

R·S·G·B

VOLUME 20 • NO. 8 • COPYRIGHT • PRICE 1/6 FEBRUARY, 1945

BULLETIN

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN



- EDUCATION AND TRAINING FOR ENGINEERS
- PRE-FABRICATED LATTICE MAST
- THE PROPAGATION OF RADIO WAVES

RADIO BOOKS

★ Published
by

THE SUPERHETERODYNE RECEIVER

By ALFRED T. WITTS, A.M.I.E.E. Every radio owner, whose interest goes beyond mere listening-in, will appreciate the expert practical knowledge of construction and maintenance given in this fully up-to-date book. Sixth Edition. 6s. net.

RADIO RECEIVER SERVICING AND MAINTENANCE

By E. J. G. LEWIS. This book gives detailed instructions for receiver servicing and repairs, and is arranged in such a way that the right treatment for any fault can be found immediately. Illustrated. Third Edition. 8s. 6d. net.

RADIO SIMPLIFIED

By JOHN CLARRICOATS. Provides a useful background of fundamental radio knowledge. It has been borne in mind that at the present time it is necessary for many people to obtain their practical instructions of the subject quickly. The author has had experience of this and has planned his book accordingly. Second Edition. 4s. 6d. net.

N.B.—Paper rationing means a shortage of books. Those you want may be temporarily out of stock.

PITMAN HOUSE,
PARKER STREET,
KINGSWAY, W.C.2

PITMAN

A.C.S. RADIO

We again offer a few suggestions from stock.

NEW GOODMAN SPEAKERS, 12 in., £6.15.0; 10 in., 33/6; 8 in. with transformer, 37/6; 3½ in., 30/-, 3 in., 30/-.

VALVES. Good stocks of both British and American types, at control prices. No Lists. Please indicate types required.

STREAMLINE MORSE KEYS, modern black crackle finish. Fine value ... 7/6

PAIR OF SCOTT IMPERIAL High Frequency Tweeter Speakers ... £5.0.0

FORMO CERAMIC COILFORMERS, 2 × 1½ in. ribbed, with 2½ × ½ × ¼ in., 5-hole base, without fittings, per doz. ... 5/-

BRITISH ACOUSTIC Low Resistance P.M. Metal Horn Speaker, 18 in. flare, as new ... £8.10.0

ELECTRO-VOICE VELOCITY Microphone, as new ... £8.8.0

PERMAREC SUPER CARBON MICROPHONE on table stand, little used ... £5.5.0

PORTABLE SUPER CARBON MICROPHONE, self-contained in bakelite battery box, as new ... £5.5.0

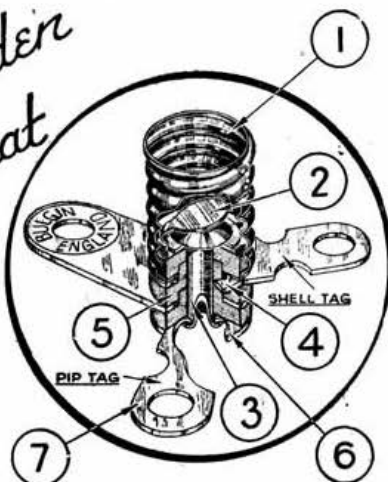
SELMER TYPE T.V.15 Super Microphone ... £10.10.0

ROTHERMEL-BRUSH Type D106 Piezo Lapel Microphone ... £2.2.0

SELECTION OF TELEVISORS and Radio-Televisors, shop soiled, much reduced. List on request.

44 WIDMORE RD BROMLEY, KENT
'Phone RAVensbourne 0156

*It's the hidden
details that
count*



ROLLED-SHELL MINIATURE EDISON SCREW LAMP-HOLDERS TO B.S.98/E.10.

- 1—Threaded shell with dimensions and details to B.S. 98-10mm. "MES"; silver-plated finish.
- 2—Central "pip"-contact of spring phosphor-bronze to ensure good contact; silver-plated.
- 3—Central rivet of solid steel ensuring permanently tight and positioned assembly.
- 4—Locking teeth on "shell"-contact solder-tag, ensuring contact and preventing unintended rotation.
- 5—Stepped insulator-washers preventing short-circuit and permitting comparatively high-voltage working conditions.
- 6—Toothed solder-tag locks to rivet-turnover, fixing position and ensuring contact to "pip"-contact.
- 7—Dual-purpose soldering tags coated pure tin and accepting "threaded" or "wound" wiring; fixing bracket, normally "dead," may contact with shell and replace the "shell-tag."

140 Types in
production

THE CHOICE OF CRITICS

A. F. BULGIN & CO. LTD.
BYE PASS ROAD, BARKING,
ESSEX.

(The Name "BULGIN" is registered Trade Mark.)

BULGIN

R.S.G.B. BULLETIN

OFFICIAL JOURNAL OF THE INCORPORATED RADIO SOCIETY OF GREAT BRITAIN

Published on or about the 15th of each month. Issued free to members.

General Editor: JOHN CLARRICOATS.

Editorial Office:

NEW RUSKIN HOUSE,
LITTLE RUSSELL STREET, LONDON, W.C.1

Telephone: Holborn 7373.



Advertisement Manager: HORACE FREEMAN

Advertising Office:

PARRS ADVERTISING LTD.,
121 KINGSWAY, LONDON, W.C.2

Telephone: Holborn 2494

Honorary Editor: ARTHUR O. MILNE.

VOL. XX.

FEBRUARY, 1945

No. 8

EDUCATION AND TRAINING FOR ENGINEERS

THE publication last month of a report prepared by the Post-War Planning Committee of the Institution of Electrical Engineers entitled "Education and Training for Engineers," focuses attention on a problem which closely affects the welfare of many of our members—especially those whose technical education was cut short by a call to the Services. The major portion of the report suggests methods whereby the electrical engineering industry may provide, in accordance with the requirements of the new Education Act, part-time further education at technical colleges for young men who desire to make headway in the profession of their choice.

It is proposed that the system of part-time education should be developed to provide for the needs of the three main groups of engineering personnel, namely, craftsmen, technicians and professional engineers. It is recognised that only by attending part-time courses can young people, who have, for one reason or another, left school at an early age, obtain further education and laboratory experience in engineering subjects. In recent years many electrical and radio engineering firms have arranged for the part-time release of young people to attend technical colleges, whilst the more progressive have established technical schools in, or attached to, the works. No doubt many of our younger members who have chosen electrical or radio engineering as their profession have already benefited by these arrangements. It is, however, to the young pre-war electrical engineers now serving their country in khaki or blue, that the report will have an immediate and personal appeal. Due to Service demands, the industry has been seriously starved of professional engineers for the past five years. These young men, had it not been for the war, would by now have established themselves in appropriate positions in industry; as it is they are at many different stages both in their technical education and in their practical training. The report suggests that their absorption or re-absorption by the industry will probably be limited more by the available facilities for further engineering education than by the immediate post-war production requirements. This will almost certainly be the case in the radio industry where a boom is fully assured.

It is suggested that the majority of ex-Service men who will require further technical education will possess qualifications which can be classified in the following seven groups: (1) Pre-war University Degree (three years or more); (2) war-time Honours or Pass Degree (two and a half years or more); (3) war-time Intermediate or Part I (one year); (4) Engineering

Cadetship Diploma; (5) Higher National Certificate or Diploma in Electrical Engineering (including six months Intensive Higher National Certificate); (6) uncompleted courses for Higher National Certificate or Diploma; (7) no engineering education.

The further education of such men may be effected by one of the following means:

- (a) Full-time courses at universities.
- (b) Full-time courses at technical colleges.
- (c) Sandwich courses at technical colleges (*i.e.* alternate periods of full-time training and full-time education).
- (d) Part-time day courses at technical colleges (one or more whole days per week).

It is recognised that many men will have been drafted to the Forces immediately on completion, and even in the middle of their personal education schemes, consequently few will have had any contact with industry. Short-term refresher courses are therefore advocated.

Standard courses of 8, 16 and 24 months would probably be required, and the shorter of these courses would be sufficient for men who have had workshop and similar experience in the technical branches of the Armed Forces.

As the report points out there must be many men in the Services who have had a secondary education, but do not possess the necessary qualifications for the professional training courses. Many of these will have had practical courses in engineering subjects, as, for example, the R.A.F. trade of Radar/Wireless Mechanic. Such men might form a fruitful source of technical assistants.

It is refreshing to find the leading professional electrical engineering body in the country fully alive to the needs of the industry it represents and prepared to take every reasonable precaution to ensure that the education and training of electrical engineers is carried out along sound and practical lines.

We have little doubt that radio engineering will benefit very considerably from the experience gained by the countless thousands of young men who are to-day toiling long hours as members of H.M. Forces. We can but hope that a high proportion of them will be given an opportunity after demobilisation of still further improving their technical knowledge through one or other of the channels suggested in this far-reaching report prepared by the Institution of Electrical Engineers.

J. C.

A 45-foot FABRICATED LATTICE MAST

By PATRICK F. CUNDY, A.M.I.E.E. (G2MQ)

Introduction

THIS article describes the building of the wooden lattice mast erected at G2MQ in 1938. Particular attention is paid to the jig method of producing the necessary components, this process having been carried so far that the structure could almost be described as "pre-fabricated." Details of materials given are of those obtained in 1938, the restriction of supply, both now and in the immediate post-war period, may cause the prospective builder to make many modifications. The dimensions quoted are those of the original structure, but they can be varied over quite wide limits without change of technique or endangering success.

Materials

The list of materials may appear formidable but their total cost in 1938 was under £10. The materials for construction of the necessary jigs are not listed, whilst the rotary head appearing in some of the illustrations is not described in the present article neither is its cost included in the above-mentioned figure.

Wood

200 ft. approx. planed 2 in. \times 2 in. nominal, deal, 8 lengths of which should be reasonably knot-free and in excess of 20 ft. long; 300 ft. approx. planed 2 in. \times 1 in. nominal, deal.

Iron Work

1 gross $4\frac{1}{2}$ in. \times $\frac{1}{4}$ in. hexagon head black iron nuts and bolts; 2 dozen $3\frac{1}{2}$ in. \times $\frac{1}{4}$ in. ditto; $2\frac{1}{2}$ gross washers for above, $1\frac{1}{2}$ in. external diameter, 0.0625 in. thick; 1 dozen 3 in. \times $\frac{1}{4}$ in. eye bolts; 3 lengths $\frac{3}{8}$ in. wrought iron bar, with 3 in. diameter eye formed at one end and a large hook at the other; four $2\frac{1}{2}$ in. gas pipe caps; 400 ft. (approx. $\frac{1}{2}$ cwt.) 7×16 gauge galvanised iron fencing wire; 3 scrap 10-gallon oil drums; 3 ft. of 1 in. \times 0.1 in. rectangular section mild steel; a few odd pieces of scrap iron for concrete reinforcement; six 18 in. long turnbuckles.

Building Materials

56 lb. of cement; 1 cwt. clean sand; $\frac{1}{4}$ cubic yard pebbles.

Painting Materials.

28 lb. undercoating paint; 14 lb. finishing paint; 2 pints of turpentine; 2 pints boiled linseed oil; 4 lb. red lead.

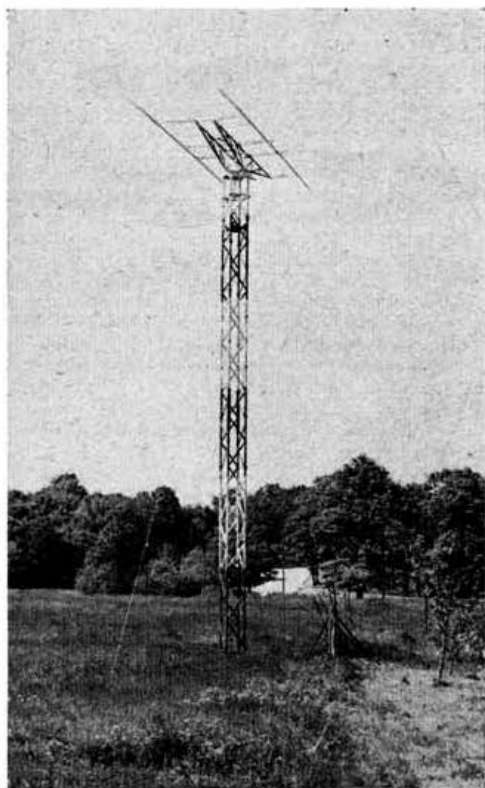
Jig Construction

The Angle Set.—This was similar in appearance and use to an ordinary carpenter's set square, but the included angle was 140° instead of the usual 90° . An adjustable tool of this type is often found among carpenter's kits (as one was available it was set at 140° and locked into position). Alternatively a sufficiently serviceable angle set could have been made from a piece of hard wood with a blade of mild steel or even aluminium sheet. Fig. 1a shows a suggested method of construction.

Drilling Jig for Vertical Members.—This was built from a 3 ft. 6 in. length of the nominal 2 in. \times 2 in. deal, two guide plates from odd pieces of ply wood sheet and a 2 in. length of thick-walled brass tube of $\frac{1}{4}$ in. bore. The position of the two holes was then marked off on the 2 in. \times 2 in. on the same face and 3 ft. $2\frac{1}{2}$ in. apart. One of these was drilled $\frac{1}{4}$ in. diameter to take a 3 in. bolt and the other of such a size that it would grip the brass tube firmly. Care was taken to ensure that these holes were perpendicular to the face upon which the original markings were

made. The guide pieces were then screwed in place at either side of the brass tube. The completed jig appeared as shown in Fig. 1b.

Jig for Manufacture of Cross-bracing Struts.—As about 80 of these struts were required it was considered that any time and care taken over the manufacture of this jig would be well repaid in easing the work and tedium of the subsequent operations. The materials used for the jig were as follows: One piece of nominal 2 in. \times 2 in., 3 ft. 3 in. long and one piece 2 ft. 8 in. long, two pieces of 2 in. \times 4 in. timber each about 7 in. long and two $\frac{3}{4}$ in. boards 6 in. wide and 3 ft. 3 in. long, and two further pieces of thick-walled brass tube each 2 in. long. The angle set was used to mark and cut off the 4 in. \times 2 in. pieces so that the smaller dimension was 4 in. approximately. One of these was screwed flush with the end of the longer piece of 2 in. \times 2 in. with the sloping face inward. Both boards were then fixed to form a hollow trough with one end open. The angle set was used again to mark off and cut a slot a distance of 2 ft. 4 in. from the 2 in. \times 4 in. block (measured along the jig) and 4 in. deep. The saw was used carefully and kept accurately vertical. The jig then appeared as shown in Fig. 1c. One end of the other piece of 2 in. \times 2 in. was then cut to the angle set and dropped into the trough, the sloping face fitted snugly against the sloping face of the 4 in. \times 2 in. and by putting the saw into the slot already made the other end was cut off at the same angle.



The mast in 1939 with a 14 Mc/s. array in place.

The jig at this stage was ready for the cutting of the cross bracing struts, three lengths of the 2 in. \times 1 in. were marked off near one end with the angle set and cut. They were then fed simultaneously into the jig and cut through together by running the saw down the slot provided. Care was taken to let the saw run freely and cut through under its own weight. A sharp saw will cut just as quickly this way, lessening fatigue, and what is more important for this job it will have less tendency to work its way out of true and so wear the guiding slots. This operation was greatly expedited by screwing the whole jig on the bench and by having an assistant available to feed the 2 in. \times 1 in. timber into the jig and support the free end during cutting. When the required number of pieces had been cut the piece of 2 in. \times 2 in. with the two angle cuts was replaced in the jig and the other 2 in. \times 4 in. piece inserted and butted up against it, the latter was then fixed in place by means of wood-screws passing horizontally through the

boards. The piece of 2 in. \times 2 in. was taken out again and prepared for use as a drilling jig; it was marked out, drilled, and had the two brass tubes fitted as indicated in Fig. 1d. An expanded view of the whole apparatus at this stage is shown in Fig. 1e.

Pre-fabrication

The Vertical Members.—From the long lengths of 2 in. \times 2 in., two sets, each of four, were selected as long as possible. Any timber cut off at this stage would have been wasted, so it was worth while juggling with the wood available to reduce this cutting to a minimum. In the original mast four lengths each 20 ft. 9 in. and four lengths each 22 ft. were obtained. Eight lengths of 2 in. \times 1 in. each 2 ft. long were used to join the 2 in. \times 2 in. together; these were cut at a slight angle and all edges except the inner ones bevelled off to ensure good draining of rain-water. Each pair of 2 in. \times 2 in. lengths and a pair of the 2 in. \times 1 in. pieces were drilled, fitted,

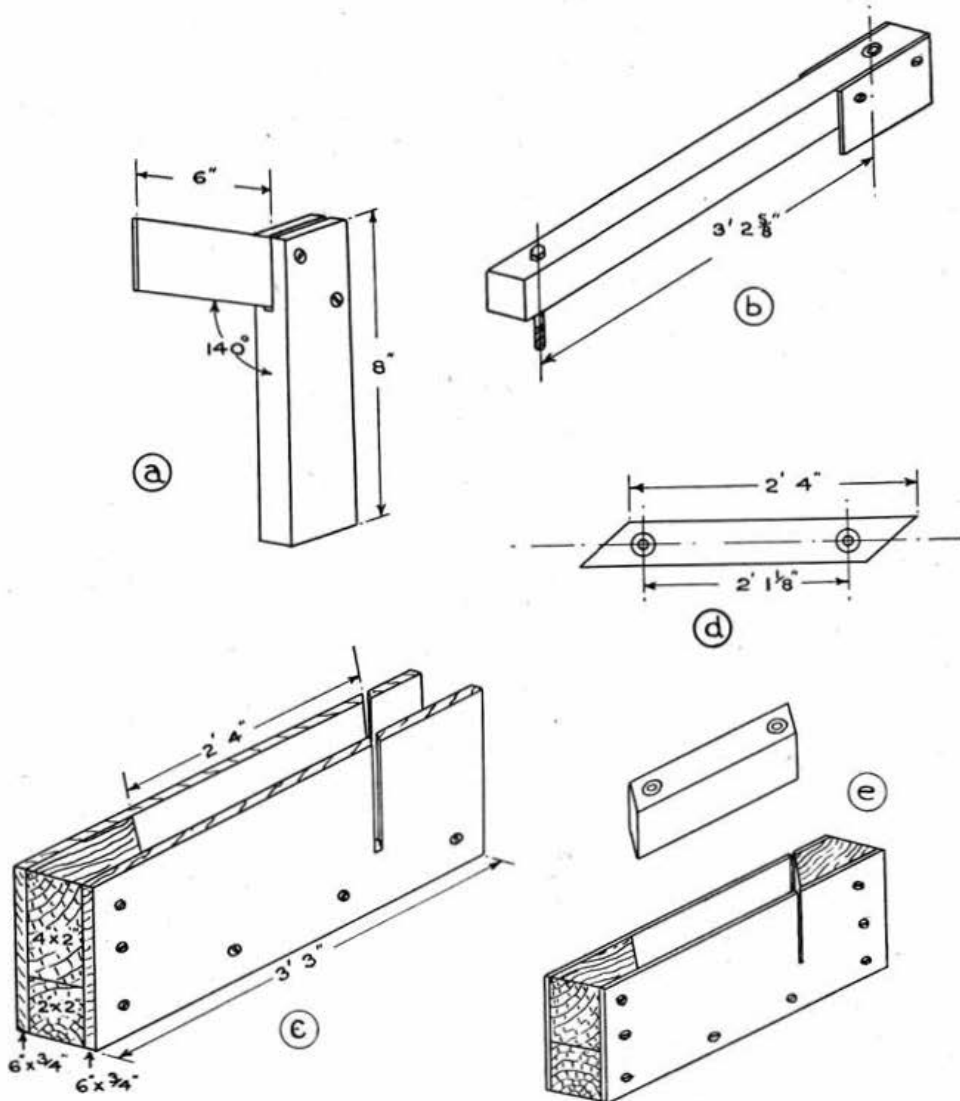


Fig. 1.
Jig Details.

(a) The angle set. (b) Vertical member drilling jig. (c) Strut cutting jig. (d) Guide for drilling struts. (e) Complete drilling jig for struts.

and marked ; this drilling operation was not performed with the aid of a jig and the parts therefore might not have been interchangeable. All these parts were then dismantled again and given two coats of undercoat paint, the first of which was made very thin by liberal addition of equal parts of turpentine and linseed oil. The cut ends were allowed to stand in the paint pot for five minutes at each painting to provide an effective seal against the ingress of moisture. When the undercoats were properly dry the sections were re-assembled and bolted finally together.

During the assembly operation all butting surfaces and bolt holes were given a liberal application of "jointing compound" so that when finally tightened

were also needed. The position of the first of these was marked out by measurement and the others drilled from it with the jig. It is clear that the end hole could not have been more than about 1 ft. 7 in. from the end of the wood, because if it were there would have been room for another hole at right angles to it. The measurement between the last hole and the end of the wood was not the same at each end due to the unequal length of the original timber and the ends with the shorter distance were placed so as to become the bottom of the mast. A sketch of one complete vertical member is shown in Fig. 2a; the position of some of the holes and the leading dimensions are also indicated.

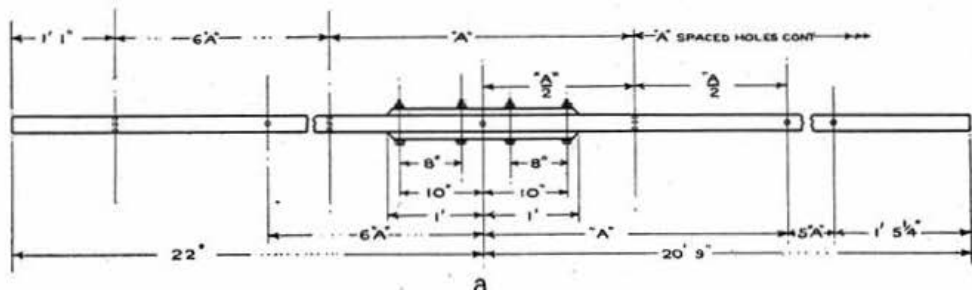


Fig. 2.
Component Details.
(a) A complete vertical member. Dimension "A" is 3 ft. 2½ in.

the compound squelched out of the edges and out of the bolt holes. The jointing compound was made by adding red lead to the undercoating until it was of the consistency of treacle. The above preservation processes were applied during final assembly to all joints and all wooden parts were treated with two undercoats. Its success is best illustrated by the fact that when the mast was lowered and dismantled for storage, following the loss of QRA in 1943, all the bolts came out as clean as new and the jointing compound had stuck the sections together so well that quite a lot of persuasion had to be used to separate them.

The next operation was drilling. To start with a $\frac{1}{2}$ in. hole was drilled exactly on the joint and at right angles to the jointing bolts. The bolt in the vertical member drilling jig was inserted in this hole, the other end of the jig being centralised over the member by its two guide plates, and the brass tube used as a drill guide for drilling the next hole. Thus, accurately spaced holes were produced along the whole length of the member. A second set of holes at right angles to the first and midway between them

Cross-bracing Struts.—The struts were drilled two at a time, both ends of each being drilled at one loading of the jig. It was found most convenient to fix the drilling jig to a carpenter's trestle. With two struts in the jig the drill guide was just proud of the trough and the whole was held firmly by placing one knee on the drill guiding block while the brace and bit was being used. After drilling, each strut was individually treated with a plane to smooth-off the cut ends and to bevel off all edges except one. Fig. 2b is a sketch of a finished end; all struts were the same and there was no need of alternate left-hand and right-hand bevelling. The struts were then given their two undercoatings of paint.

Final Assembly

Two vertical members were fixed together by means of the cross-bracing struts to form a kind of ladder with sloping rungs. The process was repeated with the other two vertical members, and finally the two ladder-like sub-assemblies were fixed together with further struts to form a rectangular cage. Sketch 3a shows the construction at the joint in the vertical members, the same method persists throughout, but without the complication of the joints. For the sake of clarity, bolts and bolt-holes are not shown in this sketch.

Four square girdles were then fitted, one at the base, two near the top (for anchoring guy wires) and one right at the top. A sketch of one of these girdles is shown in Fig. 3b, while Fig. 3c gives the exact dimensions adopted for the three guy-wire supporting system. The anchoring girdles and the base girde were identical, the top girde being of the same type but using 2 in. \times 1 in. timber instead of 2 in. \times 2 in. The base girde was arranged to leave about 3 in. of the vertical members projecting beneath, and on to these projecting ends the 2½ in. gas caps were fitted, the threads just biting into the corner of the wood and holding themselves on. The purpose of these caps was to prevent the wood splitting under compression and by filling them with tar after

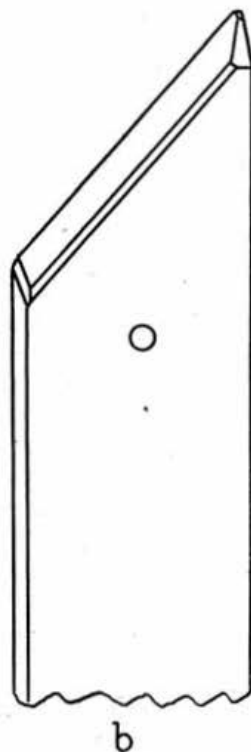


Fig. 2.
Component details.
(b)
End of a strut, showing bevelling.

erection the lower ends are perpetually immersed in a bath of preservative. It will be clear from an examination of sketch 3a that the cross-bracing struts occupy positions alternately inside and outside the square section of the mast. The guy-anchoring girdles could therefore be fitted only to a section where the struts occupy the outside position. They were both fitted in the uppermost of such sections and as far apart as possible, a spacing of about 1 ft. 2 in. was achieved. The finishing coat of paint was given after finally fitting all these items.

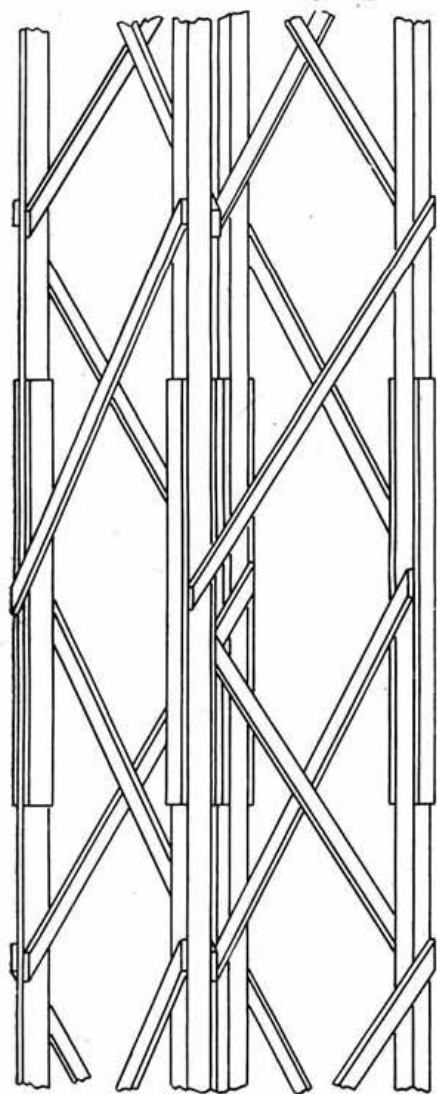
Ancillary Items

The Base.—A shallow rectangular hole was dug in the ground 3 ft. square, 3 in. deep. Four 6 in. wide boards were then placed edge-on in this depression and a rough concrete slab cast in the mould so provided. Care was taken to leave a very rough surface in

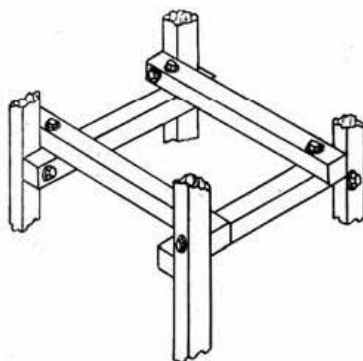
the centre to key on the next layer which was cast in a mould of the dimensions given in Fig. 4a, standing on top of the slab already cast. After the lapse of sufficient time, to allow for setting, the mould was removed; the completed base then appeared as indicated in Fig. 4b. It should be noted that a base of this type provides positive location for the mast during erection and when erected, and also keeps the whole lower portion out of the moisture present at ground level.

The Anchors.—A rectangular hole was cut in the side of each of the old oil drums, the hooked end of the three 8 in. wrought iron bars were passed into these holes, a few odd lengths of scrap iron were then laid in the hooks to increase the keying effect, and the drums filled with rough concrete. These drums were afterwards buried so that about 6 in. of the rods projected above ground-level and in line with the estimated position of the guy wires. A complete buried anchor, before replacing the soil, is shown in sketch 4c, the position of the internal ironwork being indicated by dotted lines. The anchors were buried 35 ft. away from the base and 120° apart.

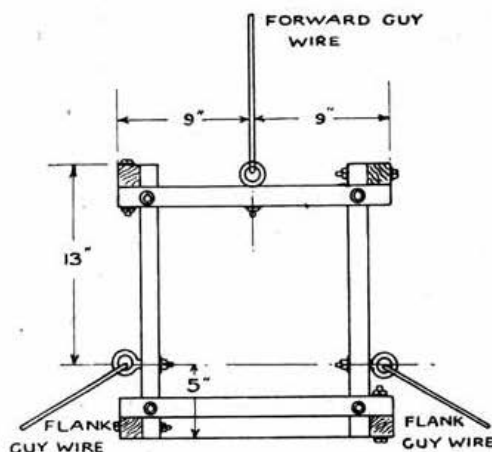
Guy Wires.—Two sets, each of three, were used so that each set could be replaced alternately as corrosion



(a)



(b)



(c)

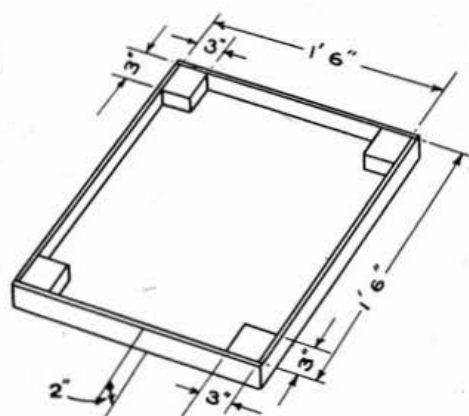
Fig. 3.
Assembly Details.
(a) A section of completed mast. (b) A girdle. (c) A girdle with details of guy wire fixing.

deemed necessary. Each guy wire was approximately 55 ft. long and broken up into 10 ft. lengths with egg insulators. Turnbuckles were used to obtain fine adjustment of length and tension. Two turnbuckles had thus to be fixed to each anchor, an operation accomplished by the use of clips made from 1 in. \times 0.1 in. mild steel strip as shown in Fig. 4d.

Erection

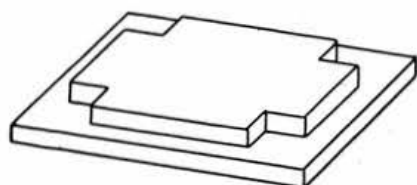
A small crab-winch complete with 200 ft. of $\frac{3}{8}$ in. wire rope, and a strong 20 ft. ladder were hired from a local builder and six people were available for the necessary auxiliary duties. The winch was firmly anchored to the ground, dead in line with the forward anchor (the definitions used here of forward and flank are the same as used for the guy wire designation in Fig. 3c), and 100 ft. away from the base. A convenient tree was pressed into service, the winch was lashed to it, due note of its existence having been taken when excavating the site for the concrete base. The mast was moved into position on the opposite side

with sash cords to the mast anchors. The wire rope was passed from the winch over the top rung of the ladder and lashed to the top of the mast. The available forces were then deployed as follows: One man on the winch, one at the base to ensure it showed no tendency to jump out of its location notches, one at each flank anchor to take up the slack in the flank guy wires which would exist until the mast was upright, and two to lift the top end of the mast to assist the winch with the initial lift. The latter two joined the two at the flank anchors to reinforce their efforts as soon as the mast was raised out of their reach. A simple signal system was agreed beforehand so that the man on the winch could indicate the necessity for an extra pull on one or the other of the flank wires if any tendency for the mast to swing out of line was observed. As soon as the mast was more or less vertical the lengths of the flank guy wires were adjusted to hold it exactly vertical against the pull of the sag in the wire rope, the forward guy wire was then made off to the forward anchor and the mast climbed to release

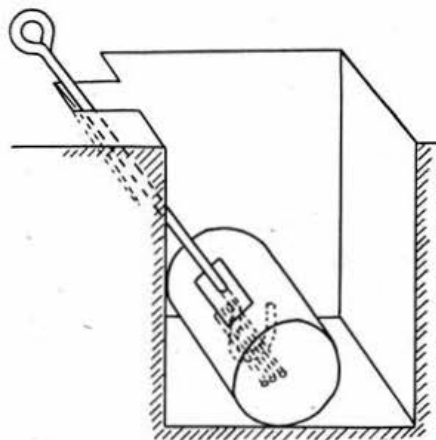


(a)

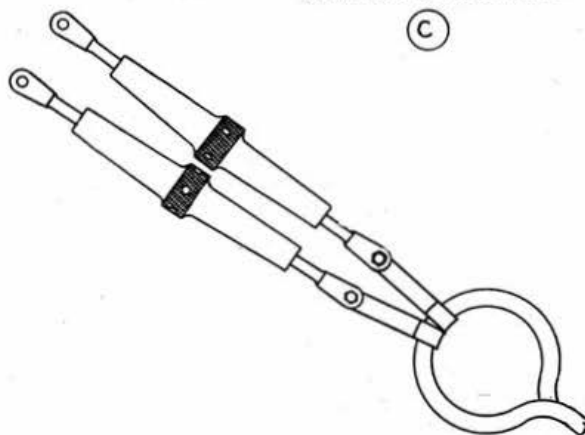
of the base and two of its feet (protected by the gas caps) placed in the locating notches provided in the base. One set of guy wires were fitted at the mast end and the two flank guy wires connected temporarily to the flank anchors with a free length exceeding the calculated final length by 6 in. The ladder was then raised to a vertical position, standing on the ground just in front of the base and on the same side of it as the winch. The ladder was held upright by guying it



(b)



(c)



(d)

Fig. 4.
Ancillary Items.

(a) The upper portion of the base mould. (b) The complete base. (c) A completed anchor. (d) The method of fixing two turnbuckles to an anchor ring.

the wire rope. The ladder was lowered and the other set of guy wires installed more or less at leisure.

Maintenance

Guy wires were periodically examined and replaced when necessary. It appeared that a life of about two years could be expected so that one set was replaced each year. Repainting of all woodwork was undertaken every two years and Fig. 5 shows the start of this process in 1940. At more frequent intervals grass and weeds were cleaned from the base and the anchors and the anchor rods were bared to a distance of 1 ft. below the surface of the soil and coated with tar. The gas caps were topped up with tar at the same time.

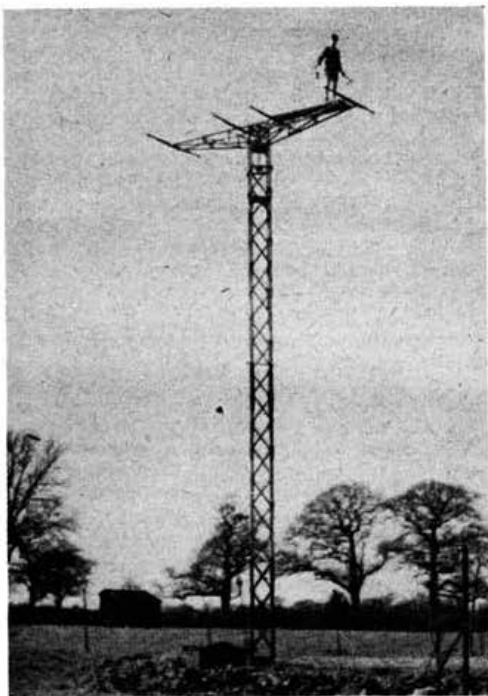


Fig. 5.
Commencing to repaint the mast.

Conclusion

The author would remind those who might be intimidated by the magnitude of the task, that a first-class aerial produces a greater gain in signal strength than could be achieved by the same expenditure on the transmitter and is less likely to violate the terms of the station licence. Anyone undertaking this work is advised to keep the jigs, you never know when another mast will be wanted!

I.E.E. Radio Section

Meetings of the Radio Section will be held at the I.E.E., Savoy Place, Victoria Embankment, London, W.C., on the following dates:—

- Feb. 20 Discussion on "Aspects of Post-War Valve Standardisation." (A. H. Cooper, B.Sc.)
- " 28 "Multipath Interference in Television Transmission." (D. I. Lawson, M.Sc.)
- Mar. 7 "Frequency Modulation." (K. R. Sturley, Ph.D., B.Sc.)
- " 13 Discussion on "Colour Television." (L. C. Jesty, B.Sc.)
- " 20 Discussion on "Apprenticeship and Trainee Systems in the Radio Industry." (J. Greig, M.Sc., Ph.D.)

All meetings commence at 5.30 p.m. Tea at 5 p.m. Society members are cordially invited to attend.

Valves and Valves

Armt. Q.M.S. H. J. L. Monk, **BRS8295**, serving at No. 1 Base Workshops, R.E.M.E., P.A.I. Force, sends a cutting from the *West Herts and Watford Observer* dated November 17, 1944, which emphasises the confusion sometimes caused by the use of the word "valve" for purposes other than radio.

Among the classified advertisements published that day under the heading "Musical-Radio-Service," there appeared the following:—

"All types of valves re-ground, also seats reground, on own premises, all modern equipment."

Can You Help?

Mr. G. May, Jr., **BRS3319**, seeks the loan of a copy of the *Radio Noise-Reduction Handbook* published by the Editors of *Radio*. His address is The Chimes, Chingford Avenue, Farnborough, Hants.

F./O. W. Stockburn, **BRS6849**, 40 Netherburn Road, Sunderland, would appreciate the offer (loan or sale) of a set of five-pin coils for use in an Eddystone two-valve receiver (1935 amateur-bands model) which he has loaned to the Sunderland Wing of the A.T.C.

Mr. J. R. Stewart, **BRS8547**, 180 Reede Road, Dagenham, Essex, seeks information of existing publications on Metallurgical Chemistry.

More News from Belgium

Mr. Arthur Milne, **G2MI**, has received news from Mr. Arthur de Smet, **ON4CC**, of Antwerp, who is safe and well with his family at his pre-war address, 25 Beuken Laan, Schilde. He was taken prisoner in May, 1940, but escaped, and with the aid of "unofficial" papers succeeded in remaining at home and avoiding forced labour in Germany. He hints at a great story of the assistance rendered to the underground movement by Réseau Belge under the direction of **ON4AA** who is now attached to the Canadian Army. Mr. R. Kerse, **ON4GW**, past president of Réseau Belge who will be remembered by the many British amateurs who travelled to Belgium in 1935, died after a long illness in 1943. **ON4CC** would like to hear from old friends and makes particular reference to **G8NY**. He also mentions that **ON4AW** has had a visit from **G5UK**.

£50 a month is needed to ensure that every Member, who is a Prisoner of War in Germany, receives a useful Parcel from the Society

Price Control

F./O. R. A. Loveland, **2ARU**, calls attention to the following advertisement which appeared in the January issue of a contemporary:—

"Hallicrafter SX23, perfect £60.—BRS....."

As the pre-war cost of this receiver was, we understand, about £33, it would appear that some effort should be made by the Board of Trade to control the price of second-hand radio equipment offered for sale by private individuals.

Side Slip

Sq./Ldr. T. J. Norton, **G4KZ**, draws attention to a mistake in Fig. 1 used to illustrate his article "A fully automatic hand-operated keying circuit" published in the January issue. There should have been no reference to "3000v" against the L.F. transformer, as any transformer will fulfil the purpose, provided it has sufficient inductance and will carry the current taken by the relays.

OUR FRONT COVER

NOTHING much of real experimental worth in radio can be accomplished without accurate measurement. The Model 7 Universal AvoMeter is a 50-range B.S. first-grade combination measuring instrument giving direct readings of A.C. and D.C. Voltage, A.C. and D.C. current, Resistance and Capacity. Audio-frequency power output and Power Level readings also provided for. It is but one of the comprehensive range of "AVO" high-grade electrical measuring instruments—a range which includes something to meet the needs of every amateur, service engineer and serious experimenter. At the present time, however, the manufacturers are only able to accept orders which bear a Government Contract Number and Priority Rating. Fuller particulars obtainable from The Automatic Coil Winder & Electrical Equipment Co., Ltd., Winder House, Douglas Street, S.W.1.

THE PROPAGATION OF RADIO WAVES

By B. H. BRIGGS (2FJD)*

PART II

Ionization, Recombination and Attachment. Production of the Ionized Layers. Regular Variations of the Layers. Sporadic-E Ionization.

IN the previous Part the general conditions in the Earth's atmosphere, and the nature of the radiation reaching the Earth from the sun were studied. It was also shown how this radiation varied during the sunspot cycle. It is now proposed to consider in greater detail the production of the ionized layers in the upper atmosphere by the sun's ultra-violet light.

Ionization, Recombination and Attachment

The atoms of the gases forming the atmosphere have an electrical structure in which negatively charged electrons rotate around the heavier positively charged nucleus. Normally, the negative and positive charges compensate each other, so that the atom, as a whole, is electrically uncharged, or neutral. When electromagnetic radiation, such as ultra-violet light, passes through the gas, the electrical structure of the atoms is set into oscillation, and for certain frequencies a resonance effect may cause one or more electrons to be ejected. The atom is then said to be *ionized*. A gas molecule which consists of two or more atoms linked together may also be ionized in a similar way.

In the ionization process a certain amount of radiation is absorbed and its energy converted into energy of motion of the particles; thus the radiation becomes weaker as it passes through the gas and will eventually be completely absorbed. Since the ejected electron is negatively charged, the remaining molecule will be left with a net positive charge. An ionized gas is thus one in which a certain proportion of the molecules have been split-up into positive and negative charged particles or *ions*. The positive ions, being charged molecules, will be many thousand times heavier than the negative ions, which are electrons. The positive ions are too heavy to be appreciably affected by radio waves, and it is the electrons in which we are mainly interested.

Since the absorption of radiation with ionization of the gas molecules depends upon a resonance effect, we shall expect that it will depend greatly upon the wavelength of the radiation. Thus the different kinds of molecule present absorb different bands of wavelengths of the ultra-violet light.

When positive and negative ions collide, there is a possibility of *recombination* occurring, a neutral molecule being produced. This recombination process, therefore, is always tending to reduce the ionization, and to remove it when the ionizing radiation ceases to act. The rate of recombination is proportional to the number of collisions occurring per second. Thus, for example, recombination is much more rapid low down in the atmosphere than high up, for the collision frequency decreases as we go upwards.

There is another process going on which can reduce the effect of the ionization as far as radio waves are concerned. The light negative electrons may be captured at a collision by a neutral molecule, so that a *heavy negative ion* is formed. This is ineffective, as in the case of the heavy positive ions, so that the process is equivalent to a reduction of the ionization. This process is known as *attachment*. The rate of attachment is also proportional to the collision frequency.

The important quantity determining the effect of the ionized gas on radio waves, is the number of free electrons per cubic centimetre, which is denoted by N . The collision frequency at the region in question is also important. In the case of the E layer the heavy ions may play a small part as well as the electrons; in this case N is taken to mean the number of free electrons which would produce the same effect as the mixture of heavy ions and electrons which is actually present.

Production of the Ionized Layers

An attempt will now be made to explain why the main ionization in the atmosphere will be expected to occur in several layers. To simplify the problem in the first instance, suppose that the atmosphere consists of one gas only, instead of the mixture of gases which is actually present, and that the radiation from the sun is coming vertically downwards. Very high up, the atmosphere is so thin that absorption of the radiation is very small, and little ionization is produced. As the radiation passes downwards the

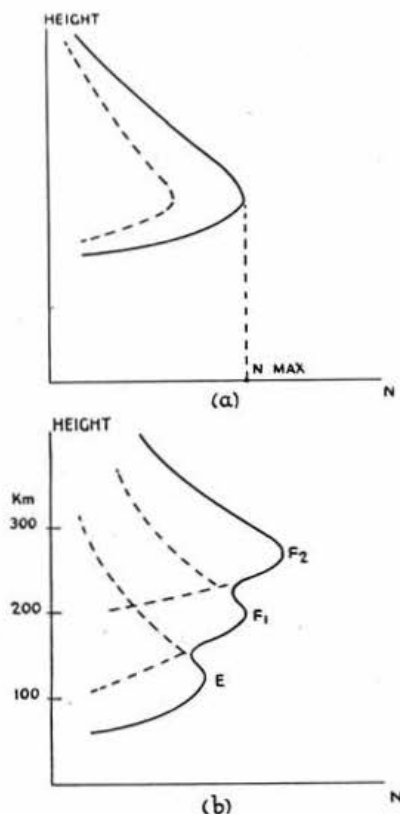


Fig. 6.

Distribution of ionization with height: (a) Hypothetical single layer; (b) superposition of three layers.

* 20, Lindley Drive, Gt. Horton, Bradford, Yorks.

ionization increases, due to the greater density, and at the same time the radiation gets weaker as it is gradually absorbed. Eventually, the radiation falls off more rapidly than the gas density increases, so that the ionization decreases again. Very low down the radiation will have been completely absorbed, and no further ionization will be produced. Thus, if ionization is plotted against height, a curve like that shown in Fig. 6 (a) is obtained. The main ionization is produced in a fairly well defined layer, the lower edge, in particular, being reasonably sharp.

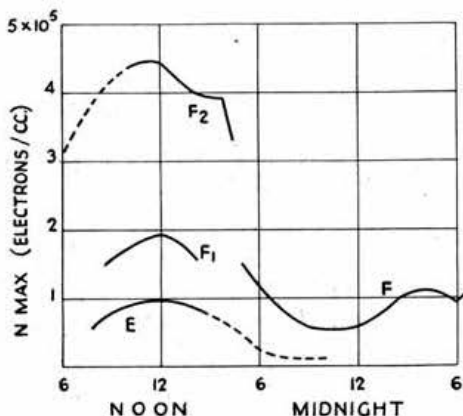


Fig. 7.

Average electron density of the layers at Washington D.C. during December, 1933.

If now it is remembered that the atmosphere actually consists of a mixture of different kinds of molecules, absorbing different bands of the ultra-violet radiation, with different powers of absorption, it is not surprising that in practice several distinct layers are produced. The identification of the molecules responsible for each layer is not so certain, but the E layer is believed to be due to oxygen, and the F layer to nitrogen. The cause of the splitting of the F layer into two parts F_1 and F_2 is not known. However, if three curves of the type shown in Fig. 6 (a), with maxima at different heights, are superimposed, Fig. 6 (b) is obtained, which agrees very well with the type of distribution of ionization with height which is found to occur in practice. Thus the three layers

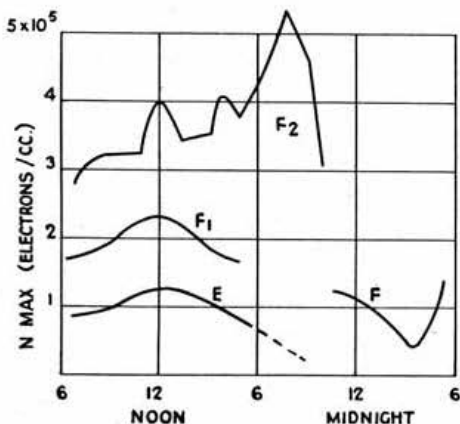


Fig. 8.

Average electron density of the layers at Washington D.C. during June, 1933.

should not be thought of as distinct, separated layers, but rather as three peaks or maxima in the ionization density.

Returning now to the case of a single layer, suppose that the intensity of the downcoming radiation is reduced. The ionization is reduced proportionally at all heights, so that a curve like the one shown dotted in Fig. 6 (a) is produced. Note that the height at which maximum ionization occurs is not altered. Suppose, again, that instead of coming vertically downwards the radiation falls obliquely. To reach a given height, it has now to pass through a greater thickness of air, so that the ionization all tends to be produced higher up and the maximum ionization occurs at a higher level. Thus, when the radiation becomes oblique instead of vertical, the layer rises.

Regular Variations of the Ionized Layers

The variations which occur in the layers, due to changes in the position of the sun, and to the sunspot cycle, can now be dealt with. The quantities with which we shall deal are the heights of the layers, and the maximum intensity of ionization in each layer (i.e. the maximum value of N , which is denoted by N_{max}). The heights are actually "virtual heights," but they give a fair measure of the true height. The meaning of virtual height, and the way in which it is measured, will be explained in Part III.

The practical results can all be explained on the basis of the theory outlined above, except in the case of the F_2 layer. This layer is, in many ways, something of a mystery, and is not completely understood.

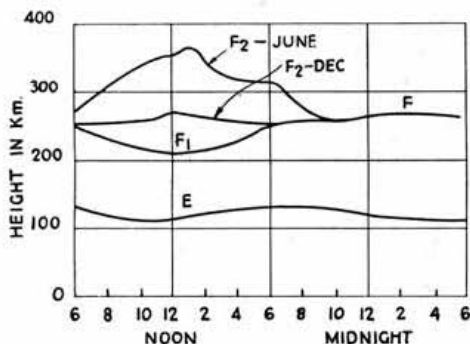


Fig. 9.

Average heights of the layers at Washington D.C. during 1933-34. (Figs. 7, 8 and 9 taken from *Radio Engineering* by F. E. Terman.)

(a) Daily Variations

At any place, the sun is most nearly overhead at noon, local time. At noon, therefore, the ionization can be expected to be at its maximum, and the layers to be at their lowest levels. When the sun's rays are more oblique, as at dawn or dusk, the layers will be formed higher up, and will not be so heavily ionized. At night, the sun's radiation is removed completely, and the ionization begins to disappear, the recombination being most rapid low down. Fig. 7 shows the observed variations of N_{max} with time of day during December, 1933. The general variations are as anticipated. The E layer disappears completely at night, owing to the rapid recombination at this level. The F_1 and F_2 layers, which are separate during the day, combine to form the single F layer at night. (The breaks in the curves are due to limitations in measuring methods). Fig. 8 shows the same features for June, 1933. Here, the F_2 layer is playing some of its tricks, for its maximum ionization does not occur at noon, but at about 7 p.m. It is believed that the radiation at noon in summer is so intense that there

is great heating in the F_2 region, temperatures as high as $1,000^\circ\text{C}$. being reached, so that the F_2 layer becomes greatly expanded at this time, and its ionization density is reduced. It may be also that some agent other than the sun's ultra-violet light is capable of affecting this layer. Fig. 9 shows the heights of the various layers, averaged over the year 1933-34. Here again E and F behave as expected, but in summer F_2 has its maximum height at noon instead of during the night.

(b) Seasonal Variations

The sun comes more nearly overhead in summer than in winter. The layers are, therefore, more heavily ionized in summer, and formed lower down. The greater ionization in summer is seen by comparing Fig. 8 with Fig. 7. The heights also behave as expected, but only the abnormal behaviour of F_2 is shown in Fig. 9.

(c) Sunspot Cycle

The sun's output of ultra-violet light varies with the sunspot cycle. Since the change is one of magnitude only, the heights of the layers will not change during the sunspot cycle, but the degree of ionization will be greater everywhere at sunspot maximum than at sunspot minimum. Figs. 7, 8 and 9 are for 1933, which was a sunspot minimum year. Fig. 9 will apply unchanged for any year of the cycle,

but the ionization densities shown in Figs. 7 and 8 will be 50 per cent. or 100 per cent. greater at sunspot maximum.

(d) Lunar Variations

The moon does not affect the ionosphere directly, but it does cause a tide in the atmosphere, which carries the ionized layers with it. In the region of the E layer this tide has an amplitude of about a mile, so that the height of the E layer changes by this amount as the moon rotates round the Earth. Since the only effect of the moon is to cause this rather small change in height, there being no change in the ionization density, the effect on radio transmission is presumably very slight.

Sporadic-E Ionization

Below, or in, the E layer there are sometimes irregular patches, or "clouds" of heavy ionization. The cause is not known, but the abnormal ionization has important practical effects. *Sporadic-E* is more frequent in summer than in winter, and may occur at any time of the day or night. It rarely lasts for more than a few hours.

Reference

Chapman. "The Sun and the Ionosphere." *Journal I.E.E.*, Nov., 1941.

(To be continued)

KHAKI and BLUE

Hams Meet at Sea

In the course of a long letter written from 129 S.P., A.P.O. 8000, F./Lt. W. C. Henshaw, **BR54159**, gives details of two highly successful "ham" meetings held at sea last month. A call on the ship's loud speaker system brought together G6CU, 2FVB, 2HCW, **BR54289**, 5394, 5611, 6226, 6932, 7420 and some 40 other W.O.M.s., W.E.M.s. and Radar Mechs. interested in amateur radio. At 2.30 p.m. on a tropical afternoon and in the shade of a lifeboat, the "gang" squatted—eastern fashion—to hear F./Lt. Henshaw give an account of what the R.S.G.B. stands for. He appealed for more members and stressed the importance of a united front and the need for a strong "get-together" spirit. Reference was made to the efforts being made by the Society to ensure an early return of licences and to the need for more "frequency space." Support was given to the suggestion made recently by Sq./Ldr. J. N. Walker, G5JU, that the Society should establish a frequency standard service similar to that of WWV. Later Cpl. Evans, G6CU, described how he obtained his full licence, giving valuable advice to the tyros. A goodly number of non-members present expressed a desire to join the Society, and arrangements were made to send their names and addresses to H.Q.

Three days later F./Lt. Henshaw read a paper on "Modern Superhet Technique" in which he touched on the history of superhet developments, I.F. deciding factors, effect of A.V.C., crystal filters, anti-static arrangements, communication superhets, servicing problems, trinning, band-pass adjustment with "wobulator" and "scope, sensitivity standards, etc. An interesting discussion followed, during which it became clear that many of those present were not fully acquainted with the principles of super-regeneration technique and its Service applications. F./Lt. Henshaw is of the opinion that an article on super-regeneration and quenching would make a valuable contribution to a future issue of THE BULLETIN.

To all those who attended these R.S.G.B. meetings at sea, we at Headquarters, send greetings and an especial word of thanks to F./Lt. Henshaw for his initiative in arranging them.

● W/O. R. E. Friend, **G4NV**, who is with No. 5 A.T.S.U., B.L.A., sends greetings to all old friends, and recalls that he was on duty throughout the Blitz in the dug-out in a London park, referred to by Sq./Ldr. Ballingall in a recent issue. The experience he has gained with his present "outfit" should stand him in good stead for post-war field days with District 12.

● Sigm. P. Gammon, **G3VB**, reports that a second meeting of radio amateurs was held in Gibraltar on January 8, when an attendance of 17 was registered. Three South Africans, Messrs. Nlkerk, Z51CK, Beaton, KA333 and Stewart were present for the first time as were G6HL, 2HFO and 2FDK. It is hoped that members serving on The Rock will contact G3VB via the Y.M.C.A., Alameda.

Congrats

● To the following members who have recently been honoured by H.M. The King:—

Sgt. R. Tidmarsh, R.A.F., **BR57613** B.E.M.
F./Lt. L. C. F. Turner, R.A.F., Mentioned in Despatches. **BR53823**
F./Lt. W. Davies, R.A.F., **BR57533**, Mentioned in Despatches.
Mr. L. Woodhams, G8RL ... B.E.M.

Also to:

W./C. W. E. Dunn, R.A.F., G2LR O.B.E.
W./C. I. Orr Ewing, R.A.F., G50G O.B.E.
W./C. A. J. E. Forsyth, R.A.F., G6FO Mentioned in Despatches.

● To Radio Officer S. J. D. Taylor, **BR5296**, of Glasgow, who was married to Miss M. A. Wood, of London and Toronto, Canada, on December 29, 1944.

● To Corp. Peter Modridge, **G6PM**, whose wife presented him with a daughter—Christine—on January 23, 1945.

● To Sq./Ldr. Sam Pollard, R.A.F.V.R., **G2GB**, of Shortlands, Kent, who was married on January 22, 1945, to Miss E. L. Forster, P.M.R.A.F.N.S.R. The marriage took place at the British Consulate, Algiers, and was later solemnised at the English Church in that city by the Rev. K. Ensor. The bride is a sister in the Princess Mary R.A.F. Nursing Service.

● To Mr. and Mrs. W. Barthope, **BR5872**, of Kingstanding, Birmingham, on the birth of a son, William George, on December 27, 1944.

● To Mr. T. L. Stevens, **G3XV**, of Wellington, Shropshire, whose wife presented him with a son and heir on Christmas morning.

● To Mr. Sydney Howard, **G8TY**, and his wife on the safe arrival of a daughter on February 6th, 1945.



Lt.-Col. Nepean (G5DN ex-AC4YN), W./Cmdr. Trinder, G4MT, Capt. Appleby, G8ZD, Major Ken Ellis (G5KW-SU5KW) and SUIMS at the Cairo Conventionette, November 24, 1944.

Letters to the Editor

Post-War Licences

DEAR SIR,—I should like to take this opportunity of adding a few comments to the interesting correspondence which has recently appeared.

Personally I shall be well satisfied if we have returned to our pre-war facilities, plus a few additions and a "Good Neighbourly" spirit. Cross-band working should be permitted if "break-in" or "push-to-talk" is used. Maximum period for any one transmission should not exceed five minutes, instead of ten. Spot frequency working should be strongly advocated by the R.S.G.B. Limited handling of messages should be allowed within the British Empire. Messages should be restricted to Society members when the person to whom the message is addressed is not a transmitting amateur. In other words information gathered by BRS could then be forwarded in message form, thus giving message-handling experience to the operator in passing useful information.

With regard to the proposal to ban the sale of commercial equipment, I would much rather hear a decently operated commercial transmitter than a badly built transmitter which ought to be working into an artificial aerial. After all, as one of your correspondents pointed out, Amateur Radio is a hobby and not just a pass-time for scientific big-wigs.

Yours sincerely,
DENNIS HANN (G3UY).

DEAR SIR,—I have read with great interest the recent correspondence on the post-war licensing question, and in my own view, based on some eight years pre-war transmitting experiences, I consider any dissatisfaction with the regulations as they stood in 1939 is due to the fact that amateurs can be divided into two distinct types, namely, the amateur operator and the amateur experimenter. The requirements of these two types are not the same, and I maintain that no useful purpose is served by an attempt to ignore their existence either by the G.P.O. or among ourselves.

Dealing with the amateur operator first, his requirements are good "clear" frequency bands, and these will only be obtained through limitation of the number of licences and the intelligent and unselfish operation of efficient modern apparatus. High power in itself serves little purpose other than to cause severe local interference, but adequate power is necessary to enable modern technical achievements to be utilised. My suggestions for regulations covering amateur operator licences are as follows:

(a) Radiating licences should not be issued to persons under the age of 21 years.

(b) Permission should be granted for the use of all amateur bands up to 56 Mc/s. (including 3.5 Mc/s.) without special application.

(c) A Morse test at 15 words per minute should be passed before licensing.

(d) Power should be limited to 25 watts on licensing, increased automatically to 50 watts after 12 months operation. Power up to

100 watts should be granted on application to those who can prove to the G.P.O. that they are engaged on radiation experiments of a serious nature.

(e) Telephony should be allowed on all bands as hitherto, but local contacts (inter-G) should not be permitted on the 14 or 28 Mc/s. bands.

If the above regulations were enforced by the G.P.O. there would be an immediate increase in the efficiency of operators and a considerable lessening in QRM.

The new licensee would be clear as to what apparatus he was entitled to build. He would be compelled to carry out his initial experiments with low power, but he would not be restricted in scope when he had gained his experience. Under these conditions, traffic handling if authorised by the G.P.O. could be permitted.

The requirements of the amateur experimenter are different. The type of person I have in mind are those with or without academic qualifications who wish to conduct serious experimental work, as distinct from mere operation. Such persons frequently spend little time "on the air" but when they do they usually require facilities outside the scope of the ordinary licence. To cover these requirements my suggestions are:

(a) Amateur experimenter licences should be granted only to persons over 30 years of age or to those possessing nationally recognised academic qualifications.

(b) Where no academic qualification exists the candidate should be required to pass a technical examination (probably the R.S.G.B. could co-operate with the G.P.O. to advantage here).

(c) A successful applicant should be licensed for all amateur frequencies including special H.F. bands of 112 Mc/s. and over.

(d) Unlimited power up to 1/2 kW should be allowed immediately on licensing.

The suggestions I have made would, if adopted, produce the following desirable effects:

(a) The bands would be cleared to a very large extent of irresponsible people.

(b) Every opportunity would be available for the development and use of modern efficient apparatus.

(c) The criticism against Amateur Radio, often made before the war, that there was no room for the serious experimenter, would be effectively answered.

(d) Holders of experimental licences would tend to co-operate more and more with the R.S.G.B. to the great benefit of Amateur Radio; particularly would this be the case if the suggested Headquarters Station came into being.

I have devoted much thought to this matter and I shall be interested to read the comments of others on my suggestions. It is very well worth while going into the question thoroughly, for unless we are clear in our minds as to what procedure we wish to see adopted with regard to the issue of licences after the war, we can hardly complain if the G.P.O. introduce regulations of which we cannot approve.

Yours faithfully,
RICHARD K. SHEARGOLD (G6RS).



CAIRO CONVENTIONETTE.

Group taken at the Fifth International Conventionette of R.S.G.B. and Allied Radio Societies, held in Cairo on November 24, 1944.

BRITISH ISLES NOTES AND NEWS

**CLOSING DATE FOR MARCH ISSUE
IS FEBRUARY 28th. REPORTS SHOULD
BE POSTED TO REACH D.R.'s AND
SCRIBES BY FEBRUARY 23rd.**

DISTRICT 1 (North Western)

D.R.: H. W. Stacey (G6CX), "Sandreas," Eddisbury Road, West Kirby, Cheshire. Hoylake 337.

THE D.R. wishes to thank all those members in and outside the District who supported his nomination for Council. Although unsuccessful by a very narrow margin, the number of votes recorded leaves no doubt that there is considerable support forthcoming for provincial candidates.

Liverpool.—The efforts of the D.R. to obtain better accommodation for the Liverpool meetings having been unavailing, it was impossible to announce the 1945 programme in the January issue. In common with most people, the time he can devote to amateur radio is at present very limited and increasing commitments in other directions make it necessary for him to ask for some assistance in keeping things going locally. Will any member willing to act as Town Representative, to arrange the Liverpool meetings and to prepare reports please volunteer for the office?

A letter from Mr. W. H. Hodgson (G3BW) of Whitehaven, mentions that he has just been discharged from the Navy on medical grounds after five years service. He would like to know of any new members in his area. A visit from Mr. J. F. Shepherd, BR88062, of Dunfermline (R.A.F.) was another welcome surprise during the month.

Oldham.—The D.R. is glad to record that activity has been revived in this area and he has with much pleasure confirmed the appointment of Mr. F. Lees (G3PO) of 26 Bargap Road, Oldham, as Acting T.R. A meeting was held at 2HCX on January 21, when the official business included a general discussion about technical education, evening classes and suitable text-books. Members present included G2MQ, 3PO, 3TN, 2HCX and BR88616. Two non-members were very welcome visitors.

The next meeting will be held on February 18 at G2MQ, 10 Moor Street, Shaw, Oldham, at 6.30 p.m. when a Morse practice session will be included. (via G2MQ.)

Ashton-u.-Lyne.—A meeting of the Ashton-u.-Lyne and District Radio Society was held at the home of G3BY, 36 Clive Street, on December 31, 1944. The chief item was a demonstration of equipment made by members when 5043 contributed an oscilloscope with built-in time base plus X and Y amplifiers, an A.C. operated bridge for resistance and capacity and an R.C. coupled audio oscillator. 4567 brought a battery operated signal generator, valve volt-meter and a one valve pocket set. 3BY demonstrated his R.C.C. coupled U.H.F. superhet, McMurdo Silver superhet with I.F. and the "Scotsman Special" amplifier. Refreshments were provided and served by Mrs. 3BY. (via G5PX.)

P.D.M.—Circumstances are such that there seems no reason why we should not hold a P.D.M. this year and suggestions as to date and venue will be appreciated. May and June have already been reserved by other Districts so the proposed dates are either April 21-22 or July 21-22. G6CX.

DISTRICT 2 (North Eastern)

D.R.: C. A. Sharp (G6KU), 56 Moore Avenue, Wibsey, Bradford. Bfd. 10772. Scribe: H. Beadle (G8UO), 13 Chandos Street, Keighley.

Bradford.—G6KU gave a demonstration of his home-built Communications Receiver at the meeting held at his home on January 21. "Preparing for the Post-War Amateur Market" was also discussed. Those present included 4CL, 8UO, 2HDU, 6568, 6590, 7851 (Dist. 17), and 7856. Thanks are extended to Mrs. Sharp for providing tea. Congrats to 2FJD and 2HDU on having articles accepted and published in THE BULLETIN. 3HA recently discovered that his C.O. was 2AIQ.

Halifax and Sowerby Bridge.—Will any member in this area let us have some news for publication?

Leeds.—We are pleased to hear that a Radio Society has been formed in Leeds under the title "Leeds Radio and Television Society." Mr. E. Beuden is the Hon. Secretary. The first meeting was held on January 19 at Swarthmore Settlement when a lecture on "Receiver Maintenance and Repair" was given by Mr. Harland. We look forward to further reports on the progress of the Society. 6730 is building a C.R.O.

Morley.—G5YV has started a radio repair business. 5893 has built a one valve regenerative receiver for 24 metres, using an EF50 as a triode.

Keighley.—BR88112 is obtaining good results with a simple receiver using an SP2 and KT4. News from 2VO and 6NZ would be welcomed.

Sheffield.—A meeting was held at the "Dog and Partridge," Trippett Lane, on January 24, when there was an attendance of

18. After business was dealt with a "Radio Quiz" took place which proved both interesting and amusing. We were pleased to welcome 2MA of Rotherham and 4336, who was on leave from the R.A.F. All members are welcome at these meetings. Will you please try to be present at the next one on February 28? We extend congratulations to Alec Pemberton, 2JY, who was recently awarded the B.E.M. 6PJ, writing by air mail from India, says he hopes to be back home by March.

General.—5834 recently startled his family and himself by tuning in V.L.C.2 on the "All Wave" receiver. The Scribe would appreciate news from 4GJ, 4JB, 4MC, 51V and 2DUX and anyone else who can spare a moment to write. Letters have been received from 3MD, 3WP, and 4LV. 2CDR is thanked for returning the receiver circuit. G8UO.

DISTRICT 3 (West Midlands)

D.R.: V. M. Desmond (G5VM), "The Chestnuts," Hanley Castle, Worcester. Scribe: E. J. Wilson (2FDR), 48 Westbourne Road, Olton, Birmingham.

Birmingham.—A meeting of M.A.R.S. was held on Tuesday, January 16, at the Chamber of Commerce, New Street, when a most interesting talk on the "Telephone, its Invention and Development" was given by Mr. H. W. Yeats (P.O. Engineer). Thirty-two members and visitors were present.

Letters have been received from P.O. R./Mech. L. Allen (BR84497) and from P.O. R./Mech. Chater (G2LU) who wish to be remembered to everybody in District 3.

Rugby.—Eight members attended the January meeting, at which G8FM gave a talk on Duplex Telephony. 2FDR.

DISTRICT 4 (East Midlands)

Deputy D.R.: A. E. Clipstone (G8DZ), 32 Tottenbury Road, Perry Road, Basford, Nottingham.

Derby.—G8SI and 2CVV who were on leave, attended the meeting held on December 31. 4071 reports steady progress with his frequency standard, 6XM has his signal generator and B.F.O. going according to plan. 5YY has acquired a super-dial for his communications receiver. At 20U the burning out of a new mains transformer has stopped progress on his C.R.O. Next meeting, February 25, 2.30 p.m. at G3OZ. G2OU.

Leicester.—The January meeting is reported upon under Nottingham. Morse classes are progressing satisfactorily. Members interested are asked to contact the T.R. at 292 Gwendolen Road. Next meeting, February 18, 2.30 p.m. at G2IX. BR85605.

Mansfield and Sutton.—The T.R. was pleased to receive visits from G3XA and 2APT both home from the M.E. Other local members on leave are invited to call on him at 18 Farndale Road, Sutton in Ashfield. 2DTQ wishes to be remembered to all old friends and seeks news of the "Robin Hood gang" particularly G4DS, SNS, 80T and 88A.

Northampton.—As there has been no organised activity in this town for some time the D.D.R. would be glad to hear from any member willing to arrange meetings and collect notes.

Nottingham.—The combined meeting held at the Magna Cinema, Wigston at the invitation of G4FO, proved a great success, no less than 35 members and friends being present, despite bad travelling conditions. The highlight of the programme was a demonstration of a steel-wire recording machine with special amplifier, incorporating a tone control system designed by the lecturer Mr. Dryden. Later, members were given an opportunity to record and hear their voices played back to them. It is possible with this ingenious equipment to produce records of an hour's duration. Mr. Dryden has been invited to prepare an article for THE BULLETIN describing the recorder. As the films which were promised did not arrive W8TBD was invited to give his views on 1-7 Mc operation. He expressed the view that the band was neglected by British amateurs, but was taken to task by G2IX, 3BU, 6VD, and 8CZ, who were "top band" addicts in pre-war days, although all had to admit that the band was neglected by many amateurs.

A collection taken on behalf of the R.S.G.B. P.O.W. Fund realised 25s.

Next meeting February 25, 6.30 p.m., at G8DZ. (Please note new address.) G8DZ.

DISTRICT 6 (South-Western)

D.R.: W. B. Sydenham, B.Sc. (G5SY), Sherrington, Cleveland Road, Torquay. Torquay 2097.

Exeter.—At the meeting held on Saturday, January 6, at the Y.M.C.A., there was an attendance of sixteen, including VE4AAO, who supported us regularly while he was stationed in this area. On this occasion he flew from Kent to attend. There was no set programme, the time being devoted to tea and a real old-time rag chew. The next meeting will be held on March 10; 2.30 p.m. at the Y.M.C.A.

Taunton.—A pleasant afternoon was spent at the Y.M.C.A. on January 14. A letter of apology was read from the T.R.

who was unable to attend owing to other pressing engagements. A film show was kindly given by G4OM. 5AK, 5GT, 6LY and 2DRU were also present. The Scribe, G5AK, has received visits from G2JM and 3SB.

Cornwall.—Will those interested in supporting meetings in the Penzance area please get in touch with H. Turner, G6ZT, c/o 14 South Terrace, Penzance? G5SY.

Forthcoming Events

- Feb. 18 Romford and District Amateur Radio Society, 3 p.m. at the Y.M.C.A., North Street, Romford.
- Feb. 18 District 4 (Leicester), 2.30 p.m. at G2IX, 19 Francis Avenue, Braunstone.
- Feb. 18 District 3 (Rugby), 3 p.m. at the Percival Guildhouse.
- Feb. 24 District 2, 7 p.m. at G5VD, 12 Langley Terrace, Crosland Road, Oakes, Huddersfield. Phone 4946.
- Feb. 24 District 15, 3 p.m. at The Excelsior Hotel, 1 Ladbroke Gardens, Notting Hill, W.11. Discussion on Post-war receiver requirements.
- Feb. 25 District 4 (Derby), 2.30 p.m. at G3OZ, 2 Franklyn Drive, Boulton Lane, Alvaston.
- Feb. 25 District 4 (Nottingham), 6.30 p.m. at G8DZ, 32 Tetterbury Road, Perry Road, Basford.
- Feb. 25 District 5, 3 p.m. at 17 Colston Ave, Bristol.
- Feb. 25 District 12, 3 p.m. at BR53386, 22 Church Hill, Winchmore Hill. Bus 224 from Southgate Tube Station to Chase Side Tavern.
- Feb. 25 District 7 (Guildford), 3 p.m. at The Cinema Café, Woodbridge Road.
- Feb. 25 Scotland "A" District, 3 p.m. in Royal Technical College, George Street, Glasgow. Enter by Montrose Street.
- Feb. 27 District 7 (Reading), 6.30 p.m. at Palmer Hall, West Street.
- Mar. 4 Districts 7 and 13. Combined Meeting, 3 p.m. at Y.M.C.A., North End, West Croydon.
- Mar. 4 District 15 (West London), 5.30 p.m. at BR56275, 51 Rushall Avenue, Bedford Park, Chiswick, W.4. Talk by G3NR on "Manufacture of Quartz Crystals." (District or Piccadilly to Chiswick Park, or Buses 27, 55 or 88.)
- Mar. 10 District (Exeter), 2.30 p.m. at Y.M.C.A.
- Mar. 13 District 7 (Reading), 7 p.m. at Palmer Hall, West Street, Morse instruction.
- Mar. 20 Midland Amateur Radio Society, 6.30 p.m. at Chamber of Commerce, New Street, Birmingham. General Meeting.

DISTRICT 7 (Southern)

D.R.: W. E. Russell (G5WP), "Milestones," Mayford, Woking, Surrey. Woking 1589.

Bournemouth.—The next meeting will be held at 3 p.m. on February 24, at 45 Parkwood Road, Bournemouth, when Mr. V. Coxall, M.Sc., BR58827, will talk on "Radio Reception at U.H.F." We were pleased to welcome "Early Bird" Raven, 3HG, at our December meeting, when 2NS and 8430 described, and demonstrated with great success, their variable delay break-in gear. 5BT of Croydon was here recently.

2HNO.

Coulson.—A welcome is extended to 3179, who has rejoined the Society. He is now with the B.L.A. (R. Sigs.). 9302, L.A.C. Dickson, is an R.A.F. Radio Mech. in South Wales. Welcome to 8766, a new lady member, also to 8953, 8955, 9013, 9035, 9110, 9147 and FR5105. The T.R. hopes to see some of them at Croydon meetings in the near future. BR53003.

Croydon.—2CVA is stationed in this area and hopes to attend meetings. Welcome to new members 34N, 9024 and 9084. Come along to meetings!

G2DP will demonstrate his 56/112 Mc/s. converter and answer questions at the March meeting. See "Forthcoming Events" for date and time. In April 5BT will give a talk and possibly a demonstration of his "scopes. All members are welcome.

G2DP.

Kingston-on-Thames.—G3II has received visits from 2ACA, 2ALP, 4903 and 8590 after last month's invitation to local members to look him up at 6 Buckingham Road, Kingston, on Sundays. With a little more support regular meetings in this area will again become a strong possibility.

Reading.—At the December meeting 2YI initiated a most interesting discussion on meters for general amateur use. V87RP (Ceylon), who has come to live in Reading for a few months, was made welcome at the meeting.

With the January meeting the series of meetings reach their first anniversary. The thanks of all concerned are due to 2YI, 2BTY, 2BYZ and 2DIO, who together with the Secretary, 4573, have put in a lot of work in rescuing Society affairs in Reading from their war-time doldrums. See "Forthcoming Events" for details of the next meeting.

Guildford.—The next meeting will be held at The Cinema Café, Woodbridge Road, Guildford, on Sunday, February 25, at 3 p.m.

Once again we have a most interesting afternoon arranged as Mr. E. A. Dedman, 2NH, will talk on "Crystal Filters in Amateur Communication Receivers." Don't forget at the last meeting 35 members were present which just about taxed the accommodation. It is essential to let 5RS, 20 Hedgeway, Guildford, know in good time if you intend being present.

Overseas.—Sgt. Markwick, 2YK, after looking in at New York en route, is sunning himself in Nassau, Bahamas, with the R.A.F. He found the station Signals Officer to be F./O. Wickham, 8WM, of Epsom, but there do not appear to be any other members of the fraternity on the Island. Sigm. P. Gammon, 3VB, foregathered with twelve others on "The Rock" to discuss the topic of the day the world over—what are our post-war tickets going to read like? 2IO is o/c and 6OB and GM5HP are members of the gang. G5WP.

DISTRICT 10 (South Wales & Monmouthshire)

Acting D.R.: H. H. Phillips (GW4KQ), 80 Cottrell Road, Roath Park, Cardiff. Cardiff 4512 during business hours.

Cardiff.—Council's reply to suggestions made on an earlier occasion was presented to a well attended meeting held on January 21 and much discussion ensued thereon. The post-war development of the Society being the main topic and considered of vital importance, the meeting was eventually adjourned to Sunday, February 25, at 2.30 p.m. and will again be resumed at the home of GW8UH, 29 Ladysmith Road, Roath Park (off Penylan Hill) Cardiff. A cordial invitation to be present is extended to all those in a position to attend.

Swansea.—It is hoped to arrange an early meeting here should the attendance warrant and whilst several have already intimated their desire to be present on such an occasion, GW4CC (W. Bowen, Thistle Dhu, Upper Killay) would like to hear from any other member interested. The Acting D.R. hopes to attend should the proposed meeting be arranged. It is learned that G5KT was recently stationed in Swansea. 4CC has received good news of F3RP and mentions that E17M continues to make progress after his serious accident reported in an earlier issue.

Newport.—Congratulations to 2JL, now living in the Home Counties upon the arrival of Robert John Stuart on December 13, 1944. GW4KQ.

DISTRICT 11 (North Wales)

Deputy D.R.: C. Spillane (BR51060), "Woodside," Meliden Road, Prestatyn.

An informal meeting was held at "The Savoy," Prestatyn, on January 21, when G2GW, 1060, 4444, 8265 and 9307 attended. BR5444 exhibited a new V.H.F. receiver which he has just constructed, whilst the rest of the afternoon was spent in general discussion.

9307 (Rhyl) is in radio engineering locally and also working full time on government work. 2FUD in the course of a further long letter reports meeting 7529 and 8761 during Christmas. 7529 is now working at a radio factory in the Swindon area. Cpl. Smith, 3044 (R. Sigs.), is reported to be in Australia. B. V. Dore, BR5520 (R.C.A.F.), has arrived back in Canada. Junior Associate Howells would like to exchange correspondence with other junior associates in the district. His home is in Newtown, Montgomeryshire.

A welcome is extended to the seven new District 11 members whose names appeared last month. BR51060 would like to hear from them and if possible meet them at the first opportunity.

District members will join the writer in offering condolences to the family of Mr. Geo. Wain, BR52866, who so recently joined the ranks of the "Silent Keys." In his passing we have lost a very enthusiastic and valuable member. BR51060.

DISTRICT 12 (London North and Herts)

D.R.: S. Buckingham (G5QF), 41 Brunswick Park Road, New Southgate, N.11. Enterprise 3112.

North London.—The January meeting held at 2DHF was attended by G6OT, 5QF, 2DWV, BR53386, 4249, 7507, 8075, 8286 and 9437. The discussion on frequency meters was postponed to allow the circular on post-war equipment sent out by H.Q. to be discussed. Many constructive ideas were put forward and memories of some pre-war equipment were revived. 2DHF exhibited a Valve Voltmeter in the course of construction. Judging by the number of persons who made copies of the circuit there should shortly be an adequate supply of this type of instrument in District 12! We learn that "Bill" Winsford, G4DC, is now settled in Weston-super-Mare. He reports all well, but says he is without mains or radio! G5QF records letters from BR54973 and 9265.

St. Albans.—Local caterers having proved unco-operative, an attempt will be made to arrange the P.D.M. elsewhere in the District. During the past year 16 members paid 47 visits to the T.R. and four others were contacted by post. Letters have been received from BR55036 and 9265 and also 2CNC, who has just returned from a spell in hospital—he is busy constructing a V.H.F. receiver.

STOP PRESS.—P.D.M. has been arranged for Saturday, June 30th, at the Salisbury Hotel, Barnet. Full details will be published later, meanwhile please reserve the date. G5QF.

DISTRICT 13 (London South)

Acting D.R.: S. E. Langley (G3ST), 19 Elm Gardens, Mitcham, Surrey.

The January meeting was supported by G2DP, 2HP, 2RF, 2VB, 311, 3ST, 3TV, 4N1, 5BT, 5KH, 5MI, BR51545, 6655, 6894, 7943, 8417, 8996, 9110, 9273 and R. Ulrick. We were glad to have 5KH with us again, also 3TV, who has recently returned to the District after a long absence. Interesting letters have been received from BR58624 (Ft./Sgt. K. W. King, R.A.F., Bombay), G3OY (Sgm. A. H. Parker, R. Sigs., C.M.F.), BR55371 (L.A.C. J. Sparrow, R.A.F., M.E.F.), BR54710 (A.C.I. D. R. Church, R.A.F., C.M.F.), G2JK (Capt. E. C. Hott, Washington, D.C., U.S.A.).

A brief account of what happened at the Annual General Meeting was given by G2DP for the benefit of those unable to be present. The usual questions came up again from several members, about post-war conditions. Here we must say again, "be patient, it's in the bag, but let's get the war over first." After tea 3ST gave a demonstration talk on his communication superhet which was successful in the recent Ann Cup award.

Congrats to G4KY (S. C. Harvey, Metropolitan Police) on his promotion to the rank of Sergeant. G3ST.

DISTRICT 14 (Eastern)

Scribe: L. J. Fuller (G6LB), 14 High Street, Walton-on-Naze, Essex.

Chelmsford.—The January meeting held at G6ZC was attended by BR58184, 7131, 3555, 3757, 7879, 2725, 5242, and G6ZC. The Society circular dealing with the Post-War Amateur Market was discussed in full, several suggestions being put forward. Chelmsford members send greetings to Mr. Mead, now training as a Radar Mechanic with the R.A.F.

Chingford.—G2HR writes from his temporary address at 32 Woodside Road, Bickley, Bromley, Kent (Imp. 1250), explaining that his absence from home has caused the cessation of meetings in Chingford. He will be pleased to hear from Chingford members and hopes that some of them will get together and revive the meetings, pending his return in the near future.

Walton-on-Naze.—The scribe has recently met several members in the Forces stationed in the area, and also Mr. Addison, a member from Brightlingsea. He was also pleased to see the D.R., G5RV, when on leave recently, and District 14 congratulates him on his promotion to Captain. G6LB.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

D.R.: H. V. Wilkins (G6WN), 539 Oldfield Lane, Sudbury Hill, Greenford, Middlesex. Byron 3369.

At the January meeting which was attended by sixteen members, we had the pleasure of welcoming our President, Mr. Gardiner, G6GR. The West London town meeting was attended by nine members and discussion took place on many and varied subjects. Our thanks are extended to Mr. and Mrs. Hindes for supplying refreshments.

It is proposed to place the whole District once again on a pre-war footing with the co-operation of existing Town Representatives. Where the T.R. is on war service it is proposed to appoint an Acting T.R. in his place to enable us to prepare the way for post-war activities. Offers to cover pre-war areas will be greatly appreciated by the D.R. Mr. Bostock, 5246, 1 Grange Road, Hayes, offers to act on behalf of SFA, so please give him your support. He intends to start meetings soon. Mr. L. C. King, 30K, 36 Lyndhurst Gardens, Pinner Hill, would welcome meetings in that area and accordingly extends an invitation to members to visit him. What about someone acting for SMA here? Mr. Grimshaw, 4542, The Palladium, Ealing 1276, is prepared to arrange Morse practices on Sunday mornings, at his flat, so give him a call and get going.

G5JL sends his ideas of post-war planning after reading the letters in the October issue. 7250 forwards another interesting letter of his experiences in Europe, 4AR was recently married while on service overseas. (Congratulations from the District, OM.) 2BMY writes from India to say they had a typical Christmas dinner out there. 2KI is now stationed in the Isle of Man, SMA has recently rejoined the Society after a lapse. He is "exiled" in Edinburgh but flies around Scotland, the islands and Northern Ireland. G6WN.

DISTRICT 16 (South Eastern)

D.D.R.: W. A. Scarr, M.A. (G2WS), 8 Beckenham Grove, Shortlands, Bromley, Kent. Scribe: E. H. Tronell (2HKU), 27 Unity Street, Sheerness, Isle of Sheppey, Kent.

Congrats to Sigm. Haylock (R. Signals) 2DHY, who married lady associate member L/Cpl. Bartholomew on January 20. He hopes to contact members in the Huddersfield area.

Vic Curling, G6VC (Northfleet) is building a receiver for amateur bands and services radio sets in his spare time. He recently spent a week with 2RB, of Nelson, Lancs. Lt. W. Crossland (R.E.M.E.), G5CI, who operated from Whitstable before the war, is now residing in Surrey, but intends returning to District 16 later on. He is a radio maintenance officer assisting in the destruction of V1. L.A.C. Cleggitt, BR52834 (R.A.F.) recently returned to the mainland after spending more than a year in the Western Isles. He would like to hear from G5XB and other members of the Maidstone Amateur Radio Society.

(Address from 2HKU.) 2HKU has built an electronic vibrator unit to deliver H.T. from L.T. He has heard from G8GR (Sheerness) now a Pilot Officer in the M.E.F.

Sussex.—Cyril Padgham, 2BCP, of 3 Clarence Road, St. Leonards-on-Sea, has heard from Ron Crookford, 2BQW, now in Italy. The latter reports having a very enjoyable tour of EIAR (Radio Bari) and was impressed with the gear. He repairs the local residents' radio sets in his spare time and receives payment in liquid form! 2BCP, who intends building an oscilloscope and valve voltmeter, would appreciate hearing from members in East Sussex, with a view to creating local activity. Lt. J. R. D. Sainsbury, R.N.V.R., 2CYW, ex-G8HV (80 Lansdowne Place, Hove, 2), would also like to contact members in the area. He sends 73 to G3GW and reminds us of "top band" days when he operated the Brentwood Amateur Radio Society's station, G8HV, at Shenfield, Essex. 2HKU.

DISTRICT 17 (Mid East)

D.R.: A. C. Simons (G5ED), Admiralty Road, Mablethorpe. Phone 69.

G8BA, 2CGL and several BR5 members have written to G3OS regarding the suggestion to hold a meeting in Gainsborough. It is hoped to publish full details next month.

G3WB is interested in a signal generator, 2FT is dividing his spare time between a new receiver and a lathe, 8562 reports that there are a number of members in Louth, including 8710, 8912 and 9100, all of whom are practising Morse. 2BQC and 8BQ are together on the Continent, 2BUB is in Belgium. 2BQC has had a landline contact with 4GI, who is in Holland. 8094 is due home from India shortly. 4390 visited the D.R. during a recent leave. 30S would like to hear from 5933. G5BD.

DISTRICT 18 (East Yorkshire)

District Scribe: S. Davidson (G6SO), 10 Sidney Street, Scarborough.

Hull.—G5CG (R.A.F.) now a Ft./Lt., has rejoined the Society. Reporting by airmail from S.E.A.C. he sends 73 to the "old gang" and hopes it will not be long before he is able to meet them again in the "White Hart"! 3PL reports contacts with 4LH, 5120 and 6185. (via G3PL.)

Scarborough.—After three years in Alexandria we say "welcome home" to P.O. Radio Mechanic Henry Wiggins, 2CP. Since his arrival he has moved to a house in the town. G6SO continues to receive a heavy postbag and some delay in replies is unavoidable at present.

York.—From the President (Mr. R. Wallwork, 7128) we learn of the activities of the Radio Club run by Archbishop Holgate Grammar School and of its continued good progress. 7128's new address is The Chestnut Guest House, 123 The Mount.

Robin Hood's Bay.—From an R.A.F. hospital in Derbyshire comes news of a new member, L.A.C. G. Skelton, 8966. He served with combined ops. and was in the thick of it on D. Day and later in France. We wish him a speedy recovery. G6SO.

DISTRICT 19 (North-Eastern)

D.R.: R. J. Bradley (G2FO), 36 Baby Road, Stockton-on-Tees.

Sunderland.—So little activity has been reported from Sunderland during the last few years that F./O. W. Stockburn, BR56849, has offered to undertake the duties of Acting T.R. in an attempt to revive interest. His address in 40 Netherburn Road, and the D.R. requests all members in Sunderland to give him their full support.

Stockton-on-Tees.—G6ZT visited the D.R. while on leave recently and wishes to be remembered to all old friends.

Darlington.—2HMK is troubled with hum in his audio amplifier—BR56943 is assisting him to eliminate it. G2FO.

Scotland

Scottish Records Officer: J. Hunter (GM6ZV), 51 Camphill Avenue, Glasgow, S.1. Langside 237.

"A" District.—The usual monthly meeting was held during January when there was a good attendance of members to hear Mr. Scott-Hay, GM2FV give a very interesting talk and display of modern short-wave receiver components. He also spoke on Constant Frequency Oscillators.

"C" District.—At the January meeting which was attended by seventeen members, Mr. J. S. Davidson spoke about "Measuring Instruments." The subject was extremely well covered and Mr. Davidson displayed various examples of meter design. GM6ZV.

Northern Ireland

D.R.: J. N. Smith (G15QX), 19 Hawthorn Drive, Belmont, Belfast, N.1. Phone 63323.

Belfast.—The general meeting of the R.S.N.I. was held on January 3 (report elsewhere in this issue). G15UR is welcomed back to membership of R.S.G.B. and R.S.N.I. He wishes to contact G2YY. Can anyone help?

G16YM reports good attendances on club nights whilst the constructional section is still busily engaged on an amplifier, which it is hoped to put on test shortly. G16VG is welcomed back after two years absence at sea with the M.N.

Congratulations to Mr. and Mrs. S. Johnston, G15SJ, on the arrival of a junior operator.

G15HU records a visit from BR58127 of Kent. He would also like to hear from any GI who cares to write. (via G15HU.) G15QX.

COUNCIL 1945**President:****ERNEST LETT GARDINER, B.Sc., G6GR.****Executive Vice-President:** S. K. Lewer, B.Sc., G6LJ.**Honorary Secretary:** H. A. M. Clark, B.Sc., G6OT.**Honorary Treasurer:** A. J. H. Watson, F.S.A.A., G2YD.**Honorary Editor:** Arthur O. Milne, G2MI.**Immediate Past President:** A. D. Gay, G6NF.

* * *

Members: F. Charman, G6CJ, D. N. Corfield, D.L.C. (Hons.), G5CD, Lt. Col. K. Morton Evans, GW5KJ, F. Hoare, G2DP, E. H. Laister, BR5386, S. E. Langley, G3ST, W. E. Russell, G5WP.

G.P.O. Liaison Officer: A. E. Watts, G6UN.**General Secretary:** John Clarricoats, G6CL.**December Council Meeting**

Resume of the Minutes of a Meeting of the Council held at New Ruskin House, Little Russell Street, London, W.C.1, on Monday, December 11, 1944, at 6 p.m.

Present: Messrs. E. L. Gardiner (President), H. A. M. Clark, A. J. H. Watson, A. O. Milne, A. D. Gay, A. E. Watts, F. Charman, D. N. Corfield, F. G. Hoare, W. E. Russell, and J. Clarricoats (General Secretary).

Apologies were received from Mr. S. K. Lewer, Mr. H. W. Stacey, and Gp./Capt. G. R. Scott Farnie.

(1) It was unanimously resolved to elect 167 Corporate Members (132 proposed by Corporate Members and 35 supported by references), 19 Associates and 4 Junior Associates. Four Junior Associates were transferred to Corporate Membership.

(2) Gp./Capt. G. R. Scott Farnie, GW5FI, tendered his resignation, because of Service duties, from the position of District 10 Representative. Mr. Phillips, GW4KQ (Deputy D.R.) was appointed Acting D.R. for South Wales.

(3) It was reported that deliveries of the 11th printing of the Handbook had commenced and that orders for 10,157 copies had been received to date.

(4) A report received from Mr. H. H. Phillips, GW4KQ, dealing with post-war plans and other matters, was considered and a reply drafted by the President endorsed.

(5) It was agreed to send to all D.R.s. a list of radio components and valves which the Council considers should be made available by British manufacturers after the war, suggesting that the list be distributed to T.R.s. and others with a request for additional items for inclusion therein. On receipt of this additional information, a meeting with interested manufacturers will be arranged. It was agreed to request that all additional information be forwarded to H.Q.s. by February 28, 1945.

(6) It was reported that arrangements are in hand for a further meeting with the G.P.O. to discuss post-war licence matters.

(7) Attention was drawn to an article in the December issue of *Wireless World* entitled "Radio Heating." The author of the article had suggested that certain frequencies, some of which fall in the amateur bands, be assigned to this type of industrial equipment. The Liaison Committee were instructed to make inquiries from the G.P.O. in regard to this matter.

The meeting closed at 9.5 p.m.

New Membership Record Card

Commencing January 1, 1945, a new membership record card has been introduced by Headquarters. The new card which replaces the Service card, will be sent to each member with his Statement of Account. The purpose of the card is to provide the Society with a full record of the war service (if any) of its members. In addition every member will be asked to append a specimen signature to assist Headquarters in checking signatures to application forms.

Civilians, as well as Service members, are requested to fill in and return the card, thereby making Headquarters record complete. The inquiry in regard to age applies only to Junior Associates and not as some appear to think to Corporate and Associate Members. In the case of those serving abroad relatives are asked to send the card to the member concerned for completion.

Changes of Address

Members who change their permanent address are asked to note that at least one month must elapse before the change can become effective for BULLETIN despatch purposes.

The Society cannot, under existing conditions, send the BULLETIN direct to a Service address. Members on Active Service should arrange for re-direction from their home address. Provided re-direction is effected promptly, no additional postage is required.

Technical Publications

The attention of members is directed to the fact that no facilities exist at Headquarters for obtaining technical publications other than the American publications listed below. Considerable inconvenience is caused by members who send cheques and postal orders for other publishers' books when forwarding either their subscription or an order for American publications.

American Publications

The Society is in a position to accept orders for the following publications which are ordered individually from America:

"QST" (Official monthly publication of The American Radio Relay League). By subscription, per annum	17s. 6d.
"The Radio Amateur's Handbook" (A.R.R.L.)	10s. 6d.
"The Radio Amateur's Handbook"—Special Defence Edition (A.R.R.L.)	8s. 6d.
"The Antenna Handbook" (A.R.R.L.)	4s. 0d.
"A Course in Radio Fundamentals" (A.R.R.L.)	3s. 6d.
"The Radio Handbook" (Editors and Engineers Los Angeles)	12s. 0d.
"Radio" (Monthly publication of Radio Ltd.) per annum	21s. 0d.

Orders must be accompanied by a remittance made payable to the Society and rates and prices are subject to alteration without previous notice. Delivery can be expected in about 12 weeks from date of order. Service Addresses must not be used. Single copies of text books only may be ordered.

Members who change their address during the currency of a subscription to QST or Radio should advise the publishers direct.

Returned Bulletins

Every month many copies of THE BULLETIN are returned to Headquarters because the address to which they have been despatched no longer holds good. This applies in particular to copies redirected to Service members from their permanent address.

We reiterate that immediately a BULLETIN is returned the appropriate stencil plate is removed from file until such time as the member concerned communicates with Headquarters.

Lost BULLETINS cannot under any circumstances be replaced at the present time.

Headquarters Address

A considerable amount of official Society correspondence is still being delivered to the General Secretary's private address. This, in spite of frequent requests for all R.S.G.B. correspondence to be sent to New Ruskin House, 28/30 Little Russell Street, London, W.C.1.

Those who act as sponsors to applicants for membership are kindly requested to record the above address on the application form, if the latter bears the temporary war-time address of the Society, viz. 16 Ashridge Gardens, Palmers Green, London, N.13.

When communicating with Headquarters the Society's name must *always* preface the address. Embarrassment and delays are often caused because letters intended for the Society are opened by one of the other firms operating from New Ruskin House.

R.S.G.B. Prisoners of War Fund

DONATIONS.—The General Secretary acknowledges with thanks, on behalf of Council, receipt of donations from: J. H. Brazzill, G3WP, 5s.; R. W. Benn, G275, 6s. 6d.; Mrs. D. Neale (widow of Reg Neale, G6GZ), £1 1s.; District 4, per G8DZ, £2 12s. 6d.; District 13 per G3ST, £3; J. Bulck, G3XJ, 5s.; E. Fiddian, 100s. 5s.; P. Freeman, G726, 8s.; R. O. Burman, 7573, 5s.; A. G. M. Collection, £9 11s.; J. Teasdale, G8VV, 10s.; T. Eyre, G3CC, £1; E. Hewines, G4CT, £1; H. Turner, G6TZ, £1; J. R. Davies, 5966, 5s.; Mrs. E. Wilson (for 4008), 2s. 6d.; F. F. Gregory, 7593, 3s.; Mrs. Oughton (for G8BG), 5s.; O. C. HPI, 4044, 10s.; J. A. F. Newman, 4095, 5s.; S. E. Jones, 2FWA, 2s. 6d.; W. B. Cooke, 7622, 2s. 6d.; District 7 (Reading), £2 8s.; R.S.N.I., per G15X, £2 16s. 6d.; J. D. Kingston, G3VK, 6s.; W. P. Stevens, 4022, 5s.; W. E. Beck, 2ALG, 5s.; J. Paddon, G2IS, £3; Anon., 9s. 1d.; C. T. Barrington, G6LY, 15s.; N. Norman, G5MI, £1 11s.; H. Arnfield, G3LX, £1; Anon., 15s.; R. E. Friend, G4NV, 10s.; R. Williamson, 7791, 5s.; T. C. Tyrrell-Lewis, 3169, 5s.; D. R. E. Pressey, 7559, 5s.; A. White, 7751, 10s.; R. A. Beaumont, G3CS, 5s.; D. Marvin, 9000, 4s. 6d.; C. Wilkinson, 4390 (per G5BD), 10s.; E. Wills, 9281, 7s. 6d.; District 13 per G3ST, 17s.

Total receipts to date £1,470 5s. 8d. Total expenditure to date £895 17s. 1d.; Balance in hand as at 30th January, 1945: European fund £204 8s. 7d. Far East fund £370.

Silent Keys

It is with deep regret that we record the passing of these members:—

Mr. R. A. Brown, BR52671, of Alexandra Park, London.

Mr. G. Mathias, BR55823, of Llanelly, South Wales.

Tel. H. D. Scragg, R.N.V.R., BR56821, of Nuneaton, Warwickshire.

Ft./Sgt. E. Slack, R.A.F., BR56979, of East Stanley, Co. Durham.

Sales Department

The following items are now in stock at Headquarters:—

Amateur Radio Handbook, cloth cover ..	6s. 0d.
Amateur Radio Handbook, paper cover ..	4s. 0d.
Radio Handbook Supplement, cloth cover ..	5s. 0d.
Radio Handbook Supplement, paper cover ..	2s. 9d.
Kilohertz-Metres Conversion Tables (Booklet) ..	1s. 3d.
Car Plaque of Emblem ..	3s. 6d.
Rubber Stamp of Emblem ..	3s. 0d.
Members' Note-paper (in packets of 100 sheets) ..	3s. 6d.

All the above items are post free, cash with order.

R.E.F. is Operating Again

We are happy to announce that Réseau des Emetteurs Français (French Section of the I.A.R.U.) is again functioning. In a letter dated January 8, M. Robert Larcher, F8BU, reports that he has reassumed his duties as President with R. Desgras, F8OC, and J. Bastial, F8JD, as Vice Presidents. L. Aubry, F8TM, is the Hon. Secretary and Dr. Tiffeneau, F8OB, the Hon. Treasurer. The temporary Headquarters of R.E.F. are at 1 Rue des Tanneries, Paris, 13, the home of the President. M. Larcher sends greetings to all British Isles and British Empire amateurs, and especially to those now serving in France.

Reseau Belge Also Active

M. Paul de Neck, ON4U, President of Reseau Belge (Belgian Section of the I.A.R.U.) writing under date of December 23 from his home address (312 Rue Royale, Brussels) extends greetings to all old friends and looks forward to meeting many of our members now serving in Belgium.

Technical Literature to the Liberated Countries

Up to the time of going to press the sending of technical literature (which includes the R.S.G.B. BULLETIN, Handbook and Supplement) to the liberated countries is forbidden except to members serving with the Armed Forces.

Headquarters will, as soon as the ban is lifted, arrange to send THE BULLETIN and other publications to R.E.F. and R.B. In the meantime it is hoped that members serving in France and Belgium will make every effort to contact local amateurs and explain the position.

Radio Society of Northern Ireland

A General meeting of the Radio Society of Northern Ireland was held on Wednesday, January 3, 1945, in the Y.M.C.A., Belfast, when a good attendance was recorded. Amongst the visitors were VE4TJ, VE5UR, GMSMX, 2FJZ, BR84196, 6166, 7937, 8350, 8351, 8690, 8795 and 9184.

Mr. J. N. Smith, G15QX (Vice-President) welcomed all present, and especially VE4TJ with whom he said he had had several pleasant QSO's in the past. Mr. Smith officially reported that R.S.N.I. was now affiliated to the R.S.G.B., an announcement which was acclaimed by all present.

The following Officers and Committee were elected for the year 1945:—

President: (vacant). **Vice-Presidents:** Messrs. F. A. Robb, G1GKT, R. Barr, Jnr., G15UR, and J. N. Smith, G15QX. **Chairman:** Mr. L. Grogan. **Vice-Chairman:** Mr. A. T. Kennedy, G13KN. **Honorary Secretary:** Mr. R. S. Holden, G15HU. **Honorary Treasurer:** Mr. W. M. Macauley, 2FIQ. **Committee:** Messrs. T. F. Fergie, BR84351, S. R. Watson, G1SGK, H. Carmichael, 2CHJ, J. Jensen, 2DGU, and J. M. Hiken, G15FN. Later in the meeting several of the visitors applied for membership. A collection taken on behalf of the R.S.G.B. P.O.W. Fund realised the sum of £2 16s. 6d.

(Monthly meetings of R.S.N.I. are now being held. Details from Mr. R. S. Holden, G15HU.—Ed.)

EXCHANGE & MART-ADVERTISEMENT RATES

MEMBERS' private advertisements 2d. per word, minimum 3s. **TRADE advertisements** 4d. per word, minimum 6s. **Box Numbers:** 6 words, plus 1s. **TERMS:** Cash with order. All copy and payments to be sent direct to Advertisement Managers, Parris Advertising Ltd., 121 Kingsway, London, W.C.2, by the 30th of the month for following month's issue.

Advertisers and buyers are reminded that under Defence Regulations 1939, Statutory Rules and Orders 1940, Number 1689 a permit (T 99 G) must be obtained before sale or purchase of certain electrical and wireless apparatus, particularly such valves and apparatus as are applicable to wireless transmission.

BRAND New components only, at list prices, for discriminating amateurs and professional constructors. **SUPPLIERS** to British and Allied Services and Government Departments. AVO and Weston test equipment and meters. Cossor and G.E.C. cathode ray tubes. T.C.C. and B & I condensers. Erie resistors. Wirewound precision resistors. Colvern w.w. Potentiometers. Keston mains transformers, chokes and output transformers. Londex relays. Rothermel pickups and potentiometers. Instrument and wavechange switches. Ceramics. J.B. single, 2 and 3-gang vari condensers. Celestion speakers and Vitavox. **SERVICE** includes circuits, practical help in construction, crystal calibration of receivers and oscillators. Unlimited resources for technical information. Specialists in short-wave work for amateurs, etc. Business hours 9 to 5-30 Mon. to Sat. inc., except Thursday 9 to 1.—**TELE-RADIO (1943) LTD.**, 177A Edgware Road, London, W.2. (Corner of Edgware Road and Marylebone Road.) Phone: Pad. 6116.

ALL KINDS OF PRINT.—Send your enquiries to G6MN. Castlemount, Workop.

AMATEUR has for disposal some spare gear. All best quality. Eddystone, Ferranti, Wharfedale, etc. Also some technical books.—S.A.E. for list, to L. WHARMBY, 33 Wicktree Lane, Fallowfield, Manchester.

"BUG" Key wanted. Good condition, state price, etc.—Box 1807, PARRS, 121 Kingsway, London, W.C.2.

EXCHANGE American 5v. radio 100-250v. A.C. or D.C. for Battery set. Sale: 3 Bakers 6v. field loudspeakers, 75s. Accumulator charger 110 A.C. to charge 4v. and 120v.; suitable resistances for higher input.—HILL, Robin Hood, Catsfield, Battle, Sussex.

FOR SALE.—9-valve superhet plus preselector; Brown's phones and Magnavox speaker, 195-255v. A.C., £15. Phillips 200-240v. D.C. to A.C. vibrator converter, 30s. Scarcely used Underwood portable typewriter, £25.—G6ZY. 5 Stanwix Gardens, London, W.3.

FOR SALE.—Taylor Model 90 Test meter, with case; as new, £12.—G3OS, 24 Woods Terrace, Gainsborough.

FOR SALE.—Acorus, 955, 954, emission as new. £1 each.—WOODWARD, 59 Belgrave Avenue, Watford.

GRAMPIAN Amplifier, Type No. D.2, portable, complete with speaker, £18. Or what have you? One Zonophone Pick-up and tone arm, 35s. New valves: 6K7G, 6K8G, 5Z4, 6F6G, 9s. each. Wanted: 35 M.M. Camera also "Bug" Key.—FORD, 2DWW, 55 John St., Dunoon, Argyllshire.

INFORMATION.—Loan service sheet required for Armstrong "Colonial" Chassis. For sale: five volumes *Practical Electrical Engineering* by Newnes, £4 10s. or exchange components.—BR87763, 30 Sea Road, Boscombe, Hants.

MONOMARK service.—Permanent London address. Letters redirected. Confidential. 5s. p.a. Royal patronage. Key tag 9d.—Write BM/MON07A, W.C.1.

NEW broadcast band coil unit for National HRO receiver, £7 10s.—Box 512, PARRS, 121 Kingsway, London, W.C.2.

RADIO. Fully experienced technical salesman wanted. Permanency.—Full particulars, salary required, etc., to BERRY'S (Short Wave) Ltd., 25 High Holborn, London, W.C.1.

RADIOS, Speakers, Electrical appliances repaired. Good stocks of Valves, Radio Components and Electrical goods.—Radio Service Depot, Donnington Wood, Wellington, Shropshire.

SALE.—Large selection of receiving and transmitting components, transformers and valves, etc. S.A.E. for list.—2DJA, 137 Randall Avenue, Cricklewood, London, N.W.2.

SALE.—Two good 4-valve universal superhets. One incorporates push buttons. Both new.—H. GREENWOOD, "Glencairn," Illingworth, Halifax.

SALE.—Govt. surplus—laboratory type potentiometers 200,000 ohms wirewound, 31" diam., ea. 10s. Condensers T.C.C. 0.1uf. 5Kv wkg., ea. 12s. 6d. Potentiometers Morganite 1 and 2 mega, ea. 2s. 6d. 10-pin screened plugs and sockets, ea. 1s. 6d.—HUSTON, BR89233, 90 Bradford Rd., Stretford, Manchester.

SALE.—Zenith fil. trans. 200/250 pri. 7-5v. twice. Approx. wt. 30lbs. Size 6" x 8" x 6". Lissen Hi-Q 3 bat. rec. 41/200 metres, new valves. Offers.—BR86878, The Cottage, Green Street, Galashiels.

WANTED.—Two epyclle drives, three extension controls No. 1008, two miniature dials, No. 1099, Eddystone.—J. WOOD, 4 Seniors Yard, Preston Street, Batley, Yorks.

WANTED.—Emerson 117P7 valve.—MATTHEWS, 36 Olma Road, Dunstable, Beds.

WANTED.—Eddystone type 1070 full vision dial.—Box 525, PARRS, 121 Kingsway, London, W.C.2.

WANTED.—Electric gramophone motor, 230v., A.C., 50cy. Induction preferred, steady silent running essential. State make, condition and price.—2AHN, 103, Colworth Road, Leytonstone, London, E.11.

WANTED.—Hallcrafters 12" speaker in cabinet to match SX17 or, SX23 speaker complete in cabinet, as supplied with SX23. Exchange RME69 speaker in cabinet, or price.—Full details to BARNETT, 14 Common Road, Evesham, Worcs.

WANTED urgently, for design purposes. *All-wave Radio, Radio, Q.S.T., Television and Short-Wave World* (especially May, 1939) or similar magazines 1935 onwards. State prices.—BR88183, "Fairhaven," 17 Dunmoll Drive, Carlisle.

WANTED.—Universal Avo Minor; please state price.—W. MACDONALD, Brae Gardens, Dingwall, Ross-shire.

WANTED.—D.C. valves: DPT with side terminal; DH, DSB, VDS, DL, DHD, VDSB, DS. Filament and emission must be sound. For sale.—1-4 types: 1A7GT, IH5GT, IC5GT.—Particulars to, ARMSTRONG, North Hall, Basingstoke, Hants.

WANTED.—Copies *Wireless World, Electronic Engineering, Wireless Engineer* 1930-1942, and any copies *Communications, Electronics, Bell System Journal, Proc. I.R.E.*, etc.—Send details and prices to BR84903, 14 Pine Gardens, Surbiton, Surrey.

40-60 watt Amplifier Modulator. GJ7. 6C5 push-pull 6C5's, push-pull 6L6's. Thordarson transformers throughout. Negative feedback, tone controls, etc., never used. Less power pack. Best offer accepted.—BR83789, 24A Watcombe Road, Bournemouth.

PATENTS AND TRADE MARKS

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. Handbook and Advice on Patents and Trade Marks free. Phone: City 6161. 50 years' refs.

BERRY'S (SHORT-WAVE) LTD.

In addition to the usual radio parts, we carry a most complete range of

RADIO & ELECTRONIC EQUIPMENT

including C.R. Tubes, 24", £3 6s. 0d. 4½" £6 1s. 0d. Meters, 0/5 ma, 57/6; 0/1, 75/6. Meico 5w Amplifier, £16 10s. 0d. Rothermel Crystal Mikehead, £4 15s. Pickups, 73/6, 78/9. Ceramic S.W. Variables: .0001, 4/6; .00016, 4/9; 15 mmf., 3/6; 25 mmf., 3/9; 40 mmf., 4/6; 75 mmf. midget, 6/-. Precision 4" S.M. Dial, 9/1, with driving head and vernier, 35/-. S.M. Drive, 8/1, with station named dial escutcheon and glass, 8/6. "P" Coils, 2/3, 2/6. I.F.s, 7/6. Metal Cabinets with hinged lid, panel and chassis, 39/6, 63/-. Jacks and Plugs, 2/6 each. S.W.H.F. Chokes, 2/6. All-wave 2.5 ma, 3/6. Toggle and Rotary switches, Ceramic Valve-bases, Stand-offs, Feed Throughs, Formers, Radio Manuals. Send I.d. stamp for full list "R.S." to:—

25 High Holborn, LONDON, W.C.1

(Telephone: HOLborn 6231)

RELAYS

The wide range of Londex Relays includes a variety of TYPES APPROVED

by
M.A.P., AIR MINISTRY
and ADMIRALTY.

Ask for details and leaflet, 205/TR.

LONDEX LTD.
MANUFACTURERS OF RELAYS

Anerley Works, 207, Anerley Road, London, S.E.20
Phone: SYDenham 6258/9.

MORE extracts from
letters sent in by CANDLER students

1 Lesson. "I have studied Lesson 1 according to your instructions, and in spite of my lack of spare time and very short practice periods, I feel myself that I am progressing well."—Ref. 984. A. F.

2 Lessons. "I am very satisfied with the first two lessons and have improved considerably, despite the fact that these were only elementary lessons."—Ref. 1938. A. F. M.

3 Lessons. "I have just completed lessons 1 to 3. . . . I can tell there is a marked difference by just learning the first three." . . . "My morse has improved considerably."—Ref. 1935. P. B.

4 Lessons. "I have just finished lesson 4. . . . I am getting on fine with my sending and receiving speeds. The other week I had my A.T.C. Morse Exam., and I passed 100 per cent."—Ref. 1661. J. R. B.

All the above students are taking the JUNIOR Code Course.

NEXT MONTH we will give you extracts from letters sent in by CANDLER students who are taking the ADVANCED Code Course.

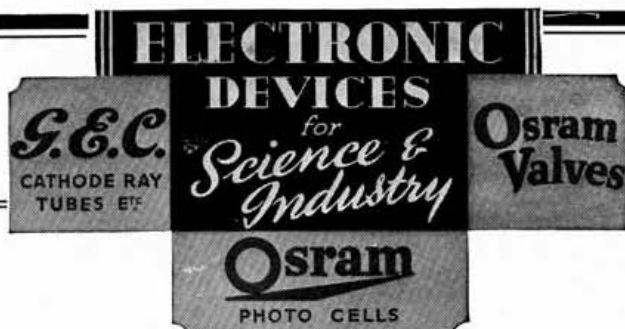
Send for the Candler "BOOK OF FACTS." Free on request. It gives full details of the Candler Junior and Advanced Morse Code Courses, for **Beginners and Operators.**

(Courses supplied on Cash or Monthly Payment Terms.)

THE CANDLER SYSTEM CO.
(Room 55), 121 Kingsway, London, W.C.2

Candler System Co., Denver, Colorado, U.S.A.

**THE GENERAL
ELECTRIC Co. Ltd.**
Magnet House, Kingsway
LONDON W.C.2.



The G.E.C. is foremost in the design, production and supply of radio valves and electronic devices as being essential links in the national effort to secure a speedy victory.

Thermionic Valves, Cathode Ray Tubes and associated Electronic Devices will inevitably become increasingly necessary in post-war application to scientific development in all spheres. Here are just a few examples:—

Navigational Aids.
Oscilloscopes for Industrial and
Scientific Research.
Valve Control Devices and
Electronic Switches.

Public Address Equipment
and Alarm Systems.
High Frequency Heating.
Instruments of all kinds.



ALWAYS ON DUTY

EDDYSTONE

358X COMMUNICATION
RECEIVER



ONLY AVAILABLE
AGAINST PRIORITY

THE RECEIVER MAY BE INSPECTED
between 9 a.m. and 4 p.m. (Saturdays 9 a.m. to 12 noon)

30 Page Booklet available at 2/6 Post Free.



LONDON AGENTS:

WEBB'S *Radio*

14, SOHO ST. LONDON, W.1.

Phone: GERvard 2089

MANUFACTURED BY:

STRATTON & CO. LTD., EDDYSTONE WORKS, BIRMINGHAM

Phone: PRIORY 2231

Cables: "STRATNOID" BIRMINGHAM