam had been frozen solid for some time so that the outlook at the time of writing was at least gloomy!

Seventy Centimetres

G3JGJ is on the band every evening 19.30/20.00 G.M.T. beaming east north-east on 432·3 Mc/s. Anyone interested may arrange a sked on 2m or 70cm.

G2XV (Cambridge) is running a sked with G2ADZ in Devon for the time being, but so far there has been no luck—it may be extended for a further month. Any others in this path are invited to take an interest.

G5MR says that F8GH and other French stations are now looking for Gs every Sunday morning from 10.00/10.30 G.M.T. (Don't forget this means 11.00/11.30 *B.S.T.* from April 10 to October 2.) F8GH calls CQ on 434·980 Mc/s (c.w.) for the first five minutes of each period, then listens for five minutes and so on.

From K2ZSQ and *QSO* (New Jersey) it is learnt KH6UK is now back in Hawaii and is getting set up for a 432 Mc/s contact attempt with W6NLZ in California. Good luck to both although if they succeed, we Europeans will lose yet another record!

Auroral Investigation

The following is the first of what we hope will be regular reports from G4LX.

A large amount of data was collected by R.S.G.B. during the I.G.Y. programme, and it is hoped to collect further information throughout the whole of the sunspot cycle in order to make proper comparisons and to investigate a number of theories. G4LX has agreed to collate all auroral reports henceforth, and regular observers are urged to send to G4LX all reports of every sign of auroral propagation on any v.h.f. band. It is already interesting to note that auroral propagation has appeared regularly on certain corresponding days in 1957, 1958, and 1959. Special attention should be directed towards the period March 25-28 this year in order to see whether this pattern continues.

On January 21, a slight auroral buzz was apparent on 50 Mc/s, but no 144 Mc/s signals were reported as having auroral signs. On February 2 at 18.50 G.M.T. an aurora developed and affected GM, GI and the North of England. G2BDQ and G4LX both in Newcastle, heard GM2FHH, GM2FXN, GM4HR, GI5AJ and G2NY. Another GM, possibly GM3GUI was also heard. Contacts were made with GM2FHH and G2NY. The opening seemed to be confined to the area of these stations, since no other stations were being called, and the aurora faded out at Newcastle at 19.50 G.M.T. At 19.50 G.M.T., however, G3HBW was

noticing the aurora in the South of England, where it lasted for some 15 minutes during which time G3FZL had QSOs with GM4HR and GI5AJ.

A further auroral report from G4LX refers to activity in Sweden: on January 10, 1960, a strong aurora was observed at SM6PU, and QSOs were made with DL1RX, DL0HH, LA9T, SM3AKW, SM5ABA, SM5BDQ, SM5ARU, SM5AMW, SM5LZ, SM5SI and SM6CJI. This aurora was the two phase pattern, 14.15-17.15 G.M.T. then 21.00-22.30 G.M.T. Slight aurora was observed by SM6PU on 13 other days during January 1960, with amateurs heard on two of the days.

Looking for Aurora

How can more v.h.f. operators enjoy auroral DX? The answer is by monitoring frequencies between 45 and 100 Mc/s where there are a large number of European high power TV and f.m. broadcasting stations to provide a reliable guide to conditions.

At the start of auroral reflection, the note of the station deteriorates rapidly to T1, accompanied usually by an increase in signal strength. Frequently a number of European stations, not normally audible, suddenly appear at good signal strength with a T1 note. Attention is directed to the following frequencies: 49·75 Mc/s Czech video; 50 Mc/s German f.m.; 52·4 Mc/s French video; 54·75 Mc/s German f.m. and Belgian a.m.

Having detected the aurora on 50 Mc/s, the 2m aerial should be beamed north, and swung between north west and north east for any sign of 144 Mc/s signals, which will have a T1 note or less. On 144 Mc/s the beam direction is critical, and a few degrees either side of the auroral reflecting layer will lose a signal completely. Beam direction, however, does not matter when monitoring 48-100 Mc/s since the high power of the particular transmitters causes a very strong reflection.

It is hoped that more 2m operators will take the trouble to look for aurora. It is more prevalent than most people realize. For instance, in U.S.A. satisfactory 144 Mc/s auroral QSOs take place on an average of four days each month, and some months have produced 12 major openings.

One word of warning . . . You must get on the air *before* the visible aurora develops. Conditions deteriorate rapidly as soon as the visible display occurs.

Four Metres

B.R.S.21476 says that owing to the steady decline of 6m it is now proposed to replace the aerial system with one for 4m, as we must now make use of this band for obvious reasons. A difficulty locally is the video frequency of Wenvoe (66·75 Mc/s) of which the partially suppressed upper sideband causes considerable splatter unless rejectors are fitted, which calls for at least two sharply tuned r.f. stages ahead of the first frequency changer.

K9EFU (Chicago) draws attention to the article " Hams on Ice " in January 1960 *QST*. This deals with v.h.f. propagation over considerable distances by reflection off the base of the auroral zone. A curve of points within the theoretical working range of Frobisher Bay (Boffin Is.) has been made using the map and information in the article, and it appears likely that Southern England or Northern France could be worked from Frobisher Bay. Although the article deals with 6m, a 6m/4m QSO over the path seems a possibility. It is worth watching!

Six Metres

G3EHY (Banwell) reports that Solar Cycle No. 18 provided openings on two successive years only—1946 and 1947—when 6m signals across the Atlantic could be heard and worked. The passage of time has naturally given opportunity for improvement in equipment, listening technique, etc., and Solar Cycle No. 19, now declining, has proved much more informative and interesting in every way.

Much DX communication across the Atlantic was found to be possible on the amateur 6m band during the three autumn/winter seasons of 1956, 1957/58, 1958/59, and a great deal was learnt from this experience. Could the m.u.f. possibly rise to 50 Mc/s in a fourth successive year, well on the declining side of the maximum sunspot cycle? The expectations were evidently, so far as Europe is concerned, regarded as rather too remote for much attention to be given to the matter.

The sceptics were, however, once again confounded, for sure enough after many months of careful observation, from the beginning of October actually, a burst through of amateur 6m signals from the U.S.A. was observed at G3EHY at 15.00 G.M.T. on January 27, 1960. W1LGE in Connecticut was heard on phone at S5, signing off a QSO with W1LUN, another local. G3EHY's calls on 10m, informing the U.S. stations of the opening were replied to, but only by unreadable phone signals, and the opening " went out " in less than a quarter of an hour. Fortunately the m.u.f. continued high for a further five days period, during which some 60 or more contacts with the States and Canada were made on 6m cross band with 10m transmissions at the G3EHY end. Until the last day no other European stations asking for 6m contacts were being heard in U.S.A., consequently the 6m band was crammed full of Ws all calling G3EHY and the pile-up was colossal, and difficult at times to sort out. On the last day a Belgian station, actually operating on 6m, came to life and the automatic sender at CT1CO was heard in U.S.A., but no news of contacts with any other Europeans has been received.

The skip appeared to be quite restricted and apparently worked only between W1, W2, W3, VE1 and Europe, all of which areas were contacted from G3EHY. All the other call areas were calling him on 6 and air mail letters from the Middle West and West Coast soon began to arrive, asking to be looked for and contacted. Well, it is now known what it feels like to be the only station on when a whole subcontinent is anxiously calling for contacts—a v.h.f. man's dream come true, but oh! the QRM!!

For the record, the first opening observed was on January 27 and this continued without a break each afternoon until February 1. The earliest signals workable were at 13.55 G.M.T. on January 31 and the latest at 17.15 G.M.T. on February 1, signals on that day being as low as 339. There was much more, and deeper, fading on all signals than in the other past three openings, and as stated above the areas from which signals arrived were limited to the north eastern States of the U.S.A. and south-east Canada.

G4LX (Newcastle-on-Tyne) says that although F2 propagation to U.S.A. in December 1958 was exceptional and every W district was heard and worked from Europe, December 1959 proved to everybody that the m.u.f. had

V.H.F. QSY

Members who wish to acquire or dispose of crystals in connection with the revision of the British Isles Two Metre Zone Plan announced in March 1959 are invited to send details to "V.H.F. QSY," R.S.G.B. *Bulletin*.

Crystals Offered

By G3SM, 66 The Drive, North Harrow, Middlesex. 8071 and 8100 kc/s.

By GM3MZZ, 28 Castlandhill Road, Rosyth, Fife. 8007 kc/s, A.M. type, $\frac{3}{4}$ in. pin spacing.

Crystals Required

By G3SM, as above. Crystals in the range 8039 to 8061 kc/s.

By GM3MZZ, as above. Crystal in the range 8102-8108 kc/s, $\frac{3}{4}$ in. spacing or FT243 $\frac{1}{2}$ in. spacing.

definitely taken a dive. On not a single occasion did the m.u.f. rise high enough for Ws to get through to Europe, but a sudden rise in m.u.f. at the end of January 1960 brought a number of VE1, W1, W2 and W3 signals through. In the North of England, G2BDQ and G4LX had been watching 6m, but here the band did not open until January 31. A second opening on February 1 was observed by G4LX but no cross-band QSOs were made.

Frequently after an auroral opening, tropical-E signals from ZE2JV are observed. These came through on February 4, 48 hours after the auroral opening of February 2.

B.R.S.21476 says his log is in complete agreement with G3EHY's report in the January BULLETIN. As to later developments, the necessary m.u.f. has never been reached at Penarth and no amateur signals have been heard. The highest was 49 Mc/s on January 10, 48 Mc/s on the 29th and 47 Mc/s on the 30th. During most of January and early February almost daily S9+ signals were received from U.S.A. police and public service transmitters in the 35/45 Mc/s region, sometimes for hours on end. On January 31 at 13.30 G.M.T. Eastern European video on 49-75 Mc/s was S9+ for some time.

V.H.F. Briefs

Mullard experimental transistors were used in a demonstration of a 100 Mc/s transmitter with an output of ½ watt at the Physical Society's recent Exhibition in London.

The alleged reception of G3NIV's 430 Mc/s signals mentioned last month, did not in fact take place. There was a genuine misunderstanding on both sides. Apologies from all concerned.

Apropos crystal etching, mentioned in this feature in January 1960, **G3EUD** (Oadby, Leics.) draws attention to an article entitled " Etching of Quartz Crystals " published in the BULLETIN for September 1950. The method described has been tried many times, and its usefulness is undoubted. G3EUD is back on 2m and has made many QSOs recently with old friends, running 10 watts to a QV04-7 (an old portable rig made up many years ago!) There will soon be a QQV04/60A in the final and the aerial (on the roof) which will be rotatable.

Associazione Radiotechnica Italiana (A.R.I.) Modena Section, are holding a Conference—V.H.F. Symposium at Modena on March 26/27. A few explanatory leaflets are available from G2AIW.

Some Notes on Four Metre Operation

By VERNON MELLOR, M.A. (G5MR)*

AN outstanding feature of the 4m band is that it is the only v.h.f. allocation to British amateurs on which propagation by ionospheric means can be reasonably expected to occur. The sporadic *E* contacts made on 2m in June 1959, were quite exceptional, and the writer can recall no other occasion on which such contacts have been made on that band from this country.

On 4m, however, ionospheric propagation (sporadic *E* or otherwise) is frequently in evidence; many contacts have been made at excellent strength with North African stations in late spring and in summer during the past three years. Sporadic *E* openings occur mostly around noon and at sunset, but on occasions DX comes through continuously for several hours, from about 09.00 until 22.00. Many operators have happy memories of working in the old 5m band, which at times brought contacts with Czechoslovakia, Italy and other v.h.f. DX in Europe as well as with North Africa. As might be expected, the 4m band behaves in much the same way.

Periods of good tropospheric propagation frequently occur, so that the band is interesting all the year round. Regular contacts between F8GH and G5MR (112 miles) on both 2m and 4m have shown that the latter gives the most consistent results and usually the better signal strength, which is often S9 plus both ways. On 4m F9CZ at 205 miles is nearly always workable on phone.

" It's not worth the trouble and expense of going on to Four, as we have the band on a year-to-year basis only "† is an opinion sometimes heard. This attitude seems hard to understand as it need not be either a costly or troublesome matter. The gear at G5MR is very simple, and the only items purchased especially for 4m were the quartz crystal (5s. surplus) for the transmitter and some tubing for the three-element Yagi. All the remaining components came from the junk box. In the event of the band being withdrawn at any time in the future, all the gear (except the crystal) could be used for other v.h.f. purposes; even the Yagi could be cut up, as the elements are just over twice the length required for 2m.

Equipment

The converter in use has an ECC84 cascode r.f. stage and a tunable local oscillator. It was originally built as a standby converter for 2m, but was modified for 4m when the latter became available. It can, in emergency, be changed back to 2m in less than half an hour.

It is most desirable that the converter should cover from 70-73 Mc/s, as many of the continental allocations differ from that in Great Britain, which is 70·2-70·4 Mc/s. For example, French stations, including those in Algeria, use 72-72·8 Mc/s. This coverage can, of course, be obtained by other means than by using a tunable local oscillator. F8GH has a crystal converter and finds it quite satisfactory to tune his main receiver over the 3 Mc/s range required. F8NB also uses a crystal controlled converter, but has two crystals, one for the French and one for the British section of the band.

The transmitter at G5MR starts off with a half 6J6 in a Squier circuit on the third overtone of a 7806·6 kc/s crystal; the second half of this 6J6 is a tripler, and thus the final frequency is reached at very low power with one valve. (It should be remembered here that an overtone circuit does not usually give an exact multiple of the fundamental‡; in the above case the final frequency turned out to be 70,232 kc/s.) The next stage is a 5763 amplifier, which is keyed in the cathode for c.w. and drives the 3E29 (829B) p.a. A smaller valve could be used in the final, but the 3E29 happened to be available. The grid drive is rather low, but appears sufficient on either c.w. or phone at the input used (45 watts).

Possibilities for Listeners

The band should appeal to B.R.S. operators also, as there is much to be found there in addition to amateur transmissions; Russian f.m. broadcast stations have been heard strongly between 70 and 73 Mc/s, and the *Voice of America* at Tangier is sometimes a good signal on about 70·5 Mc/s. If it is not desired to put up a beam, results can be obtained with a simpler aerial; amateurs in Algeria have been well received when the writer was using only a plain dipole in the roof space.

Working on 4m is very popular in France, where there are four activity periods *daily*, and it is felt that much more use should be made of it in Great Britain. For amateurs whose main interest lies in v.h.f. and u.h.f. circuit design, the band may, perhaps, have but little attraction; but for those who wish to study propagation modes at v.h.f. its possibilities are unsurpassed.

* " *Conway* " *North Road West, Hythe, Kent.*

† See announcement on page 369, R.S.G.B. BULLETIN, February, 1960.

‡ Due to the mode of oscillation.

Single Sideband

By G. R. B. THORNLEY (G2DAF) *

THE following is an extract from a letter to Society Headquarters by a transmitting amateur: "I would like to suggest that G2DAF should follow up his three technical articles with an article describing in detail the many pitfalls which the average amateur falls into when he attempts to construct a new piece of s.s.b. equipment."

The writer could not possibly agree with the implications behind this suggestion. If such an article were written, it would give readers the impression that the construction of an s.s.b. transmitter was fraught with difficulties and that there were so many pitfalls it was necessary to publish a warning to all would-be constructors. In point of fact the s.s.b. system has all the advantages. It requires less valves, less chassis and cabinet space and less material. All valves in the transmitter are receiving types operating from a low h.t. voltage and only one valve (the linear amplifier) need be a transmitting type with a high voltage power supply.

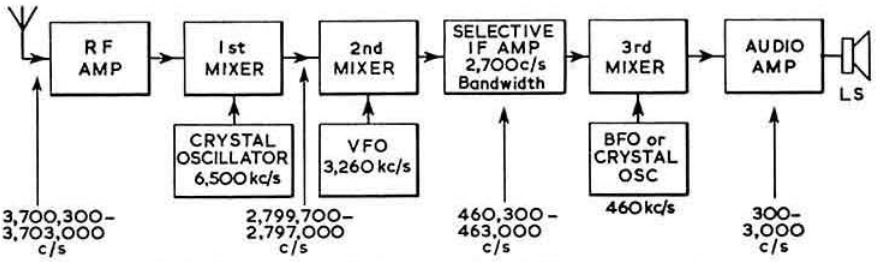


Fig. 1. Frequency translation process in a double superhet receiver.

However, it is felt that perhaps the great majority of operators at present using a.m. who are considering changing over to the s.s.b. mode have similar ideas and could just as easily have made the same suggestion. If this type of outlook is general (and the writer believes that it is) it could have a seriously adverse effect on the growth and popularity of s.s.b. for amateur use. It is then important to try to show that the s.s.b. method of transmission is in fact the simplest and most straightforward way of transmitting speech and that the apparent difficulties are in fact due only to unfamiliarity with the different techniques in use.

S.s.b. Modulation

Having been brought up on the concept of a carrier expanding and contracting in sympathy with the modulation (our old friend the modulation envelope) it is almost impossible to forget suddenly all this and visualize transmission of the modulation without the carrier. The question has been asked by many: "How can you transmit voice frequencies if you haven't got a carrier to hang them on?" This is not a foolish question! The s.s.b. method is so different from conventional a.m. its principles cannot be readily understood in terms of what is usually meant by modulation.

In a recent article in *Electronics* by A. Fick, head of the Communications Security Section of the U.S. Naval Research Laboratory, a different explanation is given. This is so good, so clear and to the point, it should be memorized by everyone interested in s.s.b. This is what he says:

"Rather than consider s.s.b. as a modulation method, we prefer to think of s.s.b. as a frequency translating process in which, for example, the voice spectrum is translated from the audio range of 300-3000 c/s up to a suitable r.f. channel of say 6,000,300-6,003,000 c/s to facilitate transmission, and then retranslated back to 300-3000 c/s at the receiving end, without the transmission of a carrier, mirror image sideband, or other spurious signals." In regard to the advantages of s.s.b. he goes on to say: "First, the r.f. spectrum required to transmit a given signal by means of s.s.b. is exactly that of the original signal, thus maximum use can be made of the available r.f. spectrum. Second, since only essential signals are transmitted by s.s.b., without a superfluous carrier or mirror image sideband, a power saving of at least 9db is achieved. Third, and most important of all, s.s.b. systems are effected far less adversely by the transmission disturbances inherent in ionospheric transmissions than are a.m., f.m., or any of the double sideband systems."

The terms heterodyning and mixing have the same meaning in s.s.b. practice and they are both frequency translation processes. Fortunately, we are all perfectly familiar with these processes when they are used in a receiver. All superhet receivers translate the frequency down from the required amateur band to the i.f. channel (or channels) and then to the final audio channel, This is shown clearly by the block diagram of a typical double superhet receiver given in Fig. 1. If the third mixer is renamed product detector, the circuit arrangement is well-known, in common use and easily followed and understood. Suppose then that the translation process is reversed and the block diagram redrawn as in Fig. 2. The mixing processes are exactly the same as in Fig. 1 but the block diagram in Fig. 2 is that of a s.s.b. transmitter. In the receiver the translation process is *down* from the r.f. signal frequency to the audio frequency, and in the transmitter *up* from the audio frequency to the r.f. signal frequency. It is possible (in familiar terms) to follow mentally the progress of the signal intelligence from the microphone to the transmitting aerial, and the question, "How can you transmit voice frequencies without a carrier to hang them on?" does not arise.

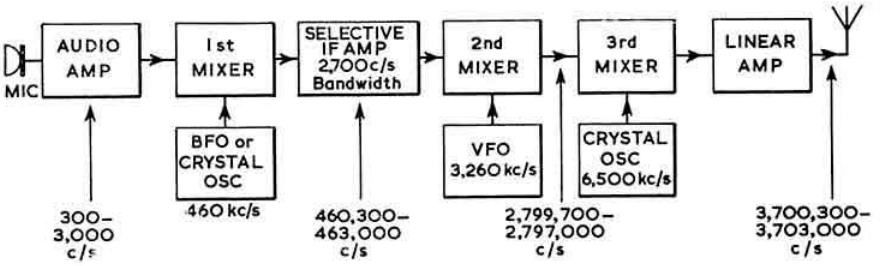


Fig. 2. Frequency translation process in an s.s.b. transmitter.

In the practical application of the circuit of Fig. 2 the output of the 460 kc/s oscillator would break through the selective i.f. amplifier and produce a continuous carrier at the final operating frequency. This is prevented (the carrier is suppressed) by making the first mixer a dual arrangement

* 5 *Janice Drive, Fulwood, Preston, Lancashire.*

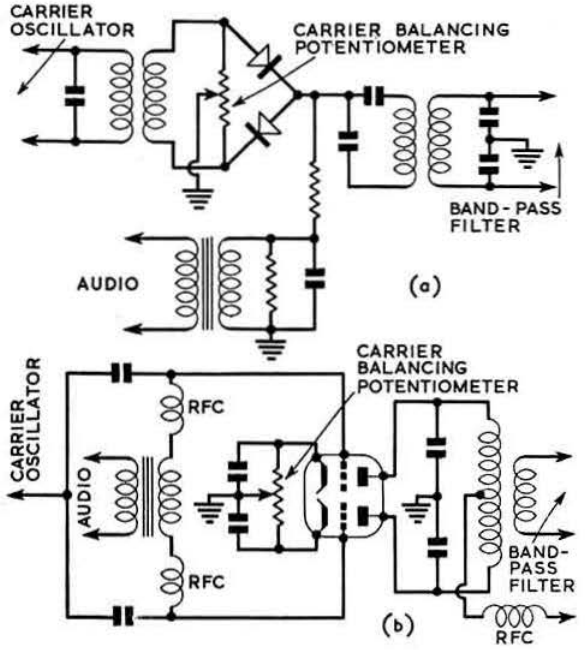


Fig. 3. Basic methods of carrier suppression. In practice other valve and diode combinations may be used. (a) Germanium diode mixer. (b) Double triode mixer.

using either a double triode valve or two germanium diodes in a bridge circuit, so that the two halves can be balanced by adjustment to a small potentiometer and the carrier cancelled out in the mixer output circuit. Two common methods of doing this are shown in Fig. 3.

The answer then to a better understanding of s.s.b. is to forget all existing conceptions of modulation and to think only in terms of frequency translation. The fog of doubt and uncertainty is lifted and the mental visualization immediately becomes clear and understandable.

S.s.b. Advantages

There are no inherent difficulties in the construction of a s.s.b. transmitter. In the filter type, the chassis, the layout and even the majority of the components are virtually identical to a selectable sideband receiver. The usual 75 watt modulator with its bulky driver and output transformers and separate 150 watt power supply is no longer required. The s.s.b. transmitter can be built and used initially to gain operating experience with a low power output—say 50 watts peak. At a later date the power can be increased to the licensed maximum merely by building a suitable linear amplifier and h.t. supply and driving this with the existing transmitter.

It is quite true that s.s.b. working demands a higher standard of frequency stability and more care in netting, but this should not be looked upon as a disadvantage peculiar to sideband working. First, as receiver selectivity is improved and more of these receivers come into regular use there will be a similar demand for better frequency stability from existing a.m. transmitters. A general clean-up in this direction is badly needed and would be of benefit to everybody using the crowded amateur bands. Second, many of the methods developed by amateurs for s.s.b. working are already being adopted to improve existing a.m. operation. These include exalted carrier detection, improved bandwidth control, better oscillator stability and press-to-talk or automatic voice control. Third, the power gain of 9db with s.s.b. operation (made up of 6db gain at the transmitter and 3db at the receiver) represents an equivalent power increase at the transmitter of four times.

A direct comparison of a s.s.b. all band transmitter and the associated equipment with the equivalent a.m. transmitter will show once and for all that the claimed advantages of less material and greater simplicity are not wishful thinking on the part of a sideband enthusiast but are very real. The facts are as follows:

G2DAF s.s.b. transmitter driving an 813 linear amplifier.
Total number of valves: 14 (this excludes automatic voice control which is optional)
Power Supplies: One 300 volt at 150 mA; one 1,600 volt at 200 mA.*
Peak talk power = 600 watts.

Elizabethan a.m. transmitter with the simple modulator described in the R.S.G.B. BULLETIN *for October 1954, page 171.*
Total number of valves: 14.
Power Supplies: One 300 volt at 150 mA; one 750 volt 200 mA (or 1,000 volt if an 813 p.a. is used instead of two 807s); one 750 volt 200 mA for the modulator.
Peak talk power = 150 watts.

If an a.m. anode modulated transmitter were built to give the same talk power as the s.s.b. transmitter it would require a p.a. running at a continuous input of 600 watts, a 300 watt modulator and of course the necessary additional power supply.

It is also of interest to the man who wants to occasionally operate c.w. that a s.s.b. transmitter can be keyed without clicks or thumps and produces a particularly stable and T9x note.

Quite frankly, the amateur who is looking for hypothetical difficulties and snags before he starts building is approaching s.s.b. in the wrong frame of mind and starting off on the wrong foot.

Crystals

There is only one aspect of construction peculiar to s.s.b. that might occasion some difficulty and that is grinding FT241A crystals to the correct frequencies for the carrier oscillator and the band pass filter. It is in fact quite easy because only one edge of the crystal has to be ground. The secret of success—if you like to call it that—is to make up some form of jig to hold the crystal firmly so that it cannot twist and break away from the fine support wires. However, it is wise to purchase more crystals than will be needed (the price is quite low) so that if one or two are spoilt in the early attempts, the loss is little in relation to the experience gained.

There are also a number of other ways of overcoming the crystal problem:

(i) If a single half-lattice section is used, standard crystals on adjacent channels (spacing 1·85 kc/s) without any grinding are suitable and it is only necessary to either grind or plate one crystal for the carrier oscillator. If this still presents difficulty, many of the experienced s.s.b. operators will be willing to help.

(ii) Any of the crystal manufacturers advertising in the BULLETIN will supply filter and carrier crystals, ground to exact frequency, at quite reasonable cost.

(iii) An alternative method is to build the transmitter with a phasing type sideband generator as described in the February issue of the BULLETIN. The carrier crystal and all the final conversion crystals are obtainable from surplus sources, except the 9 Mc/s one, the cost of which, purchased new, would be a small proportion of the total value of the transmitter and would be well worth while.

* This is the existing 1,000 volt supply (1,000-0-1,000 volt transformer) with capacitor input.

Society News

Committees of the Council

THE following are additions to the list, published last month, of members appointed to serve on Committees of the Council for 1960:

G.P.O. Liaison Mr. D. Deacon (G3BCM)
V.H.F. Mr. R. C. Hills, B.Sc.(Eng.), (G3HRH)

The Council at its meeting on February 23, 1960, set up an *ad hoc* Committee to discuss and report upon the future housing of Headquarters. It was decided that the Committee shall consist of three Council and two non-Council members. The Council members appointed are Messrs. Bartlett, Caws and Ellis. The non-Council members have not yet been appointed.

R.S.G.B. Film Library

THE following films are available on loan to R.S.G.B. Groups and Affiliated Societies:

1947 D.F. Event	(Print)
1947 N.F.D.	(Print)
1951 Festival Convention	(Print)
1952 N.F.D.	(Print)
1954 Bristol Convention ..	(Reversal Original)
1956 Publicity Film, R.S.G.B.	(Print)
1958 "Humanity in Action"	(Print)

The latter is a R.A.E.N. sequence from a British Red Cross film of that name.

Applications to book films should be made as far in advance as possible and should be sent to Mr. C. W. Austin (B.R.S. 22019), 135 Shaftesbury Avenue, Kenton, Harrow, Middlesex.

Those borrowing films are asked to take great care of them and to return them promptly after use by registered post.

Bulletin Stencil Plates

IT occasionally happens that a stencil plate used for the preparation of a particular BULLETIN wrapper becomes worn or loses ink, with the result that the Post Office experience difficulty in tracing the address.

Members who notice that the address on the wrapper used for their copy of the BULLETIN is indistinct, or in any way faulty, are asked to advise Headquarters.

Frequency Advisory Committee

THE General Secretary (Mr. John Clarricoats, O.B.E.), has been re-appointed for a further period of two years to serve on the Frequency Advisory Committee set up by the Postmaster General in December 1957.

A.R.R.L. Radio Amateur's Handbook 1959

A FEW copies of the 1959 edition of the *Radio Amateur's Handbook* are available from Headquarters at the special price of 25/- post paid.

Pirate Fined

BRYAN GERALD HAVENHAND of Barnsley Road, Sheffield, was fined £10 with three guineas advocate's fee after pleading guilty at Sheffield Magistrates' Court to the offence of operating a transmitting station without a licence. It was stated in court that Havenhand had used the call G3CPQ and on occasions VK9XN. It was also stated that Havenhand knew of the Radio Amateurs' Examination as he had written to the G.P.O. asking for details as long ago as January 17, 1958. The Chairman of the Court (Sir John Green) told Havenhand that had the transmitter not been disposed of the Court would have confiscated it.

London Meeting
Friday, March 25, 1960

"High Fidelity Sound Reproduction for the Amateur"
by H. A. M. Clark, B.Sc.(Eng.), M.I.E.E., G6OT

The lecture will be illustrated throughout with demonstrations

at the

Institution of Electrical Engineers
Savoy Place, Victoria Embankment

Buffet Tea 6 p.m. **Lecture 6.30 p.m.**

During the Geneva Radio Conference the American Radio Relay League arranged a dinner for the 52 amateurs representing 15 government delegations or otherwise participating in the conference. Amongst those in this picture are Council Members L. E. Newnham (G6NZ) and J. Douglas Kay (G3AAE) of R.S.G.B. and Goodwin L. Dosland (W0TSN), President, A. L. Budlong (W1BUD), General Manager, and John Huntoon (W1LVQ), Assistant General Manager, of A.R.R.L.

I.A.R.U. Conference to be held in Folkestone

THE Radio Society of Great Britain will act as host society at the International Amateur Radio Union, Region I Division Conference which is to be held at the Grand Hotel, Folkestone, Kent, from Monday, June 13 to Friday, June 17, 1960.

Invitations to attend the Conference have been sent to all I.A.R.U. Member Societies in Region I and, already, acceptances have been received from Denmark (E.D.R.), Finland (S.R.A.L.), France (R.E.F.), Germany (D.A.R.C.), Ireland (I.R.T.S.), Italy (A.R.I.) the Netherlands (V.E.R.O.N.), Norway (N.R.R.L.), Poland (P.Z.K.), Spain (U.R.E.), Sweden (S.S.A.), Switzerland (U.S.K.A.), Yugoslavia (S.R.J.). Replies are awaited from Belgium (U.B.A.) and Luxembourg (R.L.).

In addition to the Delegates officially appointed by the Member Societies, Observers will be permitted to attend the Conference provided their names, addresses and call-signs (or B.R.S. numbers) are submitted to the General Secretary of the R.S.G.B. at least two weeks before the opening of the Conference. R.S.G.B. members and their ladies will thus have a unique opportunity of meeting delegates and their ladies from many Region I Societies.

Arrangements have been made for visitors to the Conference to be accommodated at the Grand Hotel, Folkestone, which is one of the finest hotels on the south coast of England. The specially reduced *inclusive charge will be* 50/- *per day* which will cover service and all meals (breakfast, lunch, afternoon tea and dinner). The hotel—situated on the famous Leas—has a commanding view of the English Channel and, on fine days, of the French coast.

It is anticipated that the Conference will be opened at 2.30 p.m. on Monday, June 13, by the Mayor of Folkestone, after which a Plenary Meeting will be held to elect the Chairmen and Secretaries of Committees. It is expected that three main Committees will be set up, namely, Administrative & Operational, Technical and V.H.F. plus an *ad hoc* Credentials & Finance Committee.

A tentative programme of events is set out below:

Sunday, June 12

Delegates assemble at the Grand Hotel.

Monday, June 13

9.30 a.m. Meeting of the Executive Committee.
2.30 p.m. Official Opening.
3 p.m. Plenary Meeting.
4 p.m. Meetings of Main Committees.
5 p.m. Meeting of Credentials & Finance Committee.
9 p.m. Film Show " The Geneva Radio Conference " by Major Per-Anders Kinnman, SM5ZD (Vice-Chairman, Executive Committee).

Tuesday, June 14

9.30 a.m.-5.30 p.m. Meetings of Committees (Lunch 12.30 p.m.-2.30 p.m.).
9 p.m. Display of Colour Transparencies by Mr. Arthur Milne, G2MI.

Wednesday, June 15

9.30 a.m.-5.30 p.m. Meetings of Committees (Lunch 12.30 p.m.-2.30 p.m.).
8 p.m. Evening Coach Trip.

Thursday, June 16

9.30 a.m.-12.30 p.m. Free for shopping.
2.30 p.m. Visit to Canterbury and the Weald of Kent as guests of the Mayor and Corporation of Folkestone.

Friday, June 17

9.30 a.m.-5.30 p.m. Plenary Meetings (Lunch 12.30 p.m.-2.30 p.m.).
7.30 p.m. Conference Dinner.

Saturday, June 18

Delegates depart.

The cost of the Conference Dinner is not expected to exceed 21/- a head.

Members who wish to attend the Conference are asked to write to the General Secretary of the R.S.G.B. without delay stating the accommodation they will require at the Grand Hotel and the duration of their stay.

The Folkestone Corporation is to issue tri-lingual Privilege Tickets which will enable Delegates, Observers, and their ladies to enjoy many local facilities free of charge.

Further details of the Conference will be published later.

Grafton Radio Society Top Band Contest

CERTIFICATES of merit will be awarded to the operators placed first, second and third in the Open Section of the Grafton Radio Society's Top Band Contest to be held between 22.30 G.M.T. on March 26 and 01.00 G.M.T. on March 27 (c.w. leg) and the same times on April 2 and 3 (phone leg). One point will be scored for each contact, the final score being the sum of the scores for the two legs. Only one contact with a specific station in each leg will count for points. Contest exchanges will comprise the RST or RS report followed by the serial number of the contact (commencing with any number between 001 and 010 for the first contact).

Full details may be obtained from the Honorary Secretary, A. W. H. Wennell (G2CJN), 145 Uxendon Hill, Wembley Park, Middlesex.

PACC Contest 1960

RADIO amateurs throughout the world are invited by the Dutch national society to take part in the fifth PACC Contest. The contest will take place on April 30 and May 1 (C.w. Section) and May 7 and 8 (Phone Section), starting at 12.00 G.M.T. on the Saturday and ending at 20.00 G.M.T. on the Sunday in both cases. All bands from 3·5 to 28 Mc/s will be used but cross-band contacts will not be valid for the purposes of scoring.

Entries must be postmarked not later than June 15, 1960, and sent to P.v.d. Berg (PA0VB), Contest Manager, VERON, Keizerstraat 54, Gouda, The Netherlands, from whom a copy of the complete rules may be obtained.

GB2RS SCHEDULE

R.S.G.B. News Bulletins are transmitted on Sundays in accordance with the following schedule:

Frequency	Time	Location of Station
3600 kc/s	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.30 a.m.	North Midlands
	11 a.m.	North East England
	11.30 a.m.	South West Scotland
145·55 Mc/s	11.15 a.m.	Beaming south-east from Leeds
	11.30 a.m.	Beaming south-west from Leeds
	11.45 a.m.	Beaming north from Leeds
145·3—145·4 Mc/s	12 noon	Beaming north from South East England
	12.15 p.m.	Beaming west from South East England

R.A.E.N. Notes and News

By E. ARNOLD MATTHEWS (G3FZW) *

IN January an appeal was made for the formation of a group in **Cumberland.** It is pleasing to record that a group " ready to move " with four mobiles now exists with the prospect of another, which will be operational later in the year.

The R.A.E.N. Committee will be pleased to hear from amateurs in **Bedfordshire** who are interested in the formation of a group, or groups, in that county. A " user service " has shown interest in R.A.E.N. for some time and any group formed is assured of that encouragement which makes for smooth development.

Birmingham members recently heard Tom Douglas (G3BA), the Group's V.H.F. Developments Officer, put the case for a greater use of 2m, to Sutton Coldfield Radio Society. A feature of the evening's programme was a recording of a series of QSOs between G3LNN/M (160m), G2DCI/M (2m) and G3BA, who operated on both bands. The two mobile stations journeyed from Sutton Coldfield into Birmingham and thence out into open country. Both stations contacted G3BA at predetermined points so that contacts were made under virtually identical locations and conditions. Results showed that the v.h.f. stations were consistently more readable, less subject to fading and interference. A further

R.A.E.N. Membership Cards

In an emergency the Police may require R.A.E.N. members to produce their membership cards. Carry yours with you—*always.*

recording, comparing band conditions at night, was also played. This showed the great difference in general noise levels. **Cheshire** members are continuing v.h.f. tests and are finding that where screening is encountered l.f. bands have the advantage. The C.C. Les Goldsborough (G3ERB) summing up, says, " Top Band is essential for this area, but it can be advantageously supplemented by judicious use of 2m." In **Dorset** equipment is being made up for 10m and 2m, although the main effort is on 160m. G3ERB's remarks are echoed by the Dorset C.C., G2HCD.

The Western Trunk Route (W.T.R.) will change to 2m as soon as suitably placed stations can be found. The R.M., G2AO, states that the tests carried out on 160m show that this band is useless for communication through the Midlands conurbation at night.

Buckinghamshire C.C., G3HIU who addressed members of St.J.A.B. at their Aylesbury H.Q. on January 31, has plans for links between the H.Q.s of " user services " in the county. He will be pleased to hear from prospective members in or around **Aylesbury,** as will G2RF and G3MNL in **Cumberland.**

It is understood that **Bristol** St.J.A.B. is interested in possible use of R.A.E.N. If correct this should provide a stimulus for activity locally, since previously a view had been expressed that there was no need for R.A.E.N. in that part of the country. Experience shows that the stronger and more efficient the group the more readily the " user services " look to R.A.E.N. The **Bristol** A.C., K. J. Creamer, will be pleased to welcome new recruits as will the **Blackburn** A.C., G3EKP

G2BCX, **S.W. Essex** Group A.C., reports that he was interviewed by B.B.C. commentator Richard Burwood following the Essex Group Hospitals test reported last month. The interview, and a test with G3HWG/M, were broadcast in the Home Service twice.

* *1 Shortbutts Lane, Lichfield, Staffs.*

R.A.E.N. Rally 1959

THE 1959 R.A.E.N. Rally attracted a larger number of entries than ever before. There seems to be no doubt its popularity is due to the fact that it is different to other events, judging by the remarks made by entrants, all of whom again said how much they enjoyed themselves. Test phrases were purposely made more difficult than in previous years but this only added to the pleasure of the operators if not to the log checkers.

Some areas were quite well represented while others produced no entries at all. The logs submitted represent about 50 per cent of those taking part.

By far the greater part of the operating took place on Top Band though 3·5 Mc/s did have a larger share than in the past. 28 Mc/s and 144 Mc/s were again practically unused for Rally contacts.

The Receiving Section was better supported than in previous years and the leading entrant is to be congratulated on his entry, which shows he can read c.w. excellently; his log for the c.w. session added 102 points from 34 contacts to his already splendid score on phone. G3BMY again heads the list of fixed stations while the leading outstation was G3LNN/M. For some unknown reason the scores of outstations were much lower than in previous years.

Check logs were gratefully acknowledged from G3ELZ and G3NHU.

RESULTS—R.A.E.N. RALLY 1959

Transmitting Section—Home Stations

Position	Call-sign	Points	Position	Call-sign	Points
1	G3BMY	96	26	G3KPU	25
2	G3JEQ	84		G3LXG	25
3	G3NDO	69	28	G3MOE	24
4	G3LUG	66		G2TG	24
5	G3LPX	58		G6ZG	23
6	G3HRK	55		G4IV	23
	G3NDY	55	30	G3NHV	23
8	G4XC	54		G3IYX	23
9	G3HIU	53		G3MWZ	23
10	G3AVE	49	35	G8JC	22
11	G3CGD	44	36	G3KNO	21
12	G3GOP	42	37	G3IIH	20
13	G3HTI	41	38	G2AO	19
14	G3LWQ	39	39	G3KVT	17
15	G3DDK	38		G6ZJ	16
16	G3MDH	37	40	G3LPB	16
17	G3NKC	36		G3MC	16
18	G3ICX	35	43	G3EFA	15
	G8DT	35		G3LCS	15
20	G3ERB	33	45	G2BVM	14
21	G3MJS	30	46	G3ION	13
22	G3LID	28	47	G3NNZ	8
23	G3KFY	27	48	G3KJX	5
24	G3MWD	26			
	G3GYV	26			

Transmitting Section—Outstations

Position	Call-sign	Points	Position	Call-sign	Points
1	G3LNN/M	55	7	G3KAY/M	17
2	G3KJM/P	48	8	G3DUG/M	15
3	G3MCW/P	39		G3KEP/M	15
4	G3ISV/P	22	10	G3KPU/P	13
5	G3ERB/M	21			
	G3DWQ/P	21			

Receiving Section

Posn.	Name	Pts.	Posn.	Name	Pts.
1	E. C. Hodson	351	9	M. G. Smith	75
2	J. H. Sleight	342	10	E. W. Gent	69
3	R. Crowley	201	11	D. C. Joy	66
4	W. Stewart	183	12	J. R. Briggs	60
5	K. N. H. Bailey	126	13	B. Gillingwater	36
6	D. Blake	108	14	R. Overton-Larty	24
7	J. A. Share	93	15	A. J. Kershaw	21
8	R. M. C. Coombes	81		D. A. Youngman	21

CONTEST NEWS

RESULTS — REPORTS — RULES

Second 1·8 Mc/s Contest 1959

IF persistent efforts were to bring their true reward, H. J. M. Box (G6BQ) must rank high in the list for favour. So it is particularly pleasant to record that after many valiant efforts in previous Top Band contests, G6BQ has at last succeeded in securing first place.

The Contest, held on November 7-8, 1959, was not quite so well supported as the equivalent competition of 1958. It was, however, closely fought. G6BQ was only 6 points ahead of G. E. Read (G3ERN) with 152 points who was in turn closely followed by W. H. Wells (G3HVX) with 151 points.

Conditions varied somewhat over the British Isles, being fair to good in many areas, but noise level and QSB spoilt the competition for some, especially in Scotland. Despite this, many competitors managed to contact OK and DL stations while ZB1FA broke through once or twice to give valuable points.

The standard of log keeping was very high, for which all concerned must be complimented. Check logs from G2IM, G3ADZ, G3BRA, G3HIW, G3IAS, G3MCY, G3MWZ, G4VF, GW3YR and DL1YA are gratefully acknowledged.

Second 1·8 Mc/s Contest 1959

Posn.	Call sign	Score	Posn.	Call sign	Score
1	G6BQ	158	28	G3BIK	84
2	G3ERN	152		G3HDZ	84
3	G3HVX	151	30	G3JII	83
4	G3JEQ	140		G8PX	83
5	G3BMY	139	32	G3NFV	82
6	G3IPG	134	33	G3NEK	81
7	G3KOR	132	34	GM6IZ	80
8	G3IGW	129	35	G3FHN	79
	G3KLH	129	*	G3NDS	77
10	G3MBS	125	36	GM2HIK	76
11	G2MJ	117	37	G3KPU	73
12	G3KDV	111	38	G3LPT	70
13	G3MGS	106		G5JL	70
14	G3ZY	104	40	G2XP	67
	G3LCH/A	104	41	G2VV	65
16	G3AZY	102	42	G3LCV/A	64
17	G3LHJ	101	43	G3HXZ	60
	GM6RI	101	44	G3LUI	57
19	G2FHF	94	45	G3MGL	54
	G3JKY	94	46	G3LNR	44
21	G3KRC	92	47	G2DHV	42
	G3LVP	92	48	G6PJ	40
23	G3IIS	91		GM2CHN	40
	G3MEH	91	50	G3KZG	38
24	G3KTF	90	51	G3NBN	33
25	GM3KHH	88	52	G3JFD	30
26	G3JRL	87	53	GM3UM	29
27	G3JHC	86	54	G2HOX	25

* *Late Entry.*

National 420 Mc/s Contest 1959

THE Contests Committee regrets that in the report of the National 420 Mc/s 1959, published on page 277 of the December issue of the BULLETIN, no reference was made to G3AYC. The score made by this station, which was operated by G3COJ, was 820 points.

R.S.G.B. Contest Forms

SPECIALLY printed log forms and cover sheets for the use of members taking part in Society contests are available from Headquarters on receipt of a large s.a.e.

Low Power Contest 1960

THE rules for the Low Power Contest on April 9 and 10 are the same as in previous years.

When: 18.00 G.M.T. to 23.000 G.M.T. on April 9 and 08.00 G.M.T. to 20.00 G.M.T. on April 10, 1960.

Eligible Entrants: All fully paid-up members of the R.S.G.B. resident in Europe.

Contacts: Must be made on c.w. (A1) only between 3500 and 3600 kc/s.

Scoring: Points will be scored on the following basis:

Watts input to p.a. stage	Up to 0·5	To 1	To 2	To 3	To 4	To 5
Points per contact ...	20	10	5	3	2	1

A bonus of 20 points may be claimed for the first contact with each different county code area listed on page 373 of the February 1960 issue of the R.S.G.B. Bulletin.

Contest Exchanges: RST reports followed by the contact number starting at 001 and the county code number, e.g., 559001 Nr. 17.

Logs: (*a*) Must be tabulated in columns headed (in this order) " Date/Time (G.M.T.)," " Call-sign of Station Contacted," " My report on His Signals and Serial Number Sent," " His Report on My Signals and Serial Number Received," " County Code No," " Input Power," " Points Claimed."

(*b*) The cover sheet must be made out in accordance with R.S.G.B. Contests Rule 5 and the declaration signed.

(*c*) Details of the transmitter and power supply must be given, but circuit diagrams are not required.

(*d*) Entries must be postmarked not later than **Monday, April 25, 1960.**

Awards: At the discretion of the Council, the **1930 Committee** Cup will be awarded to the winner and **certificates of merit** to the runner-up and to the non-transmitting member submitting the best check log in the opinion of the Contests Committee.

The General Rules for R.S.G.B. Contests on page 423 of this issue of the *Bulletin* apply to this contest.

Oxford D/F Qualifying Event

DETAILS of the D/F Qualifying Event to be held at Oxford are as follows:

Sunday, April 24

Organizer: F. A. Jefferies (G8PX), 1 Lovelace Road, Summerton, Oxford.

Frequency: 1875 kc/s.

Call-sign: G8PX/P.

Map: Ordnance Survey, New Popular Edition, Sheet 158.

Assembly Point: " Three Fishes " public house, North Hinksey Village, approximately 1½ miles south-west of Oxford (N.G.R. SP/496054).

Assembly Time: 13.30 B.S.T.

Entries and Tea: Intending competitors should notify the Organiser as soon as possible stating the number in their party requiring tea, which will be at the Eastgate Hotel, 73 High Street, Oxford (N.G.R. SP/519063).

First 144 Mc/s Field Day, 1960

R.S.G.B. members throughout Europe are again invited to take part in this contest, the details of which are as shown below. Contestants are recommended to operate in accordance with the British Isles Two Metre Band Plan.

When: 10.00 G.M.T. to 19.00 G.M.T. on Sunday, May 8, 1960.

Eligible Entrants: All fully paid-up members of the R.S.G.B. resident in Europe. Multi-operator entries will be accepted provided only one call-sign is used.

Contacts: May be made on either A1, A3 or A3a with an input not exceeding 25 watts to any stage in the transmitter.

Scoring: Points will be scored on the basis of one point per mile for contacts with fixed stations and two points per mile for contacts with other portables or mobiles.

Contest Exchanges: RST or RS reports followed by the band identification letter A and the contact number and location (e.g., RST559A001 5NE Luton).

Logs: (*a*) Must be tabulated in columns headed (in this order) " Date/Time (G.M.T.)," " Call-sign of Station Contacted," " My Report on his signals and Serial Number sent," " His report on my signals and Serial Number received," " Location of Station Contacted," " Distance," " Points Claimed."

(*b*) The cover sheet must be made out in accordance with R.S.G.B. Contests Rule 5 and the declaration signed.

(*c*) Entries must be postmarked not later than Monday, **May 23, 1960.**

Awards: At the discretion of the Council, a **miniature cup** will be awarded to the winner and a **certificate of merit** to the runner-up. A **certificate of merit** will also be awarded to the non-transmitting member submitting the best check log in the opinion of the judges.

The General Rules for R.S.G.B. Contests on page 423 of this issue of the 1960 *Bulletin* apply to the contest.

General Rules for R.S.G.B. Contests

THE following rules apply to all R.S.G.B. Contests and are to be read in conjunction with the details for each individual contest published in the R.S.G.B. BULLETIN.

Rule 1. **Entrants** must operate in accordance with the terms of their licences.

Rule 2. **Unlicensed Stations.** Contacts with unlicensed stations will not count for points. Proof of contact may be required.

Rule 3. **Contest Exchanges.** An exchange of RST or RS reports followed by a three figure serial number starting with 001 for the first contact and increasing by one for each successive contact (i.e. 559001 or 58001) must be made before points can be claimed. All reports must be acknowledged. In the case of **v.h.f./u.h.f. contests,** the location and band identification letter (A for 144 Mc/s, B for 420 Mc/s and C for 1250 Mc/s) must also be exchanged. The location must be in distance and direction from the nearest town easily found on a map (i.e. 559A001 10E Oxford or 56A001 10W Cambridge).

Rule 4. **Contacts.** Only one contact on each band may be made with a specific station, whether fixed, portable, mobile or alternate address. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Cross-band contacts may not be claimed. (This rule may be subject to variation in certain contests and reference should be made to the published details).

Rule 5. **Entries** must be clearly written or typed ON ONE SIDE ONLY of R.S.G.B. contest log forms or on foolscap or quarto paper and must be set out in the form prescribed in the published details for the contest concerned. The cover sheet of an entry must be made out in the following form and all the information filled in:

Contest.....Date.....Claimed Score.....

Section (if any).....Call-sign.....

Name .....

Home address .....

Address of Station or Portable Location } (where applicable—see contest details)

National Grid Six Figure Reference (or Lat. and Long. or County Code number) } .....

Transmitter.....Power input.....watts

Receiver..... Aerial(s).....

DECLARATION: I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and I agree that the decision of the Council of the R.S.G.B. shall be final in all cases of dispute. I certify that the maximum input to the final stage of the transmitter was.....watts.

Date..... Signed.....

Failure to sign the declaration may involve disqualification of the entry.

Rule 6. **Submission of Entries.** Entries must be addressed to the Contests Committee, Radio Society of Great Britain, New Ruskin House, 28-30 Little Russell Street, London, W.C.1, England, and must be postmarked not later than the date stated in the published details governing the contest concerned. The name of the contest must be clearly shown at the top left-hand corner of the envelope. All entries become the property of the Radio Society of Great Britain.

Rule 7. **Multiple Operator Entries.** Unless otherwise stated, single operator entries only will be accepted. In those contests where multiple-operator entries are allowed, such entries will only be accepted provided that:

(*a*) The call-sign and signature of the operator concerned is recorded for each contact.

(*b*) The declaration is signed by only one operator who will be regarded as the entrant.

Rule 8. **Portable stations** must operate from the same site for the duration of a contest. Power must not be derived from public or private supply mains. No apparatus may be erected on the site prior to the day of the event. For the purposes of R.S.G.B. contests, **mobile stations** are stations installed in motor vehicles or vessels on inland waterways and so equipped that they are capable of operation in motion without any alteration.

Rule 9. The details relating to specific contests published in the *R.S.G.B. Bulletin* shall be regarded together with these general rules as the rules of the contest.

Rule 10. In the event of any dispute, the ruling of the Council of the Radio Society of Great Britain shall be final.

Rule 11. **Check logs** submitted by non-transmitting members for consideration for the award of certificates of merit should give in this order the following details: Date, Time (G.M.T.); Band; Call-sign of station heard; His report and serial number sent; Call-sign of station being worked.

Russian International C.W. Contest

THE U.S.S.R. Radio Amateurs' Federation is arranging an international c.w. contest to be held between 21.00 G.M.T. on May 7 and 21.00 G.M.T. on May 8, 1960, using all bands from 3·5 to 28 Mc/s, " to mark Radio Day as a ' Peace to the World ' event." Any chosen 12 hours of continuous operation will be judged for contest purposes.

One point will be scored for each contact, the final score being the total number of points multiplied by the number of countries worked. Contacts with stations in a participant's own country (but not with stations in the same " populated point ") will count for points. Only one contact may be made with a specific station on each band.

Contest exchanges will consist of the RST report followed by the serial number of the contact, e.g. RST599001. Participants will call " CQ M."

Awards will be made to the leading operators in each country while all participants who work 100 different U.S.S.R. amateurs will receive the " W 100 U " diploma. In addition, entrants who make contact with stations in each of the six continents will receive the " P6K " diploma. All who work 150 countries during the contest will be awarded the " P150C " certificate.

Logs, tabulated in columns headed " Date," " Band," " Time G.M.T.", " Call-sign of station worked," " Number Received," " Number Sent," " Points " and " Judge's Notes," should be posted not later than May 15, 1960, to the U.S.S.R. Central Radio Club, Post Office Box 101, Moscow.

" Radio Control Models and Electronics "

THE first issue of a new monthly magazine—*Radio Control Models and Electronics*—is due to be published on April 9. All aspects of the radio control of models will be dealt with, as well as the construction of electronic gadgets for the amateur.

CONTESTS DIARY

March 19-20	A.R.R.L. DX Contest (C.W. Section)
March 26-27	1250 Mc/s Tests (see page 373, R.S.G.B. Bulletin, February 1960)
April 9-10	French (R.E.F.) Contest (Phone Section)
April 9-10	Low Power Contest (For details see page 422)
April 24	D-F Qualifying Event (Oxford) (For details see page 422)
April 30—May 1	P.A.C.C. Contest (C.W. Section)

May 7-8	- P.A.C.C. Contest (Phone Section)
May 7-8	- Russian DX Contest
May 8	- First 144 Mc/s Field Day* (For details see page 422)
May 15	- D/F Qualifying Event (Rugby)
May 22	- D/F Qualifying Event (South Manchester)
May 22	- 420 Mc/s Contest
May 29	- D/F Qualifying Event (High Wycombe)
June 11-12	- National Field Day (see page 276, December 1959)
June 19	- 70 Mc/s Contest
July 3	- Second 144 Mc/s Field Day*
July 10	- D/F Qualifying Event
September 3-4	- European V.H.F. Contest
September 3-4	- National 144, 420 and 1250 Mc/s Contests*
September 4	- D/F National Final
September 25	- Low Power Field Day
October 2	- R.A.E.N. Rally
November 6	- Second 1·8 Mc/s Contest
November 19-20	- R.S.G.B. Telephony Contest R.S.G.B. Telephony Receiving Contest

* To coincide with Region 1 I.A.R.U. v.h.f. contest dates.

Letters to the Editor . . .

Neither the Editor nor the Council of the Radio Society of Great Britain can accept responsibility for views expressed by correspondents.

TVI

DEAR SIR,—Mr. Hamman's article in the February issue of the BULLETIN has reminded me of a very common cause of TVI which has not to my knowledge been brought to the attention of your readers.

It is often found that while a modern TV receiver may be unaffected by signals in the bands between 7 and 30 Mc/s, severe cross-hatching is produced by a signal in the 3·5 Mc/s band. Many amateurs have assumed that this pattern must be due to a harmonic of the 3·5 Mc/s signal and have taken steps to reduce their harmonic radiation when, in fact, it is due to the fundamental frequency mixing with the TV signal in the front end of the TV receiver.

There are several ways in which this mixing can be explained, but without going into technicalities it can be said to be due to the difference frequency between the TV sound and vision signals being 3·5 Mc/s so that the beat frequency producing the cross-hatch pattern is the difference between the transmitted frequency and 3·5 Mc/s, e.g. a signal of 3600 kc/s will produce a beat pattern of 100 kc/s giving about eight "stripes" measured horizontally across the TV screen, while a signal of 3800 kc/s will produce a 300 kc/s pattern—about 24 "stripes." It should also be noted that a signal within audio beat of 3500 kc/s will produce that audio beat frequency in the sound output of the TV receiver.

The cure is obviously to prevent the 80m signal from reaching the r.f. stage of the TV receiver. This can be done with some receivers merely by the insertion of a high-pass filter into the aerial feeder. In many cases, however, this is ineffective because the aerial socket is coupled to the r.f. stage via 500 pF blocking capacitors which, while of small impedance at TV frequencies, have an impedance of about 100 ohms at 3·5 Mc/s. This difficulty can be overcome by inserting the high-pass filter in the short length of coaxial cable usually employed between the aerial input blocking capacitors and the r.f. stage input coil. This means, of course, that the high-pass filter will be within the cabinet of the TV receiver and being joined to the receiver chassis will be connected to one side of the supply mains. It also means that such a modification to a neighbour's TV receiver cannot be carried out without the co-operation of the owner and probably also that of the dealer who may be responsible for the maintenance or hire of the receiver. Other methods of making the high-pass filter effective could be employed but they all involve some modification to the TV receiver input circuit to eliminate the adverse effect of the 500 pF blocking capacitor in the coaxial outer connection.

Acknowledgement for the original experiments and thought which resulted in this diagnosis of a common 80m TVI problem is due to my friend Mr. S. D. Knight (G3JRK).

Incidentally, TVI of this nature can also be produced by a Top Band transmitter, both from its fundamental producing a pattern of around 1600 kc/s—about 130 "stripes"—and from its second harmonic.

Yours faithfully,

Timperley, Altrincham, Cheshire. N. ASHTON (G3DQU).

Phone for N.F.D.?

DEAR SIR,—On behalf of a majority of the members of the South Shields & District Amateur Radio Club, I wish to put forward the following points for consideration and discussion.

It is suggested that consideration be given to revising N.F.D. operating conditions to provide for the use of phone operation over part of the time, say over a period of six hours. If need be phone operation could be restricted to selected bands (e.g., exclusion of 160m).

While it is felt that it is desirable to have some phone operation during N.F.D. it is also felt undesirable to have a separate phone N.F.D. due to the amount of work involved and as the equipment already in use could be used for the purpose.

C.w. operators have little to object to since, with the exception of the R.A.E.N. Rally and the 21/28 Mc/s Contest, all other R.S.G.B. contests are c.w. Phone operation under contest conditions should make for more efficient phone operation on the bands, something which is definitely needed.

The additional QRM should be no disadvantage as all stations would suffer to the same extent. While the scoring rate may be slower this would be equal for all contestants. Better receivers would no doubt be required to handle the phone QRM but those should lead to more efficient stations.

N.F.D. would have added interest to short-wave listeners who, in many cases through no fault of their own, do not read high-speed Morse. They could look forward to a week-end of activity on all bands.

There must be many operators who wish to take part in N.F.D. but do not want to operate c.w. After all, choice of phone or c.w. is left to the individual in normal operating. What percentage phone-only operators form of the licensed operators is not known but this must be quite high enough to warrant consideration. Indeed, it might be that additional operators and members of R.S.G.B. would be gained if more interest was taken in the phone operators and our suggestion for N.F.D. may provide this.

Yours faithfully,

K. SKETHEWAY, *Secretary*,
South Shields & District Amateur Radio Society.

D/F Events

DEAR SIR,—During the forthcoming summer season, the Contests Committee are sponsoring the usual programme of direction-finding contests in various parts of the country, culminating in a National Final. The first three competitors in each regional event will be eligible for the final.

The Committee believes that interest in D/F work is increasing throughout the country, and that there may be some new groups of enthusiasts who would be interested in organizing regional events. There is no limit to the number of qualifying contests (which are held on the 1·8 Mc/s band) and the Committee would be glad to hear from any such group or society which feels in a position to run an event: the Committee would be pleased to offer guidance in the organization.

The Committee is also aware that there is some interest in D/F work on other bands, e.g., 28 Mc/s and 145 Mc/s, and would be pleased to hear from any group who would be willing to organize an experimental contest on a different band, and from anyone who would support such a contest.

Yours faithfully,

R. C. HILLS, B.Sc.(Eng.) (G3HRH),
Chairman, R.S.G.B. Contest Committee.

Geneva Report Appreciated

DEAR SIR,—Let me congratulate you on the Editorial and Geneva Conference Report published in the January BULLETIN. Few people appreciate the amount of effort which goes into such a Report, to say nothing of the more important aspect of the results achieved and the work which led to those results.

At the Aberdeen O.R.M. in 1958 I asked the Society's then President (Mr. L. E. Newnham G6NZ) for an assurance—so far as he was able to give it—that the R.S.G.B. would fight any suggestion that our bands should be cut, and he gave me that assurance. Indeed, I need not have asked the question as I knew the answer beforehand.

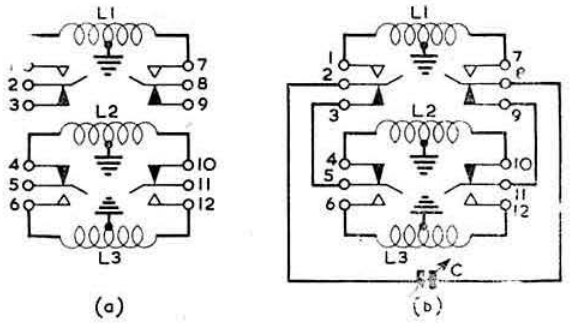
Why cannot the critics and cynics realise that without such international bodies as the R.S.G.B. and the A.R.R.L., we the radio amateurs of the world would by now have few, if *any*, bands at all. That is the position and it is the reason why I support, ardently, the R.S.G.B. and other similar bodies.

Yours faithfully,

Inverness, Scotland. J. MACINTOSH (GM3IAA).

"Tech-Teaser"

DEAR SIR,—The "Tech-Teaser" on page 111 of the September issue can be solved in a few moments by considering that the three-position switch must be so connected to the coils that the tuning capacitor must be normally connected across one of the coils in the centre position, and that this connection must be broken when either of the two normally broken contacts are made. The problem becomes easier to visualize if the coils are first drawn in as shown in my diagram (a) below.



It then takes but a few seconds to see that the tuning capacitor must be wired through the normally made contacts, as shown in diagram (b) in order that it shall connect to only one coil in any of the three positions of the switch. To a telephone engineer, as I am, such switching is one of the elementary configurations.

Yours sincerely,

St. Leonards-on-Sea, Sussex. W. E. THOMPSON (G3MQT).

A similar solution was provided by G5KT who set the "Teaser." —EDITOR.

Boy Scout Jamboree-on-the-Air, 1959

DEAR SIR,—May I on behalf of the Boy Scout Association thank the amateurs who worked so hard to enable their local scout groups to take part in the above event.

It was a great pity the 1959 Jamboree clashed with the *CQ* Magazine Phone Contest but the organizers at the International Scout Bureau, Ottawa, Canada, wish to assure everyone that this will not happen again! They have also decided to introduce set calling frequencies on the DX bands which should simplify overseas communication considerably in the future.

Once again grateful thanks to the many amateurs whose efforts resulted in Great Britain being the country with the largest number of stations participating in the 1959 Jamboree-on-the-Air.

Yours faithfully,

L. R. MITCHELL (G3BHK).

"Katoomba," Tyneham Close, Sandford, Wareham, Dorset.

Talking Books

DEAR SIR,—I read with considerable interest Mr. Tomalin's article in the December issue about Talking Books.

Few clubs have taken up servicing on a corporate basis but situations vary with every group, its members and its locality. The principal problems have lain in the fact that clubs meet mostly once a week so that unless special arrangements have been made, the blind person often has to wait a relatively long time before regaining the use of his set. Much of the servicing has been done by individuals and I think it is a great credit to radio amateurs that almost 45 per cent. of all the helpers are readers of the BULLETIN or are otherwise active in the field of Amateur Radio. The remaining members are from the G.P.O., acoustic engineers, university professors and students and indeed from all fields of electronic and radio engineering. The total number of helpers is in the region of 2,200 and I believe that there were only about 25, some five or six years ago.

It is most rewarding work but there are a number of areas, particularly in Essex, Durham, Leicestershire, Kent, Staffordshire, Sussex, Yorkshire and Northern Ireland where help is still needed. If anyone in these counties would like to offer his assistance would he please send me his name and address as well as a note of the area he could cover.

The most interesting project at the moment is the field test on the new tape machine. One hundred of these are out and we are hopeful that they will prove a great success. The present design has a removable cassette in which eighteen tracks are recorded on a $\frac{1}{4}$ in. wide tape; the track width is 0·015 in. and the gap length is 0·0002 in. Up to twenty hours can be recorded on one cassette.

The greatest help has been in preventing sets being returned to London for the most trivial of faults: in turn, this has assisted London in issuing more sets within a given period than has ever been achieved before. As a result, the improvement in the waiting list has been enormous. The latest move in this direction has been to ask the servicing volunteers to store the set when no longer required and then to re-issue it in due course without ever passing through London at all. Here again great savings have been made which are passed directly on to the blind people.

I am looking forward very much indeed to hearing from new volunteers who may care to write. There are many blind people in England and Wales not yet receiving attention so do not hesitate to withhold your name merely because you are not in one of the worst areas.

Yours faithfully,

J. Gladstone & Co. Ltd., Galashiels. D. FINLAY-MAXWELL, A.M.I.E.E. (Hon. Organiser of Voluntary Helpers, Nuffield Talking Book Library for the Blind.)

Regional and Club News

Amateur Radio Mobile Society.—Membership is rising steadily and it is hoped will be further encouraged by plans now taking shape. The programme for the coming months includes the organization of a number of rallies and other events. The monthly *Newsletter* is proving popular and the next issue of *Mobile News* is in preparation in a new format. Full details of the society's activities may be obtained from the *Hon. Secretary:* George Storey (G3HTC), 10 Avon Road, Sunbury-on-Thames, Middlesex.

Bradford Amateur Radio Society.—The A.G.M. is arranged for March 22 while field day arrangements will be discussed at the meeting on April 5. D. G. Enoch (G3KLZ) will lecture on "The Development of Television" on April 26. Recent events have included a Junk Sale and a talk on colour photography while J. C. Belcher, A.M.Brit.I.R.E. (G3FCS) was due to talk about radio and television interference on March 8. Instruction in Morse is available. *Hon. Secretary:* D. M. Pratt (G3KEP), "Glenluce," Lyndale Road, Eldwick, Bingley, Yorkshire.

Bristol.—The Film Show arranged by W. J. Dear (B.R.S.19985) on February 5 attracted a large number of members and their ladies. The programme included the film taken by B.B.C.-TV at the Group's N.F.D. stations last year. Nearly 50 members were present on February 19 when R. E. Griffin, M.I.R.E. (G5UH) gave the first of two lectures on "Television Servicing." The "G5FS Memorial Challenge Trophy" was awarded to E. C. Halliday (G3JMY), who was judged to have given the best lecture at last year's local meetings. G3JMY is speaking again on March 18, when his subject will be "Audio and R.F. Oscillators." An appeal for local support for R.A.E.N.—particularly from members living in the Somerset side of the City—has been made by K. J. Creamer (B.R.S.10167), who addressed the February meeting on this subject. *Hon. Secretary:* D. F. Davies (G3RQ), 51 Theresa Avenue, Bishopston, Bristol 7.

Cambridge and District Amateur Radio Club.—The A.G.M. is to be held at the "Jolly Waterman," Chesterton Road, Cambridge, on March 25, commencing at 8 p.m. *Hon. Secretary:* H. Waton (G3GGJ), New Road, Barton, Cambridge.

Cheltenham.—At the A.G.M. held last month, Mr. Lewis (G8ML) gave an account of his activities as Regional Representative and was congratulated on his good work. The possibility of holding an O.R.M. in the Region was discussed. G3CGD reported on the local R.A.E.N. and consideration was given to holding an informal dinner during the evening prior to the Cheltenham Mobile Rally on May 8. *Town Representative:* John J. Yeend (G3CGD), 30 St. Luke's Road, Cheltenham.

City and Guilds Radio Society.—"The Romance of the Cathode Ray Tube" was the subject of the Presidential Address given to the City and Guilds Radio Society on February 11, 1960, by the retiring President, Mr. L. H. Bedford, C.B.E. During the Annual Dinner, held later in the evening in the Union Common Room, Group Captain Fennessy was installed as President for 1960. Guest speaker on that occasion was Capt. P. P. Eckersley, formerly Chief Engineer of the B.B.C. The General Secretary of the R.S.G.B. (Mr. John Clarricoats, O.B.E.) and the Editor of the *Wireless World* (Mr. F. L. Devereux) were among the guests. Hon. Secretary of the society is Kenneth Wade.

Clifton Amateur Radio Society.—A DX Ladder Competition has been started for members operating on all bands up to 144 Mc/s. The clubroom at 225 New Cross Road, S.E.14., is open on Friday evenings from 7.30 p.m. and on Sunday mornings from 11.30 a.m. The Audio Section meets on the last Tuesday in each month, commencing at 7.30 p.m.

Cornish Radio and Television Club.—Following a talk on "Interference Sources and Methods of Reducing Interference from Overhead Power Lines," there was a discussion on the conditions of the amateur licence at the February meeting held at the Y.M.C.A., Falmouth. *Hon. Secretary:* G. Hubber (G3NVJ), 9 Cardrew Terrace, Redruth, Cornwall.

Crawley Amateur Radio Club.—The next meeting at "The Brewery Shades," Crawley High Street, will be on March 31 when Geoff Stone (G3FZL) and Charlie Newton (G2FKZ) will lecture on "Amateur Radio and the I.G.Y." Visitors and prospective members are always welcome. Further information about activities may be obtained from the *Hon. Secretary:* R. G. B. Vaughan (G3FRV), 9 Hawkins Road, Tilgate, Crawley, Sussex. (Crawley 3359).

At the Wirral Amateur Radio Society Dinner held at Moreton, Cheshire, on Friday, February 26, 1960, Council Member and Zonal Representative, Philip Wade (G2BPJ) presented the Region 1 Field Day Trophy to Norman Kendrick (G3CSG). During the evening the General Secretary of the R.S.G.B. presented a N.F.D. Plaque to John Wylde (G8BM) in recognition of the Wirral Society's success in leading the 14 Mc/s entries in the 1959 event. In this picture G2BPJ (right) is making the presentation to G3CSG.

Crystal Palace and District Radio Club.—At the A.G.M. held on February 13 the following officers and committee members were elected: *Chairman*—C. E. Newton (G2FKZ); *Hon. Treasurer*—F. H. Lawrence (G2LW); *Hon. Secretary*—G. M. C. Stone (G3FZL), 10 Liphook Crescent, Forest Hill, London, S.E. 23; *Committee Member*—G. D. Gaunt (B.R.S.19261). Mr. Stone was also elected A.S.R. Meetings are held on the second Saturday and last Tuesday in each month—in future the Tuesday meeting will be devoted to the elementary principles of the construction of radio gear. The instructor will be F. Bennister (G3COX). Details of meetings will be found in *Forthcoming Events* for Region 7 (Norwood and South London).

Derby and District Amateur Radio Society.—At the A.G.M. held recently it was reported that the paid-up membership was 133 and that assets amount to nearly £200, of which more than £150 was in cash. Officers elected were as follows: *Chairman*—T. Darn (G3FGY); *Vice-Chairman*—C. M. Swift (G3IUK); *Hon. Treasurer*—H. Shaw; *Hon. Secretary*—F. C. Ward (G2CVV), 5 Uplands Avenue, Littleover, Derby; *Management Committee*—B. J. C. Brown (G3JFD), J. Anthony (G3KQF), S. Swindell (G3NGV), A. Hitchcock (G3ESB) and F. Clay (G3IBL). Prizes were presented in connection with the Members' Exhibition to S. Thompson, Jnr., R. J. Forsyth, Jnr., and A. Hitchcock (G3ESB). Meetings are held on Wednesdays—see *Forthcoming Events* for Region 4 for details. Prospective members may obtain a copy of the complete programme from the Hon. Secretary on request.

Dorking and District Radio Society.—Members recently visited Broadcasting House and the Cable & Wireless Telegraph Terminal. The following were elected at the A.G.M.: *Chairman*—F. H. Hearnden (G3IAM); *Hon. Treasurer*—W. R. Steverson (G3JEQ); *Hon. Secretary*—J. E. Greenwell (G3AEZ), Wigmore Lodge, Beare Green, near Dorking, Surrey.

Halifax and District Amateur Radio Society.—A fund has been opened to provide a receiver for a patient at the White Windows Cheshire Home, Sowerby Bridge, who is interested in Amateur Radio. Other recent activities have been a talk by G3FDC on the subject of standing waves. N.F.D. arrangements are due to be discussed on March 15 while a visit to the ABC Television Studios in Manchester is planned for April 12. *Hon. Secretary:* Arthur Robinson (G3MDW), Candy Cabin, Ogden, Halifax.

Harlow and District Radio Society.—Meetings are held on Tuesday evenings at the home of G. E. Read (G3ERN), High Street, Harlow. Full details of activities may be obtained from the *Hon. Secretary:* B. H. Wynn, "Black Cat," Abbess Roding, Ongar, Essex.

Lincoln Short Wave Club.—Despite thick fog, 28 members and friends attended the club's Annual Dinner in January when the Region 4 Representative, F. C. Ward (G2CVV), and Mrs. Ward were the Guests of Honour. The Mobile Rally and Hamfest is to be held this year on September 18. Meetings are held on alternate Wednesdays at the Technical College, commencing at 7.30 p.m. *Hon. Secretary:* C. Lathwood (G3MUL), 40 Grange Crescent, Lincoln.

Magnus Grammar School Radio Club (Newark-on-Trent).—The inaugural meeting of this new club, which already has 20 members, was held on January 12. Meetings are held every Tuesday. The club would be interested to hear of the activities of similar school societies. *Hon. Secretary:* D. W. Selby, 90 Balderton Lane, Doddington, Newark, Notts.

Oxford University Radio Society.—This society, which has recently obtained workshop facilities, has been in existence for nearly a year and has 70 members. About five talks are given each term and visits to firms are also popular. Plans for a club transmitter are being drawn up by G3LOF who also runs Morse classes assisted by G3NMW. *Hon. Secretary:* G. G. Gemmill (B.R.S.22502), Worcester College, Oxford.

Purley and District Radio Club.—Plans are being made to take part in this year's National Field Day on June 11 and 12. A Junk Sale will be held at the meeting at the Railwaymen's Hall, Whytecliffe Road, Purley, on March 18. *Hon. Secretary:* E. R. Honeywood (G3GKF), 105 Whytecliffe Road, Purley, Surrey.

Reading Amateur Radio Club.—G5HZ has been elected *Chairman* for the coming year and G3GKH *Hon. Treasurer*. At the meeting to be held at the Palmer Hall, West Street, Reading, on March 26 at 7 p.m. there will be a talk on the practical applications of transistors in receivers and transmitters followed by films. *Hon. Secretary:* R. J. Nash (G3EJA), " Peacehaven," 9 Holybrook Road, Reading.

Reigate Amateur Transmitting Society.—At the A.G.M. the following officers were elected: *Chairman*—P. D. Lucas (G3JDN); *Hon. Secretary*—F. D. Thom (G3NKT), 12 Willow Road, Redhill; *Hon. Contests Secretary and A.S.R.*—K. J. Wheatley (G3BBR); *Hon. Treasurer*—G. E. Mac'Krell (G3KAX); *Committee Member*—S. W. L. Ayling. There was an attendance of 36 members and friends at the society's first dinner held at Laker's Hotel, Redhill, on February 6 when the chief guests were the Mayor and Mayoress of Reigate and the editor of the *Surrey Mirror*. On March 19 at The Tower, Redhill, commencing at 7.30 p.m., G4ZU will give a talk on TVI, while on April 9 G8KW will be the speaker.

South Yorkshire Amateur Radio Society.—Meetings at the Stag Inn, Docking Hill Road, Doncaster, have been arranged for 8 p.m. on March 24 (" C.W.—for better or worse," by J. B. Walker, G3CYS) and April 12 (Discussion on aerial systems). Further information regarding the society may be obtained from the *Hon. Secretary:* W. Farrar (G3ESP), 2-A Highbury Avenue, Bessacarr, Doncaster (Doncaster 56082).

Southgate, Finchley and District.—Meetings are held at Arnos School, Wilmer Way, Southgate, N.14 (near Arnos Grove Tube Station), on the second Thursday in each month, commencing at 7.30 p.m. Recent talks have been on " Test Equipment " by John Wood (ex-G3EAY) of Advance Components Ltd. and on " Workshop Tools and Methods " by Pat Beresford (G3AFC). In June, H. A. M. Clark (G6OT) is to lecture on " Impedance Matching " while in July a representative of Cosmocord Ltd. will give a talk on " Microphones and Pick-ups." *Hon. Secretary:* Alan G. Edwards (G3MBL), 244 Ballards Lane, North Finchley, London, N.12.

Spen Valley Amateur Radio Society.—Sixty-one members and their ladies attended the Annual Dinner held in Dewsbury on January 23 when the guest speaker was Mr. W. Easton, an Executive Engineer of the G.P.O. After congratulating amateurs on their work, Mr. Easton described the action the Post Office takes against pirates. The Swindon Cup for outstanding service to the society was presented to G2FCP. The Northern Mobile Rally at Harewood House, near Leeds, is to be held on May 22. *Hon. Secretary:* Norman Pride, 100 Raikes Lane, Birstall, Leeds.

Stockport Radio Society.—The fortieth anniversary of the foundation of the society was celebrated at the Annual Dinner on February 6 when the R.S.G.B. Zonal Representative, Philip Wade (G2BPJ), and Mrs. Wade were the guests of honour. Others present included the Mayor and Mayoress of Stockport. During the evening, Mr. Wade presented a wall clock to Mr. W. H. Banks, G2ARX (Hon. Treasurer), one of the founder members. The A.G.M. is to be held on May 16. Details of other meetings are given in *Forthcoming Events* for Region 1. *Hon. Secretary:* G. R. Phillips (G3FYE), 7 Germans Buildings, Buxton Road, Stockport.

Worthing and District Amateur Radio Club.—Meetings are held on the second Monday in each month, commencing at 8 p.m., in the Adult Education Centre, Union Place, Worthing. On March 14, P. J. Robinson (G3KFH/T) was due to give a talk on " Amateur Television." D. Hayter (G3JHM) will give a practical demonstration of centimetric equipment on April 11. The annual " Bucket and Spade " party is being arranged for July 10. *Hon. Secretary:* P. J. Robinson (G3KFH/T), 46 Hill View Road, Worthing.

Silent Key

ARTHUR EVANS (GW4MZ)

It is with deep regret that we record the death, on December 21, 1959, of Mr. Arthur Evans (GW4MZ) of Llandudno, North Wales. President of the Conway Valley Amateur Radio Club Mr. Evans will be sadly missed by members of that club and by his many friends. J. H.

Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives. T.R.s and club secretaries are reminded that the information submitted must include the date, time and venue of the meeting and, whenever possible, details of the lecture or other event being arranged. Regional Representatives are requested to set out copy in the style used below.

DATES FOR YOUR DIARY

March 25.—London Lecture Meeting at the I.E.E.
April 1.—Radio Amateur Old Timers' Association Reunion at the Horse Shoe Hotel, Tottenham Court Road, London, W.C.1. (R.A.O.T.A. members only.)
April 10.—Amateur Radio Mobile Society Rally.
April 24.—North Midlands Mobile Rally.
May 8.—Cheltenham Mobile Rally.
May 8.—Thanet Mobile Rally, Cliffsend, Ramsgate.
May 15.—Harwell Mobile Rally and Hamfest.
May 21-22.—Region 12 O.R.M.
May 22.—Northern Mobile Rally at Harewood House, near Harrogate.
June 13-17.—Region 1 I.A.R.U. Conference, Folkestone.
June 19.—Amateur Radio Mobile Society Rally.
June 26.—Longleat Mobile Rally.
June 26.—Region 2 O.R.M. at Redcar.
July 10.—South Shields Mobile Rally.
July 10.—Worthing "Bucket and Spade" Party.
July 17.—Southern Counties Mobile Rally at the Vintage Car Museum, Beaulieu Abbey, near Southampton.
August 14.—Derby Mobile Rally.
August 28.—South Manchester Radio Club and Stockport Radio Society Joint Rally.
September 10.—British Amateur Television Club Convention.
September 15-17.—R.S.G.B. National Convention, Cambridge.
September 18. — Lincoln Hamfest and Mobile Rally.
November 23-26.—R.S.G.B. International Radio Hobbies Exhibition.

REGION 1

Ainsdale.—Wednesdays, 8 p.m., 37 Hawthorne Grove, Southport.
Blackburn.—Fridays, 8 p.m., The Corporation Park Hotel, Revidge Road.
Blackpool (B. & F.A.R.S.).—Tuesdays, 8 p.m., Squires Gate Holiday Camp.
Bury (B.R.S.).—April 12 ("Natter Night"), George Hotel, Kay Gardens.
Chester.—Tuesdays, 8 p.m., Y.M.C.A.
Crosby (C.A.R.S.).—Tuesdays, 8.30 p.m., Colonsay, Crosby Road South, Waterloo.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., March 22 ("Home-made Panadaptor," by G2AMV), March 29 (Film Show), April 5 (Junk Sale), Gladstone Mission Hall, Queens Drive, Stoneycroft.
Macclesfield (M. & D.R.S.).—March 22, April 5, 19, The Bruce Arms, Crompton Road.
Manchester (M. & D.R.S.).—April 11, 7.30 p.m., Wellington Hotel, Nicholas Croft, High Street, off Market Street.
Manchester (S.M.R.C.).—Fridays, 7.30 p.m., Ladybarn House, Mauldeth Road, Fallowfield.
Preston (P.A.R.S.).—March 22, April 12, 26, 7.30 p.m., St. Paul's School, Pole Street.
Southport.—Thursdays, 8 p.m., The Esplanade.
Stockport (S.R.S.).—March 16 (A.G.M.), March 20 (Film, "This is the B.B.C."), March 30, April 13, 27, 8 p.m., The Blossoms Hotel, Buxton Road.
Wirral (W.A.R.S.).—March 18, April 8 ("Constructional Contest"), April 22, 7.45 p.m., 4 Hamilton Square, Birkenhead.

REGION 2

Barnsley.—March 25 ("Z Match," by J. A. Ward, G4JJ), April 8 (Mullard Film on Transistors), 7.30 p.m., King George Hotel, Peel Street.
Bradford (B.A.R.S.).—March 22 (A.G.M.), April 5 (N.F.D. arrangements), April 26 ("The Development of Television," by D. G. Enoch, G3KLZ), 7.30 p.m., Cambridge House, Little Horton Lane, Bradford 5.
Cleckheaton (S.V.A.R.S.).—March 16 (visit to Mains Radiograms Ltd., Bradford), March 30 ("Electronics in Industrial Research," by Dr. N. H. Chamberlain of Leeds University), 7.30 p.m., George Hotel, Cleckheaton, April 13 ("Post Office Mechanisation,") at Leeds G.P.O.
Halifax.—March 15 (Field Day Arrangements), March 29 (Ragchew), April 12 (Fire Prevention), 7.30 p.m., Sportsman Inn, Ogden, April 9, Visit to ABC Television Studios, Manchester.
Leeds (L.A.R.S.).—March 16 (Demonstration of hi-fi equipment by Fane Acoustics Ltd.), March 23 (Demonstration of home-built table top transmitter by W. Ripley), April 6 (Radio Controlled Models), Swarthmore Education Centre, 4 Woodhouse Square, Leeds 3. March 30, 7.30 p.m., visit to Leeds Police Information Room; April 27, 7.30 p.m., visit to Roneo Ltd.
Scarborough (S.A.R.S.).—Thursdays, 7.30 p.m., Chapman's Yard, North Street.

REGION 3

Birmingham (M.A.R.S.).—April 7 ("New Trunk Dialling Scheme," by Brig. F. Jones, Telephone Manager, Midland Area), April 19 ("Radio Pictures of the Sky," by K. Stevens), 7.30 p.m., Midland Institute, Paradise Street, Birmingham. **(Slade).**—March 25 ("Electronic Digital Computors," by M. D. Fowler, G3GKZ), April 1, April 8, 7.45 p.m., The Church House, High Street, Erdington. **(South).**—March 17 ("Electronic Equipment in use at Birmingham University," by G3JAO), Friends Meeting House, 220 Moseley Road, Birmingham 12. April 3, 160m Mobile Rally, Lickey Beacon, 10.30 a.m. (weather permitting).
Cannock.—March 27 (Sunday), 2 until 5 p.m., Walsall Road County Primary School, Cannock (Exhibition of "Heathkit" equipment).
Stourbridge & District.—March 25 (Informal), 8 p.m., White Horse, Amblecote. April 5 ("U2 Can B/2," by Tom Douglas, G3BA), 8 p.m., Brotherhood Hall, Scotts Road, Stourbridge.
Wolverhampton.—March 21, Visit to Stewarts and Lloyds (evening).

REGION 4

Derby (D. & D.A.R.S.).—March 18 (Annual Dinner), 7.15 p.m., Irongates Grill, Derby, March 23 (N.F.D. Meeting 1960), March 30 (Film), April 6 (G5YY 1928-1960), April 13 (D.F. Practice Run), 7.30 p.m., Room No. 4, 119 Green Lane, Derby.
Derby (D.S.W. Exp. S.).—Sundays, 10.30 a.m., Thursdays, 7.30 p.m., Club Rooms, Nunsfield House, Boulton Lane, Alvaston, Derby.
Grimsby (A.R.C.).—March 17 ("Six-band Transmitter" by F. R. Peterson, G3ELZ), March 31 (Junk Sale), April 14 (Talk), 8 p.m., R.A.F.A., Abbey Drive West, Grimsby.
Leicester (L.R.S.).—March 21 (Members Display by J. W. Worth, G3KKV and C. B. Pretty, G3BMD), April 4 (Open), 7.30 p.m., Old Hall Farm, Braunstone Lane, Leicester.
Lincoln (L.S.W.C.).—March 23, April 6, 7.30 p.m., Room No. 19, Technical College, Cathedral Street, Lincoln.
Melton Mowbray (A.R.C.).—April 14 ("My journeys to the Mid-Pacific," illustrated talk by D. Cox, G3HKZ), 7 p.m., Wilton Road Technical College.
Nottingham (A.R.C.).—Tuesdays and Thursdays, March 22 (Annual General Meeting), 7.30 p.m., Community Centre, Woodthorpe House, Mansfield Road, Nottingham.
Retford & Worksop (N.N.R.C.).—Tuesdays, Thursdays and Fridays, 7.30 p.m., Victoria Hall, Eastgate, Worksop, Notts.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.
High Wycombe.—March 30, 7.30 p.m., G3FAS, 61 Tyzack Road, Totteridge (N.F.D. Discussion).
April 27, G2FDF, 106 Liberty Lane, Addlestone, Surrey (N.F.D. Discussion).
Stroud.—Wednesdays, 8 p.m., Subscription Rooms, Stroud.

REGION 7

Acton, Brentford and Chiswick.—March 15 ("Getting going on 2m," by G3EOH); April 19 ("My 2 Metre Rig," by G2CAJ), 7.30 p.m., A.E.U. Rooms, 66 High Road, Chiswick.
Barnet.—March 29 (Lecture and Film: "Radio Conditions in Antarctica," by Maj. G. Watson, ex-VP8BP), 7.30 p.m.
Croydon (S.R.C.C.).—April 12, 7.30 p.m., "Blacksmith's Arms," South End, Croydon.
Dorking (D. & D.R.S.).—Second and fourth Tuesday in each month, March 22 ("Single Sideband," by R. Greenwood, G3LQA, followed by Junk Sale), 8 p.m., Star and Garter Hotel, Dorking.
East London.—April 10 ("Amateur Radio Teleprinting," by Dr. A. C. Gee, G2UK), 2.30 p.m., Lambourne Room, Town Hall, Ilford.
Ealing.—Sundays, 11 a.m., ABC Restaurant, Ealing Broadway, W.5.
East Molesey (T.V.A.R.T.S.).—April 6 ("An attempt at a simple Explanation of Digital Electronic Computers," by E. A. Dedman, G2NH), Carnarvon Castle Hotel, Hampton Court.
Enfield & District.—March 24 ("Radar" by Geoff Watts of Murphy Radio), 7.30 p.m., George Spicer School, Southbury Road, Enfield.
Harlow and District.—Tuesdays, 7.30 p.m., rear of G3ERN (G. E. Read), High Street, Harlow.
Holloway (G.R.S.).—Mondays, Tuesdays and Wednesdays (R.A.E. and Morse), Fridays (Club), 7 p.m., Montem School, Hornsey Road, N.7. (Closed for Easter April 9-24.)
Ilford.—Thursdays, Lectures 8-10 p.m., 579 High Road, Ilford (near Seven Kings Station).
Kingston.—Lectures alternate Thursdays, Theory and Morse Classes weekly, 7.45 p.m., Y.M.C.A., Eden Street, Kingston. (Morse at 2 Sunray Avenue, Tolworth.)

LONDON MEMBERS' LUNCHEON CLUB

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,

at 12.30 p.m. on Fridays, March 18 and April 8, 1960.

Telephone table reservations to HOL 7373 prior to day of luncheon. Visiting amateurs especially welcome.

New Cross (C.A.R.S.).—Fridays, 7.30 p.m., Sundays, 11.30 a.m. (Audio Section, last Tuesday in month, 7.30 p.m.), 225 New Cross Road, London, S.E.14. March 25 ("D/F Hints and Tips"), April 8 (Film Show).
Norwood and South London.—Second Saturday and last Tuesday each month, April 9, (Film Show), 8 p.m., Windermere House, Westow Street, Crystal Palace.
Romford (R. & D.R.S.).—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Carlton Road, Romford.
Southgate, Finchley & District.—Thursday April 14 ("K. W. Electronics Ltd."), 7.30 p.m., Arnos School, Wilmer Way, N.14.
South Kensington. (Civil Service R.S.).—April 5 (Annual General Meeting), 6 p.m., Science Museum, South Kensington.
Welwyn Garden City.—April 14 ("The International Geophysical Year," by Geoff Stone, G3FZL), 8 p.m., I.C.I. Restaurant, Blackfan Road, Welwyn Garden City.

REGION 8

Brighton (B. & D.R.C.).—March 16 (Film Show), March 23 (Informal), March 30 ("Geloso G209R Receiver," by R. Smith), Home Guard Club, British Legion, 76 Marine Parade, Brighton.
Crawley (C.A.R.C.).—March 31 ("Amateur

(*Continued on page 429*)

Radio and the I.G.Y." by G2FKZ and G3FZL), April 28 (" Aerials for Restricted Spaces," by G4ZU), " The Brewery Shades," High Street, Crawley.

Tunbridge Wells (W.K.A.R.S.).—March 18 (Practical demonstration of wiring and layout), 7.30 p.m., Culverden House, Culverden Park Road, Tunbridge Wells.

Worthing (W. & D.A.R.C.).—April 11 (" Centimetric Equipment," by D. Hayter, G3JHM), May 9, 8 p.m., Adult Education Centre, Union Place, Worthing.

REGION 9

Bristol.—March 18 (" Audio and R.F. Oscillators," by E. C. Halliday, G3JMY), 7.15 p.m., Carwardines Restaurant, Baldwin Street, Bristol, 1.

Exeter.—Second Thursday in each month, Y.M.C.A., St. Davids Hill, Exeter.

Torquay.—April 9 (A.G.M.), 7.30 p.m., Y.M.C.A., The Castle, Torquay.

Weston-super-Mare.—April 13 (Arrangements for N.F.D.), Technical College, Lower Church Road, Weston-super-Mare.

Yeovil (Y.A.R.C.).—Wednesdays, 7.30 p.m., Grove House, Preston Road, Yeovil.

REGION 10

Cardiff.—April 11, 7.30 p.m., Sergeants' Mess, T.A. Centre, Park Street, Cardiff.

Penarth.—March 28 (" The Electrical Supply Industry," by Les Osborne, GW2BBO), 7.30 p.m., Y.M.C.A., Penarth.

REGION 12

Aberdeen (A.A.R.S.).—March 18 (" Crystal Calibrator," by GM3NHW), March 25 (" S.S.B.", by GM3ICS and GM3FKS), April 1 (" Morse—Some Considerations and Conclusions," by GM3ALZ and GM3LER), April 8 ("Mammoth Sale " of radio equipment and components), April 15 (Activity Night with GM3BSQ), 7.30 p.m., Clubrooms, 6 Blenheim Lane, Aberdeen. **(Luncheon Club).**—April 5, 12.45 p.m., Royal Atheneum Restaurant ('phone GM3HTL, Aberdeen 34928, for reservations).

REGION 13

Edinburgh (L.R.S.).—March 24 (N.F.D. Preparations), April 7 (" Amateur Radio Pre-War.") 7.30 p.m., Y.M.C.A., 14 St. Andrew Street, Edinburgh 2.

REGION 14

Glasgow.—Last Friday of each month, 7.30 p.m., Christian Institute, Bothwell Street, Glasgow.

Prestwick.—Third Sunday in each month, 7.15 p.m., Royal Hotel, Prestwick.

REGION 17

Portsmouth.—Tuesdays, 7.30 p.m., Scarrs, 183A Albert Road.

Southampton.—First Saturday in each month, 7 p.m., Prospect House (back of Gas Board showrooms), Above Bar, April 2 (Demonstration of RTTY gear by G3HKT, G2FGD and G3IVP).

Representation

THE following are additions to the list of Town Representatives published in December 1959 issue.

REGION 6
- GLOUCESTERSHIRE—GLOUCESTER
  - C. Cole (G3GEN), 113 Stroud Road.

REGION 7
- LONDON NORTH—FINSBURY PARK AND DISTRICT
  - A. J. Mourton (G8QU), 18 Baalbec Road, Highbury, N.5.
- LONDON SOUTH—NORWOOD AND SOUTH LONDON AREA
  - E. W. Yeomanson (G3IIR), 32 Gaynesford Road, Forest Hill, S.E.23.
- LONDON EAST—EAST HAM
  - C. G. Middle (G4CM), 64 Brampton Road, E.6.
- LONDON NORTH-WEST—CRICKLEWOOD, HAMPSTEAD AND GOLDERS GREEN
  - Derek R. Aston (G8DR), 204 Cricklewood Lane, N.W.2.
- LONDON SOUTH-WEST—EAST MOSELEY AND HAMPTON COURT
  - A. Mears (G8SM), 8 Broadfields, East Molesey, Surrey.

REGION 8
- KENT—CANTERBURY AND ASHFORD
  - D. N. T. Williams (G3MDO), Llandogo, Bridge, near Canterbury.
- SUSSEX—WORTHING
  - R. B. Forge (G3FRG), 1 Beaumont Road, Worthing.

REGION 9
- DORSET—POOLE AND DISTRICT
  - D. T. Wyatt (G3LSC), 4 Norman Avenue, Branksome.

REGION 13
- FIFESHIRE—WEST FIFE AREA
  - A. H. Kightley (GM3MZZ), 28 Castlandhill Road, Rosyth.

REGION 17
- BERKSHIRE—READING
  - Lt.-Col. N. I. Bower (G5HZ), The Little Priory, Peppard Common.

International Ham Hop Club

MEMBERSHIP of the International Ham Hop Club has shown a marked increase since the beginning of the year in preparation for what promises to be a record season.

Club members complain that they are not receiving sufficient visits from other members—on the other hand, many amateurs are believed to be reluctant to join the club for fear of committing themselves to providing more Ham Hospitality than they can cope with!

Ken Mitchell (ZS1IR), formerly secretary of the South African Radio League, is to become National Representative of the club in South Africa following his forthcoming visit to Europe. The president of the club, John F. Dormois (W0GDH) of Kansas City, is due to arrive in England for a one month tour of Europe on May 20. Holger Hallum (OZ4HV) is to make a tour of Poland during the summer.

During his recent five weeks' tour of five European countries, 4S7SW met more than 200 licensed radio amateurs.

Full details of the I.H.H.C. may be obtained from the *Hon. General Secretary:* George Partridge (G3CED), 17 Ethel Road, Broadstairs, Kent.

Affiliated Society Representatives

THE following are additions to the list of Affiliated Society Representatives published in the December 1959 issue.

Crawley Amateur Radio Club: R. F. Fautley (G3ASG), 123 Ashdown Drive, Tilgate, Crawley, Sussex.

Grimsby Amateur Radio Society: H. O. Gillatt (G3LOP), 102 Station Road, Healing, Grimsby, Lincs.

Purley and District Radio Club: J. N. Buckland (G3JSQ), Purley Hospital, Brighton Road, Purley, Surrey.

Thames Valley Amateur Radio Transmitters Society: A. Mears (G8SM), 8 Broadfields, East Molesey, Surrey.

LONDON U.H.F. GROUP
will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,
at 7.30 p.m. on Thursday, April 7, 1960
All v.h.f. and u.h.f. enthusiasts welcome.

EXCHANGE AND MART SECTION

ADVERTISEMENT RATES. Members' Private Advertisements 3d. per word, minimum charge **5s. Trade Advertisements 9d. per word** minimum charge **12s.** All capitals **1s.** per word, minimum charge **18s.** Write clearly. No responsibility accepted for errors. Use of Box number **1s. 6d.** extra. Send copy and remittance to **National Publicity Co.Ltd., 20-21 Red Lion Court, Fleet Street, London, E.C.4, by 22nd** of month preceding date of issue.

ACCOMMODATION for one, unfurnished or furnished, would decorate. Within six miles of Kingston, Surrey.—G3GYE, 53 Lime Grove, New Malden. (1108

ALL types of valves required for cash. State quantity and condition.—Radio Facilities Ltd., 38 Chalcot Road, N.W.1 (PRImrose 9090.) (236

ANTENNAS.—Car radio or mobile. First class range from the Continent. Chrome on brass and stainless steel. From 37/- to 65/-. Postage 1/6d. each. Lengths from 58 in. to 75 in. Leaflets available. 25 per cent discount to Hams.—G3MMJ, Famegoods Ltd., Grenville House, Princes Risborough, Bucks. (1116

A.R.88D or E wanted for private use by advertiser. Must be in mint condition, no second quality accepted. Details and price to: Box 1113, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (1113

BC221Q frequency meter, unmod., mains power unit, excellent condition, £35. AR88 excellent condition, £38. Offers.—Thorpe, 10 Abbots Close, Sale, Cheshire. (1101

B.C.342 Receiver. A.R.R.L. Mod. Carefully done. Good condition, £14. S.27 V.H.F. receiver, 28-143 Mc/s. Good condition, £25. B.C.221 frequency meter with charts; incorporating commercial stabilised power pack. Good condition, £23.—G3EKF, Bramblings, Fishers Pond, Eastleigh, Hants. (1110

BUG-KEY, Eddystone type 689, perfect condition. Will exchange for G.E.C. TT21 valve or Eddystone type 598 full vision dial.—Apply: Box 1112, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (1112

CR-100 receivers overhauled, excellent condition, noise limiter, manual, £17/10/-. T.1131 V.H.F. transmitters, £18. 1,000 V. at 500 mA power packs, 100 watt modulator units, £4 each. Driver/PA units (Ex-T.1131), £3. (p. and p. on above, £1). 1100-0-1100 at 500 mA transformers, 25/- (p. and p., 5/-). Tested valves: 12AU7, 12AX7, 12AT7, 6L6, 5/-; KT66, 6/6; 6J5, 1/6; FW4/500, 4/-; EF50, 7/6 per doz. (post free).—G3NOO, Hamble House, Hamble, Hants. (1114

CR150 receiver wanted any state, cash or will exchange new Hallicrafters S38.—Write: 24 Highfield Road, Leighton Buzzard, Beds. (1096

EDDYSTONE S.640, little used, cabinet virtually unmarked, with Handbook, £17/10/- carriage paid, o.n.o.—G3IDT, 30 Manston Way, Leeds 15. (1100

ELECTRICAL SUPPRESSORS-FILTERS.—Low pass (Balanced/Unbalanced), high pass (28 Mc/s Peak), Dummy Loads (screened). Send for details. — Scott, 19 Clifton Gardens, London, W.9. (1102

FOR SALE.—Heathkit DX40U with VF1U in first rate condition, £39.—33 Keswick Road, Blaby, Leicester. (1098

FOR SALE.—Panda Explorer Transmitter, as new, delivered in original crating, complete, £70.—G3LXW, 21 New Road, Orpington, Kent. (Orp. 27905). (1109

G.E.C. BRT 400 Communications Receiver for sale, £85, o.n.o. Working perfectly, beautiful condition.—Buisel, 21 Marchmont Road, Wallington, Surrey (bungalow). (1103

HRO Senior 6AC7 r.f. stab osc., power pack, bandspread coils for 10, 15, 20, 40, 80 plus LF coils wired for 6 or 12 V. operation, £25. B2 complete, £8. Minimitter 6 band Convertor, £12/10/-. Minimitter transmitter in perfect condition, £50.—B. G. Meaden G3BHT, Sandy Lane, Hightown, Nr. Liverpool. (1091

METALWORK.—All types cabinets, chassis, racks, etc., to your own specifications.—Philpott's Metalworks Ltd. (G4BI), Chapman Street, Loughborough. (99

(Continued on next page)

NEW unused.—LG 300 Transmitter and Modulator, still in packing can be delivered to purchaser. Offers.—P/O Box 300, Bathurst, Gambia. (1115

PANDA CUB for sale in almost mint condition. £40 or best offer. Prefer buyer collects owing to weight. May be seen and tried at G4AH, 160 Cat Hill, East Barnet, Herts. (BAR 4272.)

PATENTS and Trade Marks. Booklet on request. King's Patent Agency Ltd. (B. T. King, G5TA, Mem. R.S.G.B. Reg. Pat. Agent).—146A Queen Victoria Street, London, E.C.4. (Phone: City 6161.) 60 years' refs. (372

QSL cards, G.P.O. approved. Log books, cheapest, best, prompt delivery. Samples.—Atkinson Bros., Printers, Looe, Cornwall. (206

QST, 1952, 2 bound volumes, 30/-. S.W.M. Vol. 14, 1956/7, bound 16/-. Soldering gun, latest type, new condition, A.C. mains, 50/-. Postage included.—Stevens, 51 Pettits Lane, Romford, Essex. (1107

SALE.—A.R.88.D. Good condition, S meter manual, £45 o.n.o. Class " D " wavemeter, £3/10/-.—G3BWH, 35 Northfield Road, Accrington. ('Phone: Rossendale 1718.) (1104

SALE.—K.W. Valiants 10/160, £35. REE 40 WATT 144 Mc/s. transmitter COMPLETE, £60. MINIATURE top band mobile phone transmitter 2E26 Final, £7. AM912/TRC 144M/cs QRO PA UNIT with brand new unopened 4X150A, £10.—Box No. 1099, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (1099

S640 for Sale. Professionally realigned, speaker, £16.—G3NGJ, The Grange, Canwick, Lincoln. (1092

VALVES FOR SALE.—All tested on Mullard valve tester. EF80, 6F1, 10F1, 6F12, 6D2, 3/- each; PY82, 6V6, 6P25, 6F13, ECC81, PZ30, KT33, 6SN7, GZ32, PY80, 185BT, 5/- each. Plus 1/- P. & P. on orders of less than six.—J. R. Calverley & Co. Ltd., 130 Water Street, Radcliffe, Lancs. (1086

WANTED.—All types of communication receivers, test equipment, tape recorders, amplifiers, etc. Prompt cash payment.—Details to R. T. & I. Service, 254 Grove Green Road, Leytonstone, London, E.11. (LEYton 4986.) (241

WANTED.—Cathode Ray Tube, long persistence, Type VCR.521.—Box 1106, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (1106

WANTED.—" Command " Transmitters and Receivers for 2-3 Mc/s. Preferably ARC-5 T-18s. and R-25s., or CCT-52232s and BC-454s, new and unmodified.—G3NES, Mellow End, Broad Oak, Canterbury. (1105

WANTED for cash.—Good clean communication receivers and S.S.B. equipment. Please state price.—Short Wave (Hull) Radio, 30-32 Princes Avenue, Hull. (Telephone 18953.) (983

WANTED.—Hallicrafters matching speaker type PM23 in cabinet for SX28. Mullard A41/G4A 'scope tube. Output transformer for RCA MI-11220 speech amplifier.—Box 1111, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (1111

WANTED.—HRO working or for spares. Selling: VFO/XL Oscillator Unit 145 with power unit 392. R.S.G.B. BULLETINS 1936-59. Practical Wireless, Radio Constructor, S.W.M., Wireless Constructor 1924-26, Wireless Weekly 1923, Popular Wireless 1922-23, Radio Times 1923-24. London Area Box 1095 National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (1095

WANTED.—20 metre Band Spread Coil for H.R.O. Receiver.—G3HRU, 59 Buckstone Grove, Alwoodley, Leeds 17. (1097

100 WATT 2 metre F.M. Transmitter, separate V.F.O. Drive Unit and speech clipper, also heavy duty 600 V. Power Pack, £16 the lot. Stamp for details. BC348 Receiver, £8. Buyers collect. —1 Windsor Hill, Princes Risborough, Bucks. (1094

REQUEST TO ADVERTISERS

When there is likely to be a delay in the dispatch of goods ordered, please advise the buyers of probable delivery date.

Thank You.

H. Freeman, *Advertisement Manager*, R.S.G.B. Bulletin

APPOINTMENTS SECTION *(Situations Vacant)*

Personal Call

SERVICE ENGINEERS REQUIRED

for the above system which includes transmitters and transistorised receivers. Training given to suitable applicants for positions in our test department and in the field.

Apply Personnel Department,

Multitone Electric Co., Ltd.,
12-20 Underwood Street, London, N.1.
Telephone CLE 8022

R·S·G·B Bulletin

ADVERTISEMENT RATES

All enquiries regarding Display and 'Exchange and Mart' advertisements should be addressed to the Advertisement Manager:

H. FREEMAN

The National Publicity Co. Ltd.

20-21 Red Lion Court, Fleet Street, London, E.C.4 *Tel.: FLEet Street 0473-6*

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